## 1

### 1NC—OFF

#### Space is an intrinsic part of India’s soft power expansion and they’re set to rapidly scale now.

Sarthak Kathayat, Sarthak Kathayat is a student at Jamia Millia Islamia, India., NIICE NEPAL, 11-1-2020, "Soft Power and India’s Space Diplomacy," https://niice.org.np/archives/6420 TDI

In international relations, soft power is the ability of any country to persuade other countries to do what it wants without the use of force. According to Joseph Nye Jr., soft power is – getting others to want the outcomes that you want – co-opts people rather than coerces them. As compared to hard power, soft power takes relatively longer to built as its intangible resources develop over a long time. Soft power tends to change other party’s attitude to the end where she acts voluntarily in a way which is different to her usual behaviour. Several characteristics of the current world order like globalisation driven economic interdependence, rise of transnational actors, resurgence of nationalism in weak states, the spread of military technology and the changed nature of international political problems have significantly reduced the effectiveness of hard power strategies. The most noteworthy example of a foreign policy misadventure based solely on hard power strategies is the 2003 US invasion of Iraq. Soft power also has its own weakness. However, the ineffectiveness of soft power strategies is an exception. In longer-term, soft power strategies appear to be more effective in the contemporary world order than the hard power. One such tool of soft power is the space technology and space diplomacy. Space technology are increasingly viewed as a crucial instrument of soft power as states have now understood the direct relation between the technological feats and global prestige that follows. Expertise in rocket science puts a state on a higher pedestal than the countries who are still struggling in the domain. Moreover, expertise in rocket science ensues significant strategic implications. The output delivered has noteworthy social and economic relevance with a massive growth potential. In a broadening concept of security that encompasses other dimensions such as economic, environmental and political, Indian space programme has been distinctive and lucid in the way it simultaneously addresses the requirements of the Indian citizenry and the state collectively in all the dimensions. Despite being challenged by numerous embargoes and technology denial regimes during Cold War, Indian space programme has emerged as the most cost-effective and successful space programme in the world. India’s space programme has been a tremendous achievement for a developing country which despite being faced with many challenges used space as a crucial mechanism to lift its people out of poverty through education, social and economic programmes. With the course of time, India’s space policy has become an intrinsic part of India’s foreign policy to strengthen India’s position as a dominant power in South Asia. Indian Space Programme India’s space programme has been seen making efforts in projecting soft power which is especially evident through its new commitment to planetary exploration and human spaceflight. The Chandrayaan-1 and Mangalyaan-1 mission cleared the fact that India now looks at space as a standard of global standing. India’s soft power has witnessed a progression with an increasingly successful participation in global space economy through ISRO’s commercial arm, Antrix Corporation. India’s growing influence on the global space economy has been an indication of its changing stature in international arena. India has also been involved in capacity building initiatives. It has successfully established itself as a leader in terms of healthcare provisions through satellite-based telemedicine. India hosts the largest telemedicine network in South Asia which has also expanded to the African continent. A non-profit Indian organisation named Apollo Telemedicine Networking Foundation has been involved in telemedicine services with dedicated centres in Iraq, Yemen, Kazakhstan and Myanmar. India’s Space Diplomacy Further using space for diplomacy in order to project its soft power across the globe, India has assisted countries like Colombia in launching its satellite which boosted India-Colombia relations. Many Latin American countries are often dependent on the US for space and military matters. However, after the launch, many countries like Argentina, Bolivia, Brazil, Chile, Ecuador, Mexico, Nicaragua and Venezuela have reached out to ISRO for launching or developing satellites. Similarly, India’s PSLV also launched Israel’s TecSar satellite in 2008 for remote sensing purposes. The launch boosted the political and strategic relations with Israel. Once a recipient of space technology from developed countries, India has demonstrated the robustness of its own space programmes by setting up joint projects and even providing assistance at the time of disaster to a number of countries. ISRO’s Oceansat-2 satellite played a pertinent role in monitoring Hurricane Sandy and helping the authorities to implement timely disaster mitigation and rescue strategies. Adding more feathers to its hat, ISRO has also launched dozens of satellites for US, Europe and Britain based companies. The recent launches of British reconnaissance satellites, NovaSAR and S1-4 are a sign of what could come next. Britain is one of the EU’s biggest spender in space sector. After Brexit, the dispute over Britain’s continued access to the European Union’s Galileo satellite navigation project will inevitably lead Britain look for alternatives and India’s space ambitions could offer a tempting proposition within the ambit of wider bilateral cooperation. As a part of India’s efforts in space diplomacy, ISRO undertook another capacity building initiative ‘Unispace Nanosatellite Assembly and Training (UNNATI)’. Under UNNATI, ISRO planned to train 45 countries in making Nano-satellites. Closer to home, India proposed a SAARC satellite in 2014 for the overall development of the region. The proposal was welcomed by SAARC nations but unfortunately the proposal couldn’t materialise as envisioned initially due to Pakistan’s backing out from the project. However, three years later, in 2017, ISRO launched the South Asia satellite or GSAT-9 to help India’s neighbouring countries in space communication. The idea of South Asia satellite ensured no political impediment as with the case of SAARC satellite. The positive spill over effect of the satellite’s launch on India’s “neighbourhood first” diplomacy was well demonstrated by the warm responses given by the leaders of South Asian countries. India’s space diplomacy with neighbours also extends on a bilateral basis. For instance, in Afghanistan, India included remote sensing satellite transmitters for acquiring space-based data in a USD 1.2 billion aid package. It is evident that soft power strategies are more relevant than the hard power strategies, especially in the contemporary world order. The rise of China as an emerging superpower is backed with its economic and military might leave less avenues for other developing nations such as India to contest China. However, soft power strategies open up another dimension for the interaction of the nations. India has utilised space as a tool of its soft power effectively in order to expand its clout. That space being an intrinsic part of India’s foreign policy has brought numerous achievements to the country, and is expected to remain an essential element for future course of India’s foreign policy.

#### Private sector key to Indian space efforts.

Raghu Krishnan, Raghu Krishnan is the technology editor for the Economic Times. In the over two decades of reporting and managing teams, he has seen the Indian IT industry grow from $ 1 billion to nearly $ 191 billion. He has a deep understanding of the shifts the Indian IT industry has undergone over the years. He has also covered science and India's aerospace R&D industry., 12-7-2020, "New space policy may take local companies global: Sivan," Economic Times, https://economictimes.indiatimes.com/news/science/new-space-policy-may-take-local-companies-global-sivan/articleshow/79599874.cms?from=mdr TDI

Bengaluru: India will draft a new space policy aimed at increasing private investments in the country’s space sector to build companies that are global in scale, Indian Space Research Organisation (Isro) chairman K Sivan told ET. The proposed regulations will be in addition to specific policies planned for launch vehicles, satellite navigation, human space mission and deep space exploration. “We want to create competition and get multiple companies in the space sector that can grow as global leaders,” Sivan said. Over 23 Indian and overseas companies have approached Isro since August seeking to harness assets built over six decades including rockets, satellites, ground stations and satellite imagery. The nodal agency is looking to transfer critical technologies through its commercial arm — New Space India Ltd (NSIL NSE -0.45 %) — to these companies at lower costs. “Space technology is costly. We want to make it viable for Indian industries and help them commercialise these technologies,” said Sivan. “We want to make the technology transfer a very simple and low-cost affair.” Last week, NSIL signed a pact to share technology as well as to allow testing facilities with Chennai-based startup Aggnikul Cosmos to build a small rocket that can hurl 100 kg satellites to low-earth orbit. Bengaluru-based Pixxel, which is building India’s first private fleet of earth observation satellites, will launch its first satellite atop the homegrown polar satellite launch vehicle (PSLV) in 2021. So far, the department of space has released drafts of technology transfer policy, remote sensing and satellite communication policy for public comments. These draft policies state that Indian companies can now own and operate satellites, build rockets and launch them from Indian soil and offer satellite-based applications to consumers. The policies also define how sensitive dual-use technologies are to be utilised and stresses on the need for adherence to national and international laws. “The industry players are able to see the sea change (in our policies). They are asking for clarifications on some of them,” said Sivan. He added the policies will be notified after consultations. India is adopting the model of the US space agency National Aeronautics and Space Administration (NASA), which allowed private firms such as SpaceX to get access to its technology and facilities to build reusable rockets that have carried humans to space this year. NASA also allows startups to compete and build vehicles and solutions for its programmes, including deep space missions. The policies are also designed to make India a global hub for satellite manufacturing and launches and providing satellite-based services for global customers. Hyderabad-based Aerospace firm Ananth Technologies is setting up a joint venture with US satellite operator Saturn Satellites, through which it will first build two communication satellites and launch them locally on an Indian rocket. Ananth is the first Indian private company to tap the global market after India opened up its space sector, which allows private firms to build satellites and rockets and offer space services from the country. “Earlier, when IITs produced aero-space engineers, there was not a strong domestic industrial ecosystem to employ them. Today, with our historic reforms in the space sector, the last frontier before humanity has opened up to Indian talent,” Prime Minister Narendra Modi told a Pan IIT conference on Friday. India has nearly 50 space startups in the sector and over 1,000 companies — both small and medium enterprises (SMEs) and large enterprises such as Larsen & Toubro, Godrej Aerospace, Tata Advanced Systems and Hindustan Aeronautics, which have been vendors to Isro, building systems and subsystems for the space programme. After opening the space sector to private firms in August, the department of space formed Indian National Space Promotion and Authorisation Centre (IN-SPACe), a new body that will act as a regulator whose rulings would apply to the space agency as well as private firms in the country. Sivan said an independent board is being set up and an approval is expected from the government by the end of December.

#### The plan tanks India’s private space industry and undermines India’s position in the global order. [Good]

Mohan ’21 [C. Raja Mohan is Director, Institute of South Asian Studies, National University of Singapore, and contributing editor on foreign affairs for 'The Indian Express', 7-27-2021, "India will need pragmatism, diplomatic skill in shaping new rules for regulation of outer space," Indian Express, https://indianexpress.com/article/opinion/columns/mission-shakti-anti-satellite-weapon-isro-drdo-india-space-missions-5701517/] TDI

Second, the challenge of the **rapid expansion of** commercial space and the growing role of the **private sector. India’s national space programme has been quite successful in mobilising an advanced technology for development.** The Indian Space Research Organisation has also been conscious of the need to draw industry, both public and private sector, to participate in the space endeavour over the decades. While its capabilities for the construction, launch and delivery of satellite services are impressive, India must now wrestle with the exponential growth of the space market. Today’s global space business is estimated to be $350 billion and according to some estimates it could nearly triple in the next two decades. **Delhi must promote a massive expansion of the private sector’s role in space to ensure that India gets a reasonable slice of the growing global space business.** In the early decades of space technology development, private sector companies worked for and with the government programmes. Today in the US and more broadly the West, **the private sector is taking the lead**. Consider for example, the business of launching satellites that has been a government monopoly until recently. As the private sector seeks a larger share of the launch business, Elon Musk’s Space X has already made a big impression in the US. Other private companies like Blue Origin (US), OneSpace (China), and Interstellar technologies (Japan) are all joining the fray. Meanwhile, the idea of deploying a constellation of small satellites is gaining great traction. Space X and Amazon have announced plans to put hundreds of satellites in low earth orbit to provide broadband internet around the world. Besides launching rockets and satellites, **private sector companies are driving innovation and contributing to the transformation of the space business. Their ambitions now extend to space tourism and the mining of asteroids.** Third, as space becomes the site for expansive commercial enterprise, national space agencies are under pressure to redefine their role. Until recently, the national agencies were the researchers, investors, developers and champions of the space programme at the political level. This all-encompassing role of the national agencies was necessary when space technology was in its infancy. It was a precondition for countries like India that embarked on the space journey with limited resources and capabilities. As the knowledge and capabilities begin to spread and the number of actors in the space domain grows rapidly, the national space agencies must necessarily redefine their role. While NASA has gone through multiple reinventions, the structure remains essentially unaltered in India. Instead of trying to do everything, the national agencies could focus on a few critical objectives — to promote a dynamic national ecosystem for space research and development both within and outside the government, lay out a long-term vision for space policy, identify priorities, anticipate potential challenges, and become the face of the space programme at home and abroad. Fourth, the need to promote effective domestic and international regulatory frameworks for the development of space programmes. After the ASAT test, **many in India pointed to the importance of Delhi having the capabilities to shape the security order in outer space. They recall that India’s inability to conduct an atomic weapon test** before the Nuclear Non-proliferation Treaty was finalised in 1968 had **severely undermined India’s position in the global nuclear order**. In the near term, though, it is even more urgent to develop commercial space laws at home that attract investment, clarify property rights, limit liability for space operators and set standards for space products and operations. Externally, India must prepare for the inevitable evolution of the global space regime centred around the 1967 Outer Space Treaty that insisted on peaceful uses of outer space, barred the national appropriation of celestial bodies, and declared outer space to be “common province of mankind”. As technological innovation, commercial competition and geopolitical rivalry put great strain on the old order in space, Delhi will need all the strategic pragmatism, legal acumen and diplomatic skill in shaping new rules for the regulation of outer space. Above all **it needs collaboration with allies and partners in outer space.**

#### Indian soft power key to democracy promotion and counteracting authoritarian foreign policy.

Khanna and Moorthy 17 Khanna, Shrey, and P. Moorthy. “Analysing India’s Soft Power Functioning in the Twenty-First Century: Possibilities and Challenges.” India Quarterly, vol. 73, no. 3, 2017, pp. 292–311. JSTOR, www.jstor.org/stable/48505543. Accessed 26 July 2021//Aanya

Democracy Promotion and Projection in Foreign Policy Soon after independence, India was keen not to be dragged into the Cold War and expressed a strong desire to retain autonomy both in internal as well as external matters. It pursued the policy of non-alignment and remained sceptical of projects of interventionism (Raja Mohan, 2007). The circumstances have, however, changed dramatically after the end of the Cold War. During this period, the project of democracy promotion reached its crescendo in global affairs and the ideology of spreading democracy was kick started, which has become evident in the number of humanitarian interventions since Iraq War. Under such circumstances, India too has been able to incorporate the democracy factor more robustly in its foreign policy. The role of democracy in the growing relations with the USA is a case in point (Joshi, 2012). Mallavarapu (2010) argues that the Indian case exemplifies the wisdom of a case-by-case rather than a broad brush approach. By this criterion, India’s intervention in Bangladesh at the time of the break-up of the original state of Pakistan looks like a success, whereas India’s continuing reluctance to assist Burmese prodemocratic forces in more recent times has also had to do at least in part with the remoteness of its likelihood of success in the immediate future (Ibid.). India joined the US-inspired Community of Democracy initiative launched in Warsaw in 2000 and has contributed to the UN Democracy Fund, formed in 2005. Cartwright (2009) argues that democracy promotion, as far as India is concerned, is not about being a ‘proselytiser’ but serving more as an exemplar in this regard. The use of democracy promotion as a foreign policy tool has been a secondorder issue in Modi’s foreign policy (Sahoo, 2014). Though India has been promoted by successive governments as the world’s largest democracy, however, geo-economics has assumed major importance in Modi’s foreign policy. And though domestic compulsions require rapid economic growth in the country, still, projection of vibrant democracy that provides stable livelihood to its citizens creates effective environment for investment in India, and for this reason, it must be strengthened as a foreign policy tool. Further, the democratic ethos of Indian foreign policy brings to fore the role of consensus in decision-making as oppose to bellicose nature of China’s foreign policy. In this regard, example of India’s action vis-a-vis disputes related to the Indus Waters Treaty and China’s action with regard to the South China Sea arbitration can be given. Whereas India almost always accepts these international rulings, China, on the other hand, usually shows an egoist approach with many such issues. This, in part, has to do with the All use subject to http Khanna and Moorthy 299 democratic ethos India imbibes in its foreign policy which makes it more amenable to rule-based international order. This democracy projection has enough potential to compete with the alternative Chinese model based upon authoritarianism and one-party rule for forging dependable relationships with Asian states. Therefore, there exist sufficient incentives for India to integrate democracy projection, if not promotion, in its foreign policy to make it the major selling point of Brand India.

#### Democracy *solves* climate change but we need an *increase* in pace of action

#### Casas-Zamora 21

[Dr. Kevin Casas-Zamora is the Secretary-General of the International Institute for Democracy and Electoral Assistance (IDEA), with over 25 years of experience in democratic governance as a researcher, analyst, educator, consultant and public official. Here he discusses the role that democracy plays in mitigating climate change. 06/29/2021 Why democracy is the key ingredient to battling climate change” <https://www.euronews.com/green/2021/06/29/why-democracy-is-the-key-ingredient-to-battling-climate-change> ] //aaditg

The recent court rulings tell us a lot, not just about the powerful assets that democracy can deploy in the struggle against climate change, but also the long-term robustness of the case for democracy as a political system. Democracies are under pressure from populism, disinformation, inequality and voter frustration, according to the Global State of Democracy report from the intergovernmental organisation International (IDEA). They are also afflicted by a crisis of self-confidence. Fairly or not, the current pandemic has helped cement a narrative portraying liberal democracies as lumbering and too divided to cope with big challenges, while extolling the presumed ability of authoritarian systems to act decisively. Andre Penner/AP2011 Deforestation in the Brazilian AmazonAndre Penner/AP2011 ‘Extremists and populists on the rise’: Why the EU needs a green prosecutor What are the vices to democracy? This narrative is not concocted out of thin air. Democracies do suffer from vices when it comes to slow-burning crises like global warming. Voters and politicians have short attention spans. Balances of power mean reforms can be held hostage to obstinate US Senators or oil lobbyists. Science can play second fiddle to voters if it entails higher taxes - France’s yellow vest protests, sparked by fuel price rises, are a case in point. And yet, despite all this, the facts are clear - 9 out of the 10 top performers in the 2021 Climate Change Performance Index are democracies. Sweden tops the list of 57 countries. China is 30th. The reasons for this are not hard to fathom. Democracies allow for the free flow of information that enables policy makers to debate and find solutions, and for civil society to mobilise. It is no coincidence that youth campaigner Greta Thunberg helped spark a global movement from a lone street demonstration in Sweden, one of the world’s top performing democracies. It is no coincidence that youth campaigner Greta Thunberg helped spark a global movement from a lone street demonstration in Sweden, one of the world’s top performing democracies. Democracies are more effective against climate change for the same reasons that they don’t experience famines, as Nobel Laureate Indian economist Amartya Sen suggested long ago - because in allowing freedom of expression, a vibrant civil society, regular elections and the workings of checks and balances, they increase the likelihood that crises will be met and destructive policies corrected. Democracy is not simply elections - it is the often chaotic workings of myriad institutions and groups as well as a culture of open debate, where climate reform is nudged along by courts, free media, parliaments, and public protests. Democracy’s most powerful weapon against the challenges of this century is its ability to self-correct. And then there is the capacity of democratic systems to forge the social consensus required for long-term transformations to be sustainable. We know this story - participatory decision-making may be slower than executive decrees, but almost always yields outcomes that are more legitimate and accepted by society, and hence more durable. Canva Democracy is a key ingredient to fighting climate changeCanva This is vital for climate change. Decarbonisation is not something governments do by fiat, though act they must - it is something societies as a whole must do by conviction. Consumer habits will need to change, from reducing air travel to adjusting diets. Trillions of dollars will have to be invested in transforming the sources of energy that fuel economies. New social contracts will have to be devised so that the burden of these fiscal bills can be equitably shared. There is no guarantee that democracies will succeed in building the consensus needed to save our species, but their odds are better than those of any other political arrangement. Could decarbonising our cities be the answer to climate change? Kids are disappointed in grownups’ ‘un-green’ ways: Here are their plans for a cleaner future Democratic governance could slow down climate change This is, however, the key question – while it is clear that the attributes of democracy are potentially superior to deal with climate change, it is much less clear that they will be actually deployed with the celerity required. This is, precisely, what courts are doing in Germany and elsewhere - they are moving forward the deadlines that political systems and societies must meet if our species is to avoid disaster. Those deadlines are tight – a few decades, at most. But courts alone won’t do the trick. Democratic governments, parliaments, and political leaders must also dramatically increase the pace of their actions. This is why it is so vital to connect the discussion of climate change with debates on the quality of democratic governance. We must distill, disseminate, and design the institutions and practices that are more likely to allow democracies to build consensus, distribute burdens and make decisions effectively to meet the climate crisis. Experimenting with new forms of political deliberation, like citizens’ assemblies, enlarging the representation of young people by lowering the voting age and adopting some of the bargaining practices between industries, workers and governments that have been so instrumental in building consensus in Northern Europe - this is the stuff democratic governance agendas should be made of in the climate crisis era.

#### India has led multiple non-proliferation movements and their benign perception is k2 maintaining US-China Relations

Pethiyagoda 14 [Kadira Pethiyagoda, a former diplomat whose PhD and upcoming book investigated Indian foreign policy. He was a visiting scholar at the University of Oxford, “India’s Soft Power Advantage,” The Diplomat, 9/17/14, <https://thediplomat.com/2014/09/indias-soft-power-advantage/>] TDI

During [Prime Minister Tony Abbott’s recent visit to India](https://thediplomat.com/2014/09/australian-pm-visits-india-signs-nuclear-deal/), he was asked to justify Australia’s signing of a deal to sell uranium to the country. In response, the [prime minister said](http://www.smh.com.au/federal-politics/political-news/australia-to-power-indias-energy-market-as-tony-abbott-settles-terms-for-uranium-trade-20140905-10cq6y.html), “India threatens no one” and “is the friend to many.” This was no mere diplomatic nicety, but a carefully chosen answer based on India’s international image. It is an image that is rare amongst great powers of India’s size and strength, and will give Delhi a unique soft power advantage in the future multipolar world. Much of the globe sees India as a relatively non-violent, tolerant and pluralistic democracy with a benign international influence. Its values are seen as largely positive. The U.S., with its Indo-U.S. nuclear deal, accorded India special treatment in nuclear cooperation. The deal provided benefits usually reserved for Non-Proliferation Treaty (NPT) signatories. Washington justified cooperation with India by highlighting Delhi’s impeccable non-proliferation record. This stance was replicated by other states, including the Nuclear Suppliers Group (NSG) member states who allowed India’s participation in international nuclear commerce and supported the Indo-U.S. deal. The NSG decided to re-engage with India following an India-specific safeguards agreement with the International Atomic Energy Agency (IAEA). The IAEA’s Board of Governors endorsed a nuclear safeguards agreement with India by consensus that would permit Delhi to add more nuclear facilities to be placed under the IAEA safeguards framework. India did not have to have an Additional Protocol like the non-nuclear weapons states who are NPT signatories. India also received favorable treatment from Canada (which agreed to supply “dual-use items” that can be used for civilian and military applications), Japan and South Korea. This cooperation was not merely driven by these states’ strategic relationships with the U.S. Russia has long cooperated with India on nuclear technology. Even China, as a member of the NSG, did not oppose the group’s decision on India. Today, India is the only known nuclear weapons state that is not part of the NPT but is still permitted to engage in nuclear commerce globally. India’s reputation extends beyond its nuclear posture. Since independence, the country has been viewed as a neutral and harmless power by most foreign audiences, particularly in Africa, the Middle East, South America and Southeast Asia. This is in part due to its prominent role in the Non-Aligned movement. Whilst Delhi’s reputation in its own neighborhood is quite different, South Asian states do not see India as a threat in the way that many of Russia or China’s neighbors view those powers. Even long-time nemesis Pakistan is unlikely to have been as adventurous in its dealings with its much larger and more powerful neighbor had it not had firsthand experience of Delhi’s restraint – even before Islamabad had nuclear capability. So what is behind India’s benign image? In part, it is self-created. For 60-plus years Delhi has favored cultivating the impression of a non-violent India. This is particularly clear in the realm of nuclear posture. Despite having tested weapons in 1974 and 1998 and being a non-signatory to the NPT and Comprehensive Test Ban Treaty, India has been one of the most vocal advocates for global disarmament. It has arguably been the most passionate anti-nuclear campaigner amongst the world’s nine known or suspected nuclear weapons states, with one of the world’s most notable pleas for global disarmament made by Prime Minister Rajiv Gandhi at the U.N. in 1988. The pursuit of this image continued a decade later, even after the Pokhran II nuclear tests. BJP Prime Minister Vajpayee stated that the tests were not a repudiation of the disarmament goal. In the Draft Report on Indian Nuclear Doctrine, the very first sentence of the first paragraph [describes](https://www.armscontrol.org/print/514) the use of nuclear weapons as the “gravest threat to humanity and to peace and stability.” The paragraph goes on to criticize the virtual abandonment by states of the goal of disarmament. Delhi sought to avoid labels of hypocrisy by positioning itself as the “[reluctant nuclear power](http://www.rediff.com/news/2004/mar/22ram.htm).” India argued that the bomb was a last resort in a world of threatening nuclear states who make no pledges to refrain from first strikes and the use of nukes against non-nuclear states. Somewhat legitimately, Indian leaders asserted that the country’s nuclear weapons could act as bargaining chips to support its global disarmament agenda. India was said to have more credibility as a nuclear weapons state with itself having something to sacrifice in order to usher in global disarmament. India declared that its security would be enhanced and not diminished in a nuclear free world. Delhi also sought to project an image of non-violence in other areas of foreign policy. In relation to the norm of “Responsibility to Protect,” India voiced support for those aspects of R2P that encouraged and supported states to protect their own populations, and expressed extreme caution at R2P’s coercive side. When some of the world’s greatest debates over intervention occurred at the U.N., Indian ambassadors drenched their speeches with the language of non-violence. This preciously guarded national image is not merely a strategic ploy to [increase India’s soft power](https://thediplomat.com/2011/09/indias-central-asia-soft-power/). Policymakers wish the country to be seen as non-violent, pluralistic and tolerant, because India genuinely holds these values. Within the nuclear realm the influence of non-violence is seen through the foot-dragging in relation to integrating nuclear weapons into military strategy and in relation to serial production of weapons. A further sign of this influence is the long public debate before going nuclear – a rarity amongst nuclear powers. We have seen repeatedly that India’s leaders find it morally inconceivable that nukes could ever be useable tools of war. Delhi’s disarmament pleas were not merely PR: they consumed valuable diplomatic resources including precious stage-time in international forums. More broadly, non-violence affected for India’s relatively restrained conduct in several conflicts with Pakistan. When it came to humanitarian intervention, over the last 25 years India’s opposition or support was directly related to the level of intrastate violence entailed in intervening. This was true regardless of who was intervening in whom, for what reason, and whether there were strategic gains in it for Delhi. This included interventions in Iraq, Libya and [Syria](https://thediplomat.com/2013/11/indias-syria-juggling-act/). India’s opposition to intervention was compounded by its pluralistic worldview, with acceptance of all regime types. It would seem that India’s values of non-violence, pluralism and tolerance stem from the independence era, when the country’s foreign policy and modern identity was crafted. Mahatma Gandhi made India’s independence movement synonymous with non-violence. First Prime Minister Jawaharlal Nehru imbued morals into his external relations. But if the values influencing India’s foreign policy took shape only then, they would have fizzled when Congress lost power. Instead the values have remained, as has the resultant global persona. This is because the values that help guide Indian foreign policy and underpin its image are rooted deep in the country’s cultural history. These values attained dominance during the formative stage of Indian civilization – the period between the Vedic era and medieval times when the greatest empires arose. India and China are the only modern great powers that have held a largely continuous culture for several millennia. Ancient India’s cultural connection to its present-day manifestation is far stronger than ancient Greek, Roman or Anglo-Celtic culture is to present-day Western states, or the ancient Middle Eastern civilizations are to today’s Arab world. It remains to be seen how India’s international reputation will fare as its strategic interests [expand throughout the Indo-Pacific](https://thediplomat.com/2013/09/india-and-the-rise-of-the-indo-pacific/) and beyond. With some diplomatic craftsmanship, Delhi can convert its somewhat ethereal values-based soft power advantage into hard strategic and economic gains. Modi’s government seems to have recognized this and is building on Congress’ initiatives to enhance India’s public diplomacy toolkit. India’s soft power has rare characteristics when compared with the other great powers of the emerging multipolar world: U.S., China, Russia, Japan and Europe (as a unified entity). Its relatively neutral, non-threatening image will make India a uniquely attractive great-power partner for countries looking to hedge against future fallout between the U.S. and China, and not wanting to antagonize either superpower. Australia has chosen a wise time to solidify ties with one of the world’s most dynamic rising powers.

#### Risk of US-China military confrontation in flashpoints inevitably go nuclear due to intermingled forces

Talmadge 18 [Caitlin Talmadge, Associate Professor of Security Studies at the Edmund A. Walsh School of Foreign Service at Georgetown University, “Beijing’s Nuclear Option, Why a U.S.-Chinese War Could Spiral Out of Control,” Foreign Affairs, <https://www.foreignaffairs.com/articles/china/2018-10-15/beijings-nuclear-option>, 10/15/18] TDI

As China’s power has grown in recent years, so, too, has the risk of war with the United States. Under President Xi Jinping, China has increased its political and economic [pressure](https://archive.is/o/fHOWC/https:/www.foreignaffairs.com/articles/taiwan/2017-04-13/how-beijing-could-squeeze-taiwan) on Taiwan and built [military installations](https://archive.is/o/fHOWC/https:/www.foreignaffairs.com/articles/asia/2017-05-18/adrift-south-china-sea) on coral reefs in the South China Sea, fueling Washington’s fears that Chinese expansionism will threaten U.S. allies and influence in the region. U.S. destroyers have transited the Taiwan Strait, to loud protests from Beijing. American policymakers have wondered aloud whether they should send an aircraft carrier through the strait as well. Chinese fighter jets have intercepted U.S. aircraft in the skies above the South China Sea. Meanwhile, U.S. President Donald Trump has brought long-simmering economic disputes to a rolling boil. A war between the two countries remains unlikely, but the prospect of a military confrontation—resulting, for example, from a Chinese campaign against Taiwan—no longer seems as implausible as it once did. And the odds of such a confrontation going nuclear are higher than most policymakers and analysts think. Members of China’s strategic com­munity tend to dismiss such concerns. Likewise, U.S. studies of a potential war with China often exclude nuclear weapons from the analysis entirely, treating them as basically irrelevant to the course of a conflict. Asked about the issue in 2015, Dennis Blair, the former commander of U.S. forces in the Indo-Pacific, estimated the likelihood of a U.S.-Chinese nuclear crisis as “[somewhere between nil and zero](https://archive.is/o/fHOWC/carnegieendowment.org/files/240315carnegieManaging.pdf).” This assurance is misguided. If deployed against China, the Pentagon’s preferred style of conventional warfare would be a potential recipe for nuclear escalation. Since the end of the Cold War, the United States’ signature approach to war has been simple: punch deep into enemy territory in order to rapidly knock out the opponent’s key military assets at minimal cost. But the Pentagon developed this formula in wars against Afghanistan, Iraq, Libya, and Serbia, none of which was a nuclear power. If deployed against China, the Pentagon’s preferred style of conventional warfare would be a potential recipe for nuclear escalation. China, by contrast, not only has nuclear weapons; it has also intermingled them with its conventional military forces, making it difficult to attack one without attacking the other. This means that a major U.S. military campaign targeting China’s conventional forces would likely also threaten its nuclear arsenal. Faced with such a threat, Chinese leaders could decide to use their nuclear weapons while they were still able to. As U.S. and Chinese leaders navigate a relationship fraught with mutual suspicion, they must come to grips with the fact that a conventional war could skid into a nuclear confrontation. Although this risk is not high in absolute terms, its consequences for the region and the world would be devastating. As long as the United States and China continue to pursue their current grand strategies, the risk is likely to endure. This means that leaders on both sides should dispense with the illusion that they can easily fight a limited war. They should focus instead on managing or resolving the political, economic, and military tensions that might lead to a conflict in the first place. There are some reasons for optimism. For one, China has long stood out for its nonaggressive nuclear doctrine. After its first nuclear test, in 1964, China largely avoided the Cold War arms race, building a much smaller and simpler nuclear arsenal than its resources would have allowed. Chinese leaders have consistently characterized nuclear weapons as useful only for deterring nuclear aggression and coercion. Historically, this narrow purpose required only a handful of nuclear weapons that could ensure Chinese retaliation in the event of an attack. To this day, China maintains a “[no first use](https://archive.is/o/fHOWC/https:/www.foreignaffairs.com/articles/1972-07-01/no-first-use-nuclear-weapons)” pledge, promising that it will never be the first to use nuclear weapons. The prospect of a nuclear conflict can also seem like a relic of the Cold War. Back then, the United States and its allies lived in fear of a Warsaw Pact offensive rapidly overrunning Europe. NATO stood ready to use nuclear weapons first to stalemate such an attack. Both Washington and Moscow also consistently worried that their nuclear forces could be taken out in a bolt-from-the-blue nuclear strike by the other side. This mutual fear increased the risk that one superpower might rush to launch in the erroneous belief that it was already under attack. Initially, the danger of unauthorized strikes also loomed large. In the 1950s, lax safety procedures for U.S. nuclear weapons stationed on NATO soil, as well as minimal civilian oversight of U.S. military commanders, raised a serious risk that nuclear escalation could have occurred without explicit orders from the U.S. president. The good news is that these Cold War worries have little bearing on U.S.-Chinese relations today. Neither country could rapidly overrun the other’s territory in a conventional war. Neither seems worried about a nuclear bolt from the blue. And civilian political control of nuclear weapons is relatively strong in both countries. What remains, in theory, is the comforting logic of mutual deterrence: in a war between two nuclear powers, neither side will launch a nuclear strike for fear that its enemy will respond in kind. The bad news is that one other trigger remains: a conventional war that threatens China’s nuclear arsenal. Conventional forces can threaten nuclear forces in ways that generate pressures to escalate—especially when ever more capable U.S. conventional forces face adversaries with relatively small and fragile nuclear arsenals, such as China. If U.S. operations endangered or damaged China’s nuclear forces, Chinese leaders might come to think that Washington had aims beyond winning the conventional war—that it might be seeking to disable or destroy China’s nuclear arsenal outright, perhaps as a prelude to regime change. In the fog of war, Beijing might reluctantly conclude that limited nuclear escalation—an initial strike small enough that it could avoid full-scale U.S. retaliation—was a viable option to defend itself. The most worrisome flash point for a U.S.-Chinese war is Taiwan. Beijing’s long-term objective of reunifying the island with mainland China is clearly in conflict with Washington’s longstanding desire to maintain the status quo in the strait. It is not difficult to imagine how this might lead to war. For example, China could decide that the political or military window for regaining control over the island was closing and launch an attack, using air and naval forces to blockade Taiwanese harbors or bombard the island. Although U.S. law does not require Washington to intervene in such a scenario, the Taiwan Relations Act [states](https://archive.is/o/fHOWC/uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title22-section3301&num=0&edition=prelim) that the United States will “consider any effort to determine the future of Taiwan by other than peaceful means, including by boycotts or embargoes, a threat to the peace and security of the Western Pacific area and of grave concern to the United States.” Were Washington to intervene on Taipei’s behalf, the world’s sole superpower and its rising competitor would find themselves in the first great-power war of the twenty-first century. In the course of such a war, U.S. conventional military operations would likely threaten, disable, or outright eliminate some Chinese nuclear capabilities—whether doing so was Washington’s stated objective or not. In fact, if the United States engaged in the style of warfare it has practiced over the last 30 years, this outcome would be all but guaranteed.  The most worrisome flash point for a U.S.-Chinese war is Taiwan. Consider submarine warfare. China could use its conventionally armed attack submarines to blockade Taiwanese harbors or bomb the island, or to attack U.S. and allied forces in the region. If that happened, the U.S. Navy would almost certainly undertake an antisubmarine campaign, which would likely threaten China’s “boomers,” the four nuclear-armed ballistic missile submarines that form its naval nuclear deterrent. China’s conventionally armed and nuclear-armed submarines share the same shore-based communications system; a U.S. attack on these transmitters would thus not only disrupt the activities of China’s attack submarine force but also cut off its boomers from contact with Beijing, leaving Chinese leaders unsure of the fate of their naval nuclear force. In addition, nuclear ballistic missile submarines depend on attack submarines for protection, just as lumbering bomber aircraft rely on nimble fighter jets. If the United States started sinking Chinese attack submarines, it would be sinking the very force that protects China’s ballistic missile submarines, leaving the latter dramatically more vulnerable. Even more dangerous, U.S. forces hunting Chinese attack submarines could inadvertently sink a Chinese boomer instead. After all, at least some Chinese attack submarines might be escorting ballistic missile submarines, especially in wartime, when China might flush its boomers from their ports and try to send them within range of the continental United States. Since correctly identifying targets remains one of the trickiest challenges of undersea warfare, a U.S. submarine crew might come within shooting range of a Chinese submarine without being sure of its type, especially in a crowded, noisy environment like the Taiwan Strait. Platitudes about caution are easy in peacetime. In wartime, when Chinese attack submarines might already have launched deadly strikes, the U.S. crew might decide to shoot first and ask questions later. Adding to China’s sense of vulnerability, the small size of its nuclear-armed submarine force means that just two such incidents would eliminate half of its sea-based deterrent. Meanwhile, any Chinese boomers that escaped this fate would likely be cut off from communication with onshore commanders, left without an escort force, and unable to return to destroyed ports. If that happened, China would essentially have no naval nuclear deterrent. Platitudes about caution are easy in peacetime. In wartime, U.S. forces might decide to shoot first and ask questions later. The situation is similar onshore, where any U.S. military campaign would have to contend with China’s growing land-based conventional ballistic missile force. Much of this force is within range of Taiwan, ready to launch ballistic missiles against the island or at any allies coming to its aid. Once again, U.S. victory would hinge on the ability to degrade this conventional ballistic missile force. And once again, it would be virtually impossible to do so while leaving China’s nuclear ballistic missile force unscathed. Chinese conventional and nuclear ballistic missiles are often attached to the same base headquarters, meaning that they likely share transportation and supply networks, patrol routes, and other supporting infrastructure. It is also possible that they share some command-and-control networks, or that the United States would be unable to distinguish between the conventional and nuclear networks even if they were physically separate. To add to the challenge, some of China’s ballistic missiles can carry either a conventional or a nuclear warhead, and the two versions are virtually indistinguishable to U.S. aerial surveillance. In a war, targeting the conventional variants would likely mean destroying some nuclear ones in the process. Furthermore, sending manned aircraft to attack Chinese missile launch sites and bases would require at least partial control of the airspace over China, which in turn would require weakening Chinese air defenses. But degrading China’s coastal air defense network in order to fight a conventional war would also leave much of its nuclear force without protection. Once China was under attack, its leaders might come to fear that even intercontinental ballistic missiles located deep in the country’s interior were vulnerable. For years, observers have pointed to the U.S. military’s failed attempts to locate and destroy Iraqi Scud missiles during the 1990–91 Gulf War as evidence that mobile missiles are virtually impervious to attack. Therefore, the thinking goes, China could retain a nuclear deterrent no matter what harm U.S. forces inflicted on its coastal areas. Yet recent research suggests otherwise. Chinese intercontinental ballistic missiles are larger and less mobile than the Iraqi Scuds were, and they are harder to move without detection. The United States is also likely to have been tracking them much more closely in peacetime. As a result, China is unlikely to view a failed Scud hunt in Iraq nearly 30 years ago as reassurance that its residual nuclear force is safe today, especially during an ongoing, high-intensity conventional war. China’s [vehement criticism](https://archive.is/o/fHOWC/https:/www.foreignaffairs.com/articles/united-states/2017-02-15/good-thaad-and-ugly) of a U.S. regional missile defense system designed to guard against a potential North Korean attack already reflects these latent fears. Beijing’s worry is that this system could help Washington block the handful of missiles China might launch in the aftermath of a U.S. attack on its arsenal. That sort of campaign might seem much more plausible in Beijing’s eyes if a conventional war had already begun to seriously undermine other parts of China’s nuclear deterrent. It does not help that China’s real-time awareness of the state of its forces would probably be limited, since blinding the adversary is a standard part of the U.S. military playbook. Put simply, the favored U.S. strategy to ensure a conventional victory would likely endanger much of China’s nuclear arsenal in the process, at sea and on land. Whether the United States actually intended to target all of China’s nuclear weapons would be incidental. All that would matter is that Chinese leaders would consider them threatened. At that point, the question becomes, How will China react? Will it practice restraint and uphold the “no first use” pledge once its nuclear forces appear to be under attack? Or will it use those weapons while it still can, gambling that limited escalation will either halt the U.S. campaign or intimidate Washington into backing down? Chinese writings and statements remain deliberately ambiguous on this point. It is unclear which exact set of capabilities China considers part of its core nuclear deterrent and which it considers less crucial. For example, if China already recognizes that its sea-based nuclear deterrent is relatively small and weak, then losing some of its ballistic missile submarines in a war might not prompt any radical discontinuity in its calculus. The danger lies in wartime developments that could shift China’s assumptions about U.S. intentions. If Beijing interprets the erosion of its sea- and land-based nuclear forces as a deliberate effort to destroy its nuclear deterrent, or perhaps even as a prelude to a nuclear attack, it might see limited nuclear escalation as a way to force an end to the conflict. For example, China could use nuclear weapons to instantaneously destroy the U.S. air bases that posed the biggest threat to its arsenal. It could also launch a nuclear strike with no direct military purpose—on an unpopulated area or at sea—as a way to signal that the United States had crossed a redline. If such escalation appears far-fetched, China’s history suggests otherwise. In 1969, similar dynamics brought China to the brink of nuclear war with the Soviet Union. In early March of that year, Chinese troops ambushed Soviet guards amid rising tensions over a disputed [border area](https://archive.is/o/fHOWC/https:/www.foreignaffairs.com/articles/china/1967-07-01/tension-sino-soviet-border). Less than two weeks later, the two countries were fighting an undeclared border war with heavy artillery and aircraft. The conflict quickly escalated beyond what Chinese leaders had expected, and before the end of March, Moscow was making thinly veiled nuclear threats to pressure China to back down. If nuclear escalation appears far-fetched, China’s history suggests otherwise. Chinese leaders initially dismissed these warnings, only to radically upgrade their threat assessment once they learned that the Soviets had privately discussed nuclear attack plans with other countries. Moscow never intended to follow through on its nuclear threat, archives would later reveal, but Chinese leaders believed otherwise. On three separate occasions, they were convinced that a Soviet nuclear attack was imminent. Once, when Moscow sent representatives to talks in Beijing, China suspected that the plane transporting the delegation was in fact carrying nuclear weapons. Increasingly fearful, China test-fired a thermonuclear weapon in the Lop Nur desert and put its rudimentary nuclear forces on alert—a dangerous step in itself, as it increased the risk of an unauthorized or accidental launch. Only after numerous preparations for Soviet nuclear attacks that never came did Beijing finally agree to negotiations. China is a different country today than it was in the time of Mao Zedong, but the 1969 conflict offers important lessons. China started a war in which it believed nuclear weapons would be irrelevant, even though the Soviet arsenal was several orders of magnitude larger than China’s, just as the U.S. arsenal dwarfs China’s today. Once the conventional war did not go as planned, the Chinese reversed their assessment of the possibility of a nuclear attack to a degree bordering on paranoia. Most worrying, China signaled that it was actually considering using its nuclear weapons, even though it had to expect devastating retaliation. Ambiguous wartime information and worst-case thinking led it to take nuclear risks it would have considered unthinkable only months earlier. This pattern could unfold again today. A U.S. B-2 Spirit bomber, capable of carrying nuclear weapons, in Hawaii, September 2018 Danielle Quilla/U.S. Air Force. Both the United States and China can take some basic measures to reduce these dangers. More extensive dialogue and exchange—formal and informal, high level and working level, military and political—could help build relationships that might allow for backchannel de-escalation during a conflict. The two countries already have a formal military hot line in place, although it does not connect political leaders. A dedicated and tested infrastructure for senior military and political leaders to reliably and easily communicate during wartime would provide at least one off-ramp in the event of a crisis. But better communication can only do so much for a problem that ultimately stems from military doctrine and grand strategy. Given that the United States’ standard wartime playbook is likely to back China into a nuclear corner, it would be logical for Washington to consider alternative strategies that would leave China’s nuclear capabilities untouched. For example, some analysts have proposed coercing China through a distant naval blockade, and others have suggested confining any U.S. campaign to air and naval operations off China’s coast. The goal in both cases would be to avoid attacks on the Chinese mainland, where the bulk of Chinese nuclear forces reside. The problem with these alternatives is that the mainland is also where the bulk of Chinese conventional capabilities are located. The United States is unlikely to voluntarily leave these capabilities intact, given its predilection for reducing its own casualties and rapidly destroying enemy forces. If China is using its mainland bases to lob ballistic missiles at U.S. troops and allies, it is hard to imagine a U.S. president ordering the military to hold back in the interest of de-escalation. U.S. allies are particularly unlikely to accept a cautious approach, as they will be more exposed to Chinese military power the longer it is left intact. No one wants a U.S.-Chinese war to go nuclear, but a U.S. campaign that avoids escalation while letting China’s conventional forces turn Taiwan—not to mention Japan or South Korea—into a smoking ruin would not seem like much of a victory either. Of course, Beijing could also take steps to ameliorate the problem, but this is just as unlikely. China has chosen to mount both conventional and nuclear warheads on the same missiles and to attach both conventional and nuclear launch brigades to the same bases. It likely sees some strategic advantage in these linkages. Precisely because these entanglements raise the prospect of nuclear escalation, Beijing may believe that they contribute to deterrence—that they will make the United States less likely to go to war in the first place. But just as China benefits if the United States believes there is no safe way to fight a war, the United States benefits if China believes that war would result not only in China’s conventional defeat but also in its nuclear disarmament. In fact, the United States might believe that this fear could give it greater leverage during a conflict and perhaps deter China from starting one at all. In short, neither side may see much value in peacetime reassurance. Quite the opposite: they may be courting instability. If this is the case, however, then U.S. and Chinese leaders should recognize the tradeoffs inherent in their chosen policies. The threat of escalation may make war less likely, but it also makes war radically more dangerous if it does break out. This sobering reality should encourage leaders on both sides to find ways of resolving political, economic, and military disputes without resorting to a war that could rapidly turn catastrophic for the region and the world.

#### Nuclear proliferation causes nuclear war due to entanglement of conventional and nuclear weapons

Acton 19 [James M. Acton, Acton holds the Jessica T. Mathews Chair and is co-director of the Nuclear Policy Program at the Carnegie Endowment for International Peace, “The Weapons Making Nuclear War More Likely,” Carnegie Endowment for International Peace, <https://carnegieendowment.org/2019/02/08/weapons-making-nuclear-war-more-likely-pub-78343>, 2/18/19] TDI

The threat of nuclear war fills people with fear. Yet the increasingly blurred line between nuclear and conventional weapons is heightening the danger. Nuclear and non-nuclear weapons have never been entirely separate from each other. The B-29 bomber, for example, was designed and built to deliver conventional bombs. But on 6 August 1945 one of these aircraft, Enola Gay, dropped a nuclear weapon on the Japanese city of Hiroshima. Seventy-four years later, nine countries now possess thousands of nuclear weapons, which are becoming increasingly entangled with non-nuclear weapons. The global stockpile of nuclear weapons is down from an all-time high of about 64,000 in 1986 - but some contemporary weapons are about 300 times more powerful than the bomb dropped on Hiroshima. Apart from the UK, all nuclear-armed states possess dual-use weapons that can be used to deliver nuclear or conventional warheads. These include missiles of ever-longer ranges.Russia, for example, has recently deployed a new ground-launched cruise missile, the 9M729. The US believes this missile is dual-use and has been tested to distances "well over" 500km (310 miles). The missile is at the heart of US claims Russia breached the terms of a treaty banning the use of medium- and intermediate-range missiles. The US has announced its withdrawal from the pact, raising concerns about a new arms race. China, meanwhile, has recently been showing off its newest missile, the DF-26. Capable of travelling more than 2,500km (1,553 miles), it appears to be the world's longest range dual-use missile capable of a precision strike. There are a number of scenarios in which such missiles could inadvertently increase the chance of a nuclear war. The most obvious is that in a conflict, they might be launched with conventional warheads but mistaken for nuclear weapons. This ambiguity could prompt the adversary to launch an immediate nuclear response. It is difficult to know whether it would choose this course of action - or wait until the weapons had detonated and it became clear how they were armed. In practice, the greatest danger with dual-use missiles may lie elsewhere: misidentification before they have even been launched. Imagine that China dispersed lorry-mounted DF-26 missiles loaded with nuclear warheads around its territory. The U.S., wrongly believing them to be conventionally armed, might decide to try to destroy them. By attacking them, it could inadvertently provoke China into launching those nuclear weapons it still had before they could be destroyed. Dual-use missiles are not the only way in which nuclear and non-nuclear weapons are increasingly entangled. For example, all nuclear forces need a communication system - which could include satellites. But, increasingly, these nuclear command-and-control systems are also being used to support non-nuclear operations. The U.S., for example, operates satellites to provide warning of attacks with nuclear-armed or conventionally armed ballistic missiles. In a conflict between Nato and Russia, these could be used to detect short-range conventional ballistic missiles launched by Russia - as the first step towards shooting them down. If this strategy was successful, Russia could decide to attack the US early-warning satellites in response. In fact, the US intelligence community has warned that Russia is developing ground-based laser weapons for that exact purpose. But blinding U.S. early-warning satellites would not simply undermine its ability to spot conventionally armed missiles. It would also compromise the ability of the US to detect nuclear-armed ballistic missiles and could raise fears that Russia was planning a nuclear attack on the US. Indeed, the latest US Nuclear Posture Review - the key official statement of US nuclear policy - explicitly threatens to consider the use of nuclear weapons against any state that attacks its nuclear command-and-control systems. This threat applies whether or not that state has used nuclear weapons first. The governments of nuclear-armed states are presumably aware of the growing entanglement between nuclear and non-nuclear weapons. They are also aware of at least some of the associated dangers. However, working to reduce these risks does not seem to be a priority. The focus remains on enhancing their military capabilities, to deter one another. One option could be for countries to try to agree a ban on weapons that could threaten nuclear command-and-control satellites. But for the moment, governments of nuclear-armed states are reluctant to sit around the same table. As a result, the prospects of such cooperation appear to be bleak.

## 2

### 1NC—OFF

#### Next off is the Counterplan

#### States should:

#### - establish an international body that would license resources from outer space for private appropriation with a 20% royalty on all profits that is put into a Space Resource Fund that is used to fund space traffic management including at least active debris removal.

#### - Implement Carbon-Capture Sequestration systems

#### The CP competes and solves debris.

Saletta 16 [Morgan Saletta, PhD, History and Philosophy of Science, The University of Melbourne, and Kevin Orrman-Rossiter, Graduate Student, History & Philosophy of Science, The University of Melbourne. April 17, 2016. “All of humanity should share in the space mining boom,” <https://theconversation.com/all-of-humanity-should-share-in-the-space-mining-boom-57740>] brett

One solitary asteroid might be worth trillions of dollars in platinum and other metals. Exploiting these resources could lead to a global boom in wealth, which could raise living standards worldwide and potentially benefit all of humanity.

There are already companies, such as Planetary Resources, hoping to make mining in space a reality.

Peter Diamondis, co-founder of Planetary Resources and founder of the XPrize Grand Challenges, believes that the benefits to humanity give us a moral imperative to explore and utilise space. He has also declared “there are twenty-trillion-dollar checks up there, waiting to be cashed!”

However, behind the utopian rhetoric and dazzling dreams of riches lie some very real problems.

Ownership and the Outer Space Treaty

The framework of international space law is given by the Outer Space Treaty (OST), which entered into force in 1967. Among its main principals, the OST includes these statements:

the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind

and,

outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means

Because the OST is generally interpreted as preventing anything like private fee-simple ownership, it is sometimes claimed to be an obstacle to commercial ventures in space. But such claims simply do not hold water.

There are numerous terrestrial examples where resources are profitably exploited in the absence of fee-simple ownership. Governments routinely licence companies to engage in timber extraction, mining, offshore oil exploration and other activities, receiving royalties payments on production.

In the United States, revenues from such royalties totalled some US$13.5 billion dollars in 2014 from federally owned or managed lands alone.

Nevertheless, some proponents of mining in outer space argue for serious modification or an end to the Outer Space Treaty and claim, against the evidence, that without fee-simple ownership, there is no incentive for commercial exploitation.

The Unites States’ Space Act of 2015 was just one volley – and a deliberately vague one at that – in this ongoing international debate.

A balanced approach?

The riches exist, but how will humanity benefit from mining in outer space, or for that matter, other global commons such as the deep sea floor?

Behind the lofty rhetoric of benefits to humanity, there is a dark shadow of voodoo economics, the shambling, walking dead figure of trickle down economics– and the possibility of a world where a few trillionaires enjoy the view from space while others barely eke a living on its surface.

Yet we do suggest that commercial interests and profit seeking can be a healthy part of the exploration of outer space. Yet outer space is not the Wild West frontier of Frederick Jackson Turner, nor do we live in the Gold Rush days of Jack London’s tale of greed and death.

In the common heritage of space, with multiple state and private actors engaging in exploration and potentially exploitation, international cooperation and oversight will benefit all.

The Alaskan model

There is a balanced, pragmatic approach that will promote commercial and profit driven activities, while also producing tangible benefits to all of humanity.

Importantly, this pragmatic approach has a well established precedent that has existed for nearly 40 years. And this comes not from a social democracy or left-wing ideology, but was the brainchild of a libertarian, Republican governor of Alaska, Jay Hammond.

That model is the Alaska Permanent Fund Corporation (APFC) created in 1976, and its unique “citizen’s dividend”. The APF is a resource wealth fund, which derives its revenue primarily from leases on oil fields.

In 1977, Hammond suggested that “rather than permitting government to spend all public monies earned through the exploitation of the public’s resources for what government thinks best, let’s grant shares to Alaskans.”

The first dividend payment was made in 1982, and in 2015 that payment amounted to US$2,072.

Linking a citizen’s dividend to a sovereign wealth fund was unique, but the idea of a citizen’s dividend has a long and venerable tradition. One of the earliest advocates was no less than the political theorist and American Revolutionary, Thomas Paine.

International body

How would this work for outer space?

We need an international body similar to the International Seabed Authority, which was established by the United Nations Convention on the Law of the Sea, or the International Telecommunications Union, which allocates satellite orbits.

This would provide the stable business and investment environment that entrepreneurs seek by ensuring international law and obligations are met. This body could license outer space resources and levy a royalty on production, which is part of standard business practice between petroleum and other mining companies and governments here on Earth.

In turn, these revenues, or a significant portion thereof, would be deposited in a Space Resource Fund, possibly under the aegis of the World Bank. And every single citizen on Earth, say aged 18 or above, would receive a dividend on a yearly basis as their rightful share as owners of the common province of humankind.

Crucially, we are not suggesting redistribution, which has been an obstacle to the International Seabed Authority and the Moon Treaty in the past, but a fair share dividend of wealth that truly belongs to everyone.

Our model doesn’t provide a handout, or a welfare cheque, or charity from a trillionaire philanthopist; it pays every owner in a global commons a share of what is rightfully theirs.

Even tiny dividends by the standards of the world’s wealthy nations would make a difference for some developing world farmers. If there truly are trillions of dollars out there, then this might be something fundamentally world changing.

We accept that Larry Page and Sir Richard Branson – founding investors and advisors in Planetary Resources – and its founders Eric Anderson and Peter Diamandis, truly want humanity to benefit from outer space, and that they truly believe in corporate social responsibility and a sustainable future. We would encourage them to embrace the idea that the sky really does belong to all of us, as the common “province of all mankind”.

By paying rent for the right to exploit resources in space and royalties on production, the same way oil companies pay to exploit oil in the Gulf of Mexico, they’ll be engaging in business as usual.

They will have bought the right to make a potentially enormous profit and prove they really are responsible global citizens. And they’d get a citizen’s dividend cheque too.

#### Solves debris.

Webb et al. 18 [Lucas; November 2018; Masters of Astronautical Engineering student at USC; Brittany Wojciechowski,\*\*; Wichita State University PhD student in aerospace engineering; Aubrey Koonce\*\*, Molly Williams\*\*\*, Wichita State University; European Space Policy Institute; “The Need for Strict Regulation of Asteroid Mining,” <https://espi.or.at/publications/voices-from-the-space-community/category/3-voices-from-the-space-community>] brett

In terms of policy recommendations, the aim is not to regulate the resources themselves but rather the activity of space mining. The Moon Agreement provides the groundwork for a stricter policy, which provides a model of how asteroid mining policies should be created and implemented. 12 Modeling new regulations based off of the Moon Agreement, we propose the creation of a mediating organization that oversees and enforces asteroid mining and its regulation. As in the Moon Agreement, this organization’s focus should be on the “orderly and safe development of natural resources… the rational management of those resources; the expansion of opportunities… [and] the equitable sharing”13 of asteroidal resources. We propose that asteroid mining firms must enter into a rental agreement with the mediating organizations. To gain access to mine space resources, Parties will be required to pay a small fee. This paid fee could then be applied towards administrative costs, but a portion could also be used to assist underdeveloped States’ space programs. In this way the mediating organization would be similar to the International Seabed Authority under the UN Convention on the Law of the Sea. 14 In order to restrict mining activity, Parties will have a duration of time (depending on extraction process of the mission) or until they meet a specific threshold of resources collected. If a Party does not exceed the threshold then they will have up until the end of the rental agreement to extract resources. By attaching this additional restriction to rented spaces, subsequent mining expeditions will have an equal opportunity to collect the same quantity or as much feasible within the contract duration. Careful documentation of the minerals acquired will be necessary and upon return to Earth, and expeditions will be subject to something akin to a space “customs”. The customs procedures will be to ensure that proper inventory was taken, and no resources are absent or mismarked. Additionally, the Party shall submit a written statement including their own inventory that was taken that contains the type, quantity, etc. of the resources in their possession. This submitted inventory would be open to everyone, allowing for free access to said information. Also, underdeveloped countries would have the ability to petition for resources through the mediating organization. However, it is up to the country/company to decide whether or not they will extend a helping hand. Perhaps an incentive and/or a reciprocal agreement of sorts could be proposed in order to foster assistance between the developed and underdeveloped Parties of the proposal. The proposal should be signed by nations that are interested themselves or have companies within them that are interested in space mining. Companies cannot sign the proposal themselves, however their governing country can sign and inform the mediating agency that they will regulate these companies and ensure they abide by the space mining regulations. Individuals or groups would be allowed to partner together, however the partnership should be outlined clearly within a contract and must be signed by all parties involved. Nations that have ratified the regulations will enforce the rules on the companies within their territory. The consequences of not following the rules of the proposal could include imprisonment and/or a large fine, like those described in Article 18 of Luxembourg’s asteroid mining policies.15 Any companies and/or individuals that do not follow the rules of the proposal should also be reported to the mediating agency along with the consequence given to them. Venturing forward into the opportunities that space provides humanity, equality and fairness should be at the forefront of new policies. While not every situation can be accounted for at the present time, by keeping these notions in mind, just systems can be formed to supply the foundation for future asteroid mining endeavors. The proposed guidelines for a treaty in which countries can come together to be a part of something larger, in the scheme of space exploration, are rough ideas, requiring shaping. However, the authors believe that this outline embodies the key ideals needed for expansion into space. 4 Conclusion For asteroid mining to become a reality collaboration with others needs to occur. Understanding the various aspects mining will include perspectives of multiple stakeholders, with all needing to keep open minds. A key component of this process will be to revise or otherwise clarify the Outer Space Treaty 16 (among other international agreements) as needed to ensure that international law is consistent with the policy recommendations outlined above. We encourage others to start thinking about what needs to be done for asteroid mining to become feasible and properly regulated. We also hope that the regulations provided will be of help in assisting in future policies. We must understand that strict regulations will be required to better ensure that asteroids will not become monopolized or depleted.

#### CCS solves warming

Herzog 16, Howard J., Senior Research Engineer in MIT Energy Initiative, July 7, “Carbon Capture is Technically Feasible, and It can be Financially Feasible” <http://www.nytimes.com/roomfordebate/2016/07/07/clean-coal-or-a-dirty-shame/carbon-caputre-is-technically-feasible-and-it-can-be-financially-feasible>. JG

Carbon dioxide capture and storage addresses a major weakness of fossil fuels by reducing their carbon dioxide emissions to near zero. It has several strengths. Unlike wind or solar, it can produce power when it’s needed. It is the most efficient form of clean energy for energy-intensive industries like cement, refineries, petrochemicals and iron and steel. It’s compatible with our fossil fuel infrastructure, which supplies over 80 percent of the commercial energy used today, and its capacity to produce negative emissions when combined with biomass-fired power plants. Carbon capture has been demonstrated successfully at about two dozen projects worldwide that each store about a million tons or more of carbon dioxide a year. Most problems with the Kemper project are due to issues not directly related to the carbon capture technology. However, in today’s marketplace, carbon capture is generally too expensive. That is because policy is not in place to set significant limits on carbon dioxide emissions. Therefore, it is cheaper to emit carbon dioxide to the atmosphere than to capture and store it. But based on many studies that were summarized in the Intergovernmental Panel on Climate Change Assessment Report 5, having more options, including carbon capture, lowers costs for meeting carbon dioxide stabilization targets. The magnitude of climate change is so large, we need as many options as possible, including renewables, nuclear, and carbon capture. But arguing that renewables can do it alone is a very risky proposition. One weakness of wind and solar is their intermittency. But proponents are now claiming energy storage can solve that problem.

#### CCS is the only option – all other approaches fail

Jacqueline Koch, Pacific Energy Forum, Can Any Tech Stop Asia’s Coal Future? April 30, 2014, thebreakthrough.org/index.php/programs/energy-and-climate/can-any-tech-stop-asias-coal-future

In principle, there are only three ways to reduce CO2 from coal-based electricity production. First, you can replace coal use with other fuels or increased energy efficiency. Second, you can increase the efficiency of coal combustion itself. The third strategy is CCS. China and India are beginning to deploy the first two strategies, but not fast enough to change the story dramatically in the next few decades. Japan, as noted, with its nuclear plant closures, is going backwards on reducing CO2 emissions by deploying more coal and gas. That elevates the importance of CCS. And, as noted before, CCS is really the only strategy available for coal use for certain processes in heavy industry. Energy efficiency is important—but, given the surge in first-time demand resulting from urbanization and increased wealth, improvements in efficiency are not expected to significantly dent absolute demand growth. Indeed, substantial efficiency improvements are already “baked in” to the high-growth scenarios for Asia; growth would be even higher if efficiency lagged. Improving the efficiency of coal plants is useful, but will only reduce CO2 emissions at the margin. Then there are renewables. Each year brings news and discussions regarding the dramatic percent increase in additions of wind and solar power in China, but this is from a very small base. In 2011, China derived 78 percent of its power from coal, and less than 2 percent from wind and solar. In 2013, China added in excess of three times more new coal electricity in kilowatt hours (kWh) than wind and solar combined. While China is building 28 new nuclear plants and aims to have up to 150 on line within two decades, this would still only produce a fraction of the power produced from coal. A recent Bloomberg study predicted that China coal use might peak as percentage of total power supply in the coming decades, but until then (and even after, according to the U.S. Department of Energy) would continue to grow in absolute amounts and still provide well over half of China’s electricity in 2030, even in the best-case scenario. Moreover, this scenario will not be significantly affected by the recent coal plant construction ban in parts of coastal China; substantial development is proposed in the western and northern provinces. Due to the long life of coal plants—lasting 50 years or more—and given that China’s plants are mostly less than a decade old, the current and soon-to-be-built plants will continue to retard climate progress for another half-century if nothing is done to address their CO2 emissions. However, there are potential game-changers. They include modular, less expensive nuclear plants that could step in to replace coal boilers on an economical retrofit basis, or the “reforming” of natural gas, which removes the carbon and produces hydrogen to make price-competitive carbon-free liquid fuels like ammonia. My organization is working hard with developers to commercialize this technology. But CCS on coal-fired power plants seems like the most likely and necessary option in the near term.

## 3

### 1NC – OFF

#### CP Text: States, except the United States, should ban the appropriation of outer space for asteroid mining by private entities. The United States should fund the appropriation of outer space for the mining of rare earth metals from asteroids by private entities.

#### The PIC is key to beat China and protect against Chinese REM gatekeeping

Stavridis 21 [(James, retired US Navy admiral, chief international diplomacy and national security analyst for NBC News, senior fellow at JHU Applied Physics Library, PhD in Law and Diplomacy from Tufts) “U.S. Needs a Strong Defense Against China’s Rare-Earth Weapon,” Bloomberg Opinion, March 4, 2021, <https://www.bloomberg.com/opinion/articles/2021-03-04/u-s-needs-a-strong-defense-against-china-s-rare-earth-weapon>] TDI

You could be forgiven if you are confused about what’s going on with rare-earth elements. On the one hand, news reports indicate that China may increase production quotas of the minerals this quarter as a [goodwill gesture](https://www.scmp.com/news/china/diplomacy/article/3122501/china-raises-rare-earth-quotas-goodwill-trade-signal-us) to the Joe Biden administration. But other sources say that China may ultimately ban the export of the rare earths altogether on “[security concerns](https://www.bloomberg.com/news/articles/2021-02-19/china-may-ban-rare-earth-technology-exports-on-security-concerns?sref=QYxyklwO).” What’s really going on here?

There are 17 elements considered [rare earths](https://www.bloomberg.com/news/articles/2021-02-16/why-rare-earths-are-achilles-heal-for-europe-u-s-quicktake) — lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, scandium and yttrium — and while many aren’t actually rare in terms of global deposits, extracting them is difficult and expensive. They are used across high-tech manufacturing, including smartphones, fighter aircraft and components in virtually all advanced electronics. Of particular note, they are essential to many of the clean-energy technologies expected to come online in this decade.

I began to focus on rare-earth elements when I commanded the North Atlantic Treaty Organization’s presence in Afghanistan, known as the International Security Assistance Force. While Afghans live in an extremely poor country, [studies](https://thediplomat.com/2020/02/afghanistans-mineral-resources-are-a-lost-opportunity-and-a-threat/) have assessed that they sit atop $1 trillion to $3 trillion in a wide variety of minerals, including rare earths. Some [estimates](https://www.fraserinstitute.org/article/afghanistans-rare-earth-element-bonanza) put the rare-earth levels alone at 1.4 million metric tons.

But every time I tried to visit a mining facility, the answer I got from my security team was, “It’s too dangerous right now, admiral.” Unfortunately, despite a great deal of effort by the U.S. and NATO, those security challenges remain, deterring the large foreign-capital investments necessary to harvest the lodes. Which brings us back to Beijing.

China controls roughly 80% of the rare-earths market, between what it mines itself and processes in raw material from elsewhere. If it decided to wield the weapon of restricting the supply — something it has repeatedly [threatened](https://www.wsj.com/articles/china-trade-fight-raises-specter-of-rare-earth-shortage-11559304000) to do — it would create a significant challenge for manufacturers and a geopolitical predicament for the industrialized world.

It could happen. In 2010, Beijing threatened to cut off exports to Japan over the disputed Senkaku Islands. Two years ago, Beijing was reportedly considering restrictions on exports to the U.S. generally, as well as against specific companies (such as defense giant Lockheed Martin Corp.) that it deemed in violation of its policies against selling advanced weapons to Taiwan.

President Donald Trump’s administration issued an executive order to spur the production of rare earths domestically, and created an [Energy Resource Governance Initiative](https://www.state.gov/wp-content/uploads/2019/06/Energy-Resource-Governance-Initiative-ERGI-Fact-Sheet.pdf) to promote international mining. The European Union and Japan, among others, are also aggressively seeking newer sources of rare earths.

Given this tension, it was superficially surprising that China announced it would boost its mining quotas in the first quarter of 2021 by nearly 30%, reflecting a continuation in strong (and rising) demand. But the increase occurs under a shadow of uncertainty, as the Chinese Communist Party is undertaking a “review” of its policies concerning future sales of rare earths. In all probability, the tactics of the increase are temporary, and fit within a larger strategy.

China will go to great lengths to maintain overall control of the global rare-earths supply. This fits neatly within the geo-economic approach of the [One Belt, One Road](https://www.bloomberg.com/opinion/articles/2019-10-30/china-is-determined-to-reshape-the-globe) initiative, which seeks to use a variety of carrots and sticks — economic, trade, diplomatic and security — to create zones of influence globally. In terms of rare earths, the strategy seems to be allowing carefully calibrated access to the elements at a level that makes it economically less attractive for competitors to undertake costly exploration and mining operations. This is similar to the oil-market strategy used by Russia and the Organization of Petroleum Exporting Countries for decades.

Some free-market advocates believe that China will not take aggressive action choking off supply because that could [precipitate retaliation](https://www.bloomberg.com/opinion/articles/2021-02-22/china-weaponizing-rare-earths-technology-will-probably-backfire) or accelerate the search for alternate sources in global markets. What seems more likely is a series of targeted shutdowns directed against specific entities such as U.S. defense companies, Japanese consumer electronics makers, or European industrial concerns that have offended Beijing.

The path to rare-earth independence for the U.S. must include: Ensuring supply chains of rare earths necessary for national security; promoting the exploitation of the elements domestically (and removing barriers to responsibly doing so); mandating that defense contractors and other critical-infrastructure entities wean themselves off Chinese rare earths; sponsoring research and development to find alternative materials, especially for clean energy technology; and creating a substantial stockpile of the elements in case of a Chinese boycott.

This is a bipartisan agenda. The Trump administration’s [strategic assessment](https://www.commerce.gov/news/press-releases/2019/06/department-commerce-releases-report-critical-minerals) of what needs to be done (which goes beyond just 17 rare earths to include a total of 35 critical minerals) is thoughtful, and should serve as a basis for the Biden administration and Congress.

#### REM access key to military primacy and tech advancement – alternatives fail

Trigaux 12 (David, University Honors Program University of South Florida St. Petersburg) “The US, China and Rare Earth Metals: The Future Of Green Technology, Military Tech, and a Potential Achilles‟ Heel to American Hegemony,” USF St. Petersberg, May 2, 2012, <https://digital.stpetersburg.usf.edu/cgi/viewcontent.cgi?article=1132&context=honorstheses>] TDI

The implications of a rare earth shortage aren’t strictly related to the environment, and energy dependence, but have distinct military implications as well that could threaten the position of the United States world’s strongest military. The United States place in the world was assured by powerful and decisive deployments in World War One and World War Two. Our military expansion was built upon a large, powerful industrial base that created more, better weapons of war for our soldiers. During the World Wars, a well-organized draft that sent millions of men into battle in a short amount of time proved decisive, but as the war ended, and soldiers drafted into service returned to civilian life, the U.S. technological superiority over its opponents provided it with sustained dominance over its enemies, even as the numerical size of the army declined. New technologies, such as the use of the airplane in combat, rocket launched missiles, radar systems, and later, GPS, precision guided missiles, missile defense systems, high tech tanks, lasers, and other technologies now make the difference between victory and defeat.

The United States military now serves many important functions, deterring threats across the world. The United States projects its power internationally, through a network of bases and allied nations. Thus, the United States is a powerful player in all regions of the world, and often serves as a buffer against conflict in these regions. US military presence serves as a buffer against Chinese military modernization in Eastern Asia, against an increasingly nationalist Russia in Europe, and smaller regional actors, such as Venezuela in South America and Iran in the Middle East. The U.S. Navy is deployed all over the world, as the guarantor of international maritime trade routes. The US Navy leads action against challenges to its maritime sovereignty on the other side of the globe, such as current action against Somali piracy. Presence in regions across the world prevents escalation of potential crisis. These could result in either a larger power fighting a smaller nation or nations (Russia and Georgia, Taiwan and China), religious opponents (Israel and Iran), or traditional foes (Ethiopia and Eretria, Venezuela and Colombia, India and Pakistan). US projection is also key deterring emerging threats such as terrorism and nuclear proliferation. While not direct challenges to US primacy, both terrorism and nuclear proliferation can kill thousands.

The US Air Force has a commanding lead over the rest of the world, in terms of both numbers and capabilities. American ground forces have few peers, and are unmatched in their ability to deploy to anywhere in the world at an equally unmatched pace.

The only perceived challenge to the United States militarily comes from the People’s Republic of China.76 While the United States outspends all other nations in the world put together in terms of military spending, China follows as a close second, and has begun an extensive modernization program to boot.77 The Chinese military however, is several decades behind the United States in air power and nuclear capabilities.78 To compensate, China has begun the construction of access-denial technology, preventing the US from exercising its dominance in China’s sphere of influence.79 Chinese modernization efforts have a serious long-term advantage over the United States; access to rare earth metals, and a large concentration of rare earth chemists doing research.80 This advantage, coupled with the U.S. losing access to rare earth metals, will even the odds much quicker than policymakers had previously anticipated. 81

The largest example is US airpower. With every successive generation of military aircraft, the U.S. Air Force becomes more and more dependent on Rare Earth Metals.82 As planes get faster and faster, they have to get lighter and lighter, while adding weight from extra computers and other features on board.83 To lighten the weight of the plane, scandium is used to produce lightweight aluminum alloys for the body of the plane. Rare Earth metals are also useful in fighter jet engines, and fuel cells.84 For example, rare earths are required to producing miniaturized fins, and samarium is required to build the motors for the F-35 fighter jet.85 F-35 jets are the next generation fighter jet that works together to form the dual plane combination that cements U.S. dominance in air power over the Russian PAK FA.86

Rare earth shortages don’t just affect air power, also compromising the navigation system of Abrams Tanks, which need samarium cobalt magnets. The Abrams Tank is the primary offensive mechanized vehicle in the U.S. arsenal. The Aegis Spy 1 Radar also uses samarium.87 Many naval ships require neodymium. Hell Fire missiles, satellites, night vision goggles, avionics, and precision guided munitions all require rare earth metals. 88

American military superiority is based on technological advancement that outstrips the rest of the world. Command and control technology allows the U.S. to fight multiple wars at once and maintain readiness for other issues, as well as have overwhelming force against rising challengers. This technology helps the U.S. know who, where, and what is going to attack them, and respond effectively, regardless of the source of the threat.

Rare Earth Elements make this technological superiority possible.

To make matters worse, the defense industrial base is often a single market industry, dependent on government contracts for its business. If China tightens the export quotas further, major US defense contractors will be in trouble.89 Every sector of the defense industrial base is dependent on rare earth metals. Without rare earths, these contractors can’t build anything, which collapses the industry.90

Rare Earth shortages are actually already affecting our military, with shortages of lanthanum, cerium, europium and gadolinium happening in the status quo. This prevents us not only from building the next generation of high tech weaponry, but also from constructing more of the weapons and munitions that are needed in the status quo. As current weapon systems age and they can’t be replaced, the US primacy will be undermined. Of special concern is that U.S. domestic mining doesn’t produce “heavy” rare earth metals that are needed for many advanced components of military technologies. Given the nature of many military applications, substitutions aren’t possible. 91

#### Primacy and allied commitments solve arms races and great power war – unipolarity is sustainable, and prevents power vacuums and global escalation

Brands 18 [Hal, Henry Kissinger Distinguished Professor at Johns Hopkins University's School of Advanced International Studies and a senior fellow at the Center for Strategic and Budgetary Assessments." American Grand Strategy in the Age of Trump." Page 129-133]

Since World War II, the United States has had a military second to none. Since the Cold War, America has committed to having overwhelming military primacy. The idea, as George W. Bush declared in 2002, that America must possess “strengths beyond challenge” has featured in every major U.S. strategy document for a quarter century; it has also been reflected in concrete terms.6

From the early 1990s, for example, the United States consistently accounted for around 35 to 45 percent of world defense spending and maintained peerless global power-projection capabilities.7 Perhaps more important, U.S. primacy was also unrivaled in key overseas strategic regions—Europe, East Asia, the Middle East. From thrashing Saddam Hussein’s million-man Iraqi military during Operation Desert Storm, to deploying—with impunity—two carrier strike groups off Taiwan during the China-Taiwan crisis of 1995– 96, Washington has been able to project military power superior to anything a regional rival could employ even on its own geopolitical doorstep.

This military dominance has constituted the hard-power backbone of an ambitious global strategy. After the Cold War, U.S. policymakers committed to averting a return to the unstable multipolarity of earlier eras, and to perpetuating the more favorable unipolar order. They committed to building on the successes of the postwar era by further advancing liberal political values and an open international economy, and to suppressing international scourges such as rogue states, nuclear proliferation, and catastrophic terrorism. And because they recognized that military force remained the ultima ratio regum, they understood the centrality of military preponderance.

Washington would need the military power necessary to underwrite worldwide alliance commitments. It would have to preserve substantial overmatch versus any potential great-power rival. It must be able to answer the sharpest challenges to the international system, such as Saddam’s invasion of Kuwait in 1990 or jihadist extremism after 9/11. Finally, because prevailing global norms generally reflect hard-power realities, America would need the superiority to assure that its own values remained ascendant. It was impolitic to say that U.S. strategy and the international order required “strengths beyond challenge,” but it was not at all inaccurate.

American primacy, moreover, was eminently affordable. At the height of the Cold War, the United States spent over 12 percent of GDP on defense. Since the mid-1990s, the number has usually been between 3 and 4 percent.8 In a historically favorable international environment, Washington could enjoy primacy—and its geopolitical fruits—on the cheap.

Yet U.S. strategy also heeded, at least until recently, the fact that there was a limit to how cheaply that primacy could be had. The American military did shrink significantly during the 1990s, but U.S. officials understood that if Washington cut back too far, its primacy would erode to a point where it ceased to deliver its geopolitical benefits. Alliances would lose credibility; the stability of key regions would be eroded; rivals would be emboldened; international crises would go unaddressed. American primacy was thus like a reasonably priced insurance policy. It required nontrivial expenditures, but protected against far costlier outcomes.9 Washington paid its insurance premiums for two decades after the Cold War. But more recently American primacy and strategic solvency have been imperiled.

THE DARKENING HORIZON For most of the post–Cold War era, the international system was— by historical standards—remarkably benign. Dangers existed, and as the terrorist attacks of September 11, 2001, demonstrated, they could manifest with horrific effect. But for two decades after the Soviet collapse, the world was characterized by remarkably low levels of great-power competition, high levels of security in key theaters such as Europe and East Asia, and the comparative weakness of those “rogue” actors—Iran, Iraq, North Korea, al-Qaeda—who most aggressively challenged American power. During the 1990s, some observers even spoke of a “strategic pause,” the idea being that the end of the Cold War had afforded the United States a respite from normal levels of geopolitical danger and competition. Now, however, the strategic horizon is darkening, due to four factors.

First, great-power military competition is back. The world’s two leading authoritarian powers—China and Russia—are seeking regional hegemony, contesting global norms such as nonaggression and freedom of navigation, and developing the military punch to underwrite these ambitions. Notwithstanding severe economic and demographic problems, Russia has conducted a major military modernization emphasizing nuclear weapons, high-end conventional capabilities, and rapid-deployment and special operations forces— and utilized many of these capabilities in conflicts in Ukraine and Syria.10 China, meanwhile, has carried out a buildup of historic proportions, with constant-dollar defense outlays rising from US$26 billion in 1995 to US$226 billion in 2016.11 Ominously, these expenditures have funded development of power-projection and antiaccess/area denial (A2/AD) tools necessary to threaten China’s neighbors and complicate U.S. intervention on their behalf. Washington has grown accustomed to having a generational military lead; Russian and Chinese modernization efforts are now creating a far more competitive environment.

**Space dominance solves nuclear war. Hegemony de-escalates all conflict scenarios.**

**Yoo 18** [(Emanuel S. Heller Professor of Law at the University of California, Berkeley, and a visiting scholar at AEI since 2003. He served as a deputy assistant attorney general in the Office of the Legal Counsel of the U.S. Department of Justice from 2001 to 2003, where he worked on constitutional and national security matters, as General Counsel of the U.S. Senate Committee on the Judiciary from 1995-96, and as a law clerk to Justice Clarence Thomas of the U.S. Supreme Court (John, Winning the Space Race, October 15th, <http://www.aei.org/publication/winning-the-space-race/>)] \*edited for offensive language

President Donald Trump’s National Security Strategy set a new course by focusing on rebuilding the domestic economy as central to national security and aiming at “rival powers, Russia and China, that seek to challenge American influence, values, and wealth.” Critics observed that the White House seemed to reverse past presidents’ emphasis on advancing democracy and liberal values and elevating American sovereignty over international cooperation.1

Less noticed but perhaps equally revisionist, the Trump administration reversed its predecessor’s course on outer space. Even as American military and civilian networks increased their dependence on satellites, the Obama White House had deferred to European efforts to develop a space “Code of Conduct.” The Trump administration instead relies on unilateralism: “any harmful interference with or an attack upon critical components of our space architecture that directly affects this vital US interest will be met with a deliberate response at a time, place, manner, and domain of our choosing.” On June 18, 2018, President Trump announced a new branch of the military: the United States Space Force.

Control of space already underlies the United States’ predominance in nuclear and conventional warfare. Intercontinental and submarine launched ballistic missiles, the heart of the US nuclear deterrent, pass through space to reach their targets. Reconnaissance satellites monitor rival nations for missile launches, strategic deployments, and major troop movements. Communications satellites provide the high-speed data transfer that stitches the US Armed Forces together, from generals issuing commands to pilots controlling drones. With economic rivals such as China and India, and rogue states like Iran and North Korea developing space programs that pursue similar missions, the importance of space technology to US interests and international peace will only increase.

Space not only enhances military operations, but also exposes new vulnerabilities. Anti-satellite missiles can make an opponent’s space-based communication networks easier to disable than purely ground-based systems. Losing reconnaissance satellites could blind gut the US’s strategic monitoring and disabling the GPS system would degrade its operational and tactical abilities. Space invites asymmetric warfare because anti-satellite attacks could even the technological odds against western powers that have become dependent on information-enhanced operations. As the nation most dependent on space-based networks, **the United States may have the most to lose.**

Strategists divide competition in this emerging arena into four categories. First is space support, which refers to the launching and management of satellites in orbit. The second is force enhancement, which seeks to improve the effectiveness of terrestrial military operations. The importance of these basic missions is well-established. Indeed, the very first satellites performed a critical surveillance role in the strategic competition between the United States and the Soviet Union. Spy satellites replaced dangerous aerial reconnaissance flights in providing intelligence on rival nuclear missile arsenals. Later space-based systems provided the superpowers with early warnings of ballistic missile launches. These programs bolstered stability and aided progress in nuclear arms reduction talks. Satellites created “national technical means” of verification: the capability to detect compliance with arms control treaties without the need to intrude on territorial sovereignty. They reduced the chances of human miscalculation by increasing the information available to decision makers about the intentions of other nations.

The US has made the most progress in the second mission, force enhancement, by using space to boost conventional military abilities. GPS enables the exact deployment of units, the synchronization of combat maneuvers, clearer identification of friend and foe, and precision targeting. In its recent wars, the US has used satellite information to find the enemy, even to the level of individual leaders, deploy on-station air or ground forces, and fire precision-guided munitions to destroy targets with decreased risk of collateral damage. American military leaders have argued that continued integration of space and conventional strike capabilities will allow the US to handle the twenty-first century threats—**terrorism, rogue nations, asymmetric warfare, and regional challengers**—more effectively with less resources.

The third and fourth space missions focus on space itself. Space control involves freely using space to one’s benefit while denying access to opponents. Conceptually akin to air superiority, space control begins with defense: hardening command, control, communications and reconnaissance facilities to prevent enemy interference. It includes shielding satellite components, giving them the ability to avoid collisions, disguising their location, and arming satellites to destroy attackers.2

Such forms of active defense can blend into the fourth mission: space force. Space force envisions weapons systems based in orbit that can strike targets on the ground, in the air, or in space. In an important respect, **space control and force application demand a greater exercise of power than air or naval superiority**. While air and naval superiority can be achieved through rapid deployment of assets for the duration of a conflict, dominance in space requires a broader geographic scope and longer-term duration—a constellation of space weapons would circle the globe for years.3It is in this realm that new weapons technologies are emerging, prompting questions of whether space-faring nations like the United States should treat space as another area for great power competition. “The reality of confrontation in space politics pervades the reality of the ideal of true cooperation and political unity in space, which has never been genuine, and in the near term seems unlikely,” argues Everett Dolman.4 The US certainly has taken such concerns to heart. In the decade ending in 2008, for example, the US increased its space budget from $33.7 billion to $43 billion in constant dollars. The entirety of this spending increase went to the Defense Department.

These weapons systems take several forms. Already operational, the US national missile defense system relies upon satellites to track ballistic missile launches and help guide ground-launched kill vehicles. Space-based lasers, like those in development by the US today, remain the only viable method to destroy ballistic missiles in their initial boost phase, when they are easiest to destroy.

American reliance on space-based intelligence and communication for its startling conventional military advantages has made its satellites a **target of potential rivals**. In 2007, for example, China tested a ground-launched missile to destroy a weather satellite in low earth orbit—the same region inhabited by commercial satellites. “For countries that can never win a war with the United States by using the methods of tanks and planes, attacking an American space system may be an irresistible and most tempting choice,” Chinese analyst Wang Hucheng has written, in a much-noticed comment.5

Though the 2007 ASAT (Anti-satellite weapon) test sparked international controversy, China had only followed the footsteps of the superpowers. The United States had carried out a primitive anti-satellite weapon test as early as 1959. During the Eisenhower, Kennedy, and Johnson administrations, the US continued to test anti-ballistic missile systems in an anti-satellite role. The Soviet Union followed suit. The superpowers temporarily dropped these programs with the signing of the Anti-Ballistic Missile Treaty of 1972, only to restart them in the 1990s. As rivals and rogue nations begin to mimic American development of force enhancement and space control abilities, the US will naturally develop anti-satellite weapons to restore its advantage and deter attacks. Such anti-satellite weapons may become even more common due to the vulnerability of satellites and the spread of ballistic missile technology.

Critics question whether the benefits of space weapons are worth the possibility of strategic instability. They argue that only arms control agreements and international institutions can head off a disastrous military race in space. But space will become an arena for pre-emptive deterrence. Every environment—land, air, water, and now space—has become an arena for combat. The US could deter destabilizing space threats from rivals by advancing its defensive capabilities. Some realist strategists argue not just in favor of protecting US space assets, but seeking US space supremacy. Because great power competition has already spread to space, the United States should capitalize on its early lead to control the ultimate high ground, that of outer space.

Criticisms of space weapons overlook the place of force in international politics. Advances in space technology can have greater humanitarian outcomes that outweigh concerns with space weapons themselves. Rather than increase the likelihood of war, space-based systems reduce the probability of destructive conflicts and limit both combatant and civilian casualties. Reconnaissance satellites reduce the chances that war will break out due to misunderstanding of a rival’s deployments or misperception of another nation’s intentions. Space-based communications support the location of targets for smart weapons on the battlefield, which lower harm to combatants and civilians. Space-based weapons may bring unparalleled speed and precision to the strategic use of force that could reduce the need for more harmful, less discriminate conventional weapons that spread greater destruction across a broader area. New weapons might bring war to a timely conclusion or even help nations **avoid armed conflict in the first place**. We do not argue that one nation’s overwhelming superiority in arms will prevent war from breaking out, though deterrence can have this effect. At the very least, space weapons, like other advanced military technologies, could help nations settle their disputes without resort to wider armed conflict, and hence bolster, rather than undermine, international security.

#### Counterplan solves scenario 1 – climate solutions rely on REMs

Arrobas et al 17 [(Daniele La Porta Arrobas is a senior mining specialist with the World Bank based in Washington DC and has degrees in Geoscience and Environmental Management, Kirsten Hund is a senior mining specialist with the Energy and Extractives Global Practice of the World Bank and holds a Master’s in IR from the University of Groningen in the Netherlands, Michael Stephen McCormick, Jagabanta Ningthoujam has an MA in international economics and international development from JHU and a BS in MechE from Natl University of Singapore, John Drexhage also works at the Intl Institute for Sustainable Development) “The Growing Role of Minerals and Metals for a Low Carbon Future,” World Bank, June 30, 2017, <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/207371500386458722/the-growing-role-of-minerals-and-metals-for-a-low-carbon-future>] TDI

* Full report - https://documents1.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf

Climate and greenhouse gas (GHG) scenarios have typically paid scant attention to the metal implications necessary to realize a low/zero carbon future. The 2015 Paris Agreement on Climate Change indicates a global resolve to embark on development patterns that would significantly be less GHG intensive. One might assume that nonrenewable resource development and use will also need to decline in a carbon-constrained future. This report tests that assumption, identifies those commodities implicated in such a scenario and explores ramifications for relevant resource-rich developing countries. Using wind, solar, and energy storage batteries as proxies, the study examines which metals will likely rise in demand to be able to deliver on a carbon-constrained future. Metals which could see a growing market include aluminum (including its key constituent, bauxite), cobalt, copper, iron ore, lead, lithium, nickel, manganese, the platinum group of metals, rare earth metals including cadmium, molybdenum, neodymium, and indium—silver, steel, titanium and zinc. The report then maps production and reserve levels of relevant metals globally, focusing on implications for resource-rich developing countries. It concludes by identifying critical research gaps and suggestions for future work.

## 4

### 1NC—OFF

#### Interpretation: The aff must read a delineated advocacy text in the 1AC. Violation – They don’t have a plan text.

#### Vote neg for stable ground – I don’t know what disads and CP’s I can read against your plan and what arguments will become relevant cuz they can just say they don’t defend a state, and I don’t know agent based CP links and DAs. For example, the NoKo Regime Collapse DA makes sense vs the NoKo aff but not against the US aff. Text is key – if they don’t have to spec, they can just shift their advocacy depending on the 1nc – I’m literally shooting at a moving target, which wrecks competitive equity. CX doesn’t check – my preround prep was skewed which is when people construct the 1NC. Independently, it means vote neg on presumption and don’t grant permutations because they don’t solve their offense and you don’t know what the aff does.

#### Fairness and education are voters – debate’s a game that needs rules to evaluate it and education gives us portable skills for life like research and thinking.

#### Drop the debater – a) its illogical since we indict the entirety of the 1AC, b) only dropping the debater deters future abuse and sets a positive norm.

#### Use competing interps – reasonability invites arbitrary judge intervention since we don’t know your bs meter.

#### No RVI’s – a) illogical – you shouldn’t win for being fair – it’s a litmus test for engaging in substance, b) baiting – they can stick me with 4 min of answers to a short arg and make the 2NR impossible,

## Case

### 1NC—Case

#### NUQ-their ev indicates any space activity contributes

#### Now the debris advantage:

#### They solve 0% of this advantage- satellites don’t count as appropriation because no territory is being permanently claimed as a company’s property, just being temporarily occupied

Reuters—no impact—there isnt an internal link to space col—no ev abt reducing debris=we get to colonize space LOL—David doesn’t say space travel impossible

#### Tracking debris exists now and solves collisions.

**Mosher** **’19** [Dave; September 3rd; Journalist with more than a decade of experience reporting and writing stories about space, science, and technology; Business Insider, “Satellite collisions may trigger a space-junk disaster that could end human access to orbit. Here’s How,” <https://www.usafa.edu/app/uploads/Space_and_Defense_2_3.pdf>; GR]

The Kessler syndrome plays center-stage in the movie "Gravity," in which an accidental space collision endangers a crew aboard a large space station. But Gossner said that type of a runaway space-junk catastrophe is unlikely. "Right now I don't think we're close to that," he said. "I'm not saying we couldn't get there, and I'm not saying we don't need to be smart and manage the problem. But I don't see it ever becoming, anytime soon, an unmanageable problem." There is no current system to remove old satellites or sweep up bits of debris in order to prevent a Kessler event. Instead, space debris is monitored from Earth, and new rules require satellites in low-Earth orbit be deorbited after 25 years so they don't wind up adding more space junk. "Our current plan is to manage the problem and not let it get that far," Gossner said. "I don't think that we're even close to needing to actively remove stuff. There's lots of research being done on that, and maybe some day that will happen, but I think that — at this point, and in my humble opinion — an unnecessary expense." A major part of the effort to prevent a Kessler event is the Space Surveillance Network (SSN). The project, led by the US military, uses 30 different systems around the world to identify, track, and share information about objects in space. Many objects are tracked day and night via a networkof radar observatories around the globe. Optical telescopes on the ground also keep an eye out, but they aren't always run by the government. "The commercial sector is actually putting up lots and lots of telescopes," Gossner said. The government pays for their debris-tracking services. Gossner said one major debris-tracking company is called Exoanalytic. It uses about 150 small telescopes set up around the globe to detect, track, and report space debris to the SSN. Telescopes in space track debris, too. Far less is known about them because they're likely top-secret military satellites. Objects detected by the government and companies get added to a catalog of space debris and checked against the orbits of other known bits of space junk. New orbits are calculated with supercomputers to see if there's a chance of any collisions. Diana McKissock, a flight lead with the US Air Force's 18th Space Control Squadron, helps track space debris for the SSN. She said the surveillance network issues warnings to NASA, satellite companies, and other groups with spacecraft, based on two levels of emergency: basic and advanced. The SSN issues a basic emergency report to the public three days ahead of a 1-in-10,000 chance of a collision. It then provides multiple updates per day until the risk of a collision passes. To qualify for such reporting, a rogue object must come within a certain distance of another object. In low-Earth orbit, that distance must be less than 1 kilometer (0.62 mile); farther out in deep space, where the precision of orbits is less reliable, the distance is less than 5 kilometers (3.1 miles). Advanced emergency reports help satellite providers see possible collisions much more than three days ahead. "In 2017, we provided data for 308,984 events, of which only 655 were emergency-reportable," McKissock told Business Insider in an email. Of those, 579 events were in low-Earth orbit (where it's relatively crowded with satellites).

### Alt Causes---1NC

#### Alt causes swamp the AFF:

#### 1] Mega-constellations of satellites produce unmanageable debris.

Boley & Byers 21 [Aaron C., Department of Physics and Astronomy @ The University of British Columbia\*, and Michael, Department of Political Science @ The University of British Columbia; Published: 20 May 2021; Scientific Reports; “Satellite mega-constellations create risks in Low Earth Orbit, the atmosphere and on Earth,” <https://www.nature.com/articles/s41598-021-89909-7>] brett

Companies are placing satellites into orbit at an unprecedented frequency to build ‘mega-constellations’ of communications satellites in Low Earth Orbit (LEO). In two years, the number of active and defunct satellites in LEO has increased by over 50%, to about 5000 (as of 30 March 2021). SpaceX alone is on track to add 11,000 more as it builds its Starlink mega-constellation and has already filed for permission for another 30,000 satellites with the Federal Communications Commission (FCC)1. Others have similar plans, including OneWeb, Amazon, Telesat, and GW, which is a Chinese state-owned company2. The current governance system for LEO, while slowly changing, is ill-equipped to handle large satellite systems. Here, we outline how applying the consumer electronic model to satellites could lead to multiple tragedies of the commons. Some of these are well known, such as impediments to astronomy and an increased risk of space debris, while others have received insufficient attention, including changes to the chemistry of Earth’s upper atmosphere and increased dangers on Earth’s surface from re-entered debris. The heavy use of certain orbital regions might also result in a de facto exclusion of other actors from them, violating the 1967 Outer Space Treaty. All of these challenges could be addressed in a coordinated manner through multilateral law-making, whether in the United Nations, the Inter-Agency Debris Committee (IADC), or an ad hoc process, rather than in an uncoordinated manner through different national laws. Regardless of the law-making forum, mega-constellations require a shift in perspectives and policies: from looking at single satellites, to evaluating systems of thousands of satellites, and doing so within an understanding of the limitations of Earth’s environment, including its orbits.

Thousands of satellites and 1500 rocket bodies provide considerable mass in LEO, which can break into debris upon collisions, explosions, or degradation in the harsh space environment. Fragmentations increase the cross-section of orbiting material, and with it, the collision probability per time. Eventually, collisions could dominate on-orbit evolution, a situation called the Kessler Syndrome3. There are already over 12,000 trackable debris pieces in LEO, with these being typically 10 cm in diameter or larger. Including sizes down to 1 cm, there are about a million inferred debris pieces, all of which threaten satellites, spacecraft and astronauts due to their orbits crisscrossing at high relative speeds. Simulations of the long-term evolution of debris suggest that LEO is already in the protracted initial stages of the Kessler Syndrome, but that this could be managed through active debris removal4. The addition of satellite mega-constellations and the general proliferation of low-cost satellites in LEO stresses the environment further5,6,7,8.

Results

The overall setting

The rapid development of the space environment through mega-constellations, predominately by the ongoing construction of Starlink, is shown by the cumulative payload distribution function (Fig. 1). From an environmental perspective, the slope change in the distribution function defines NewSpace, an era of dominance by commercial actors. Before 2015, changes in the total on-orbit objects came principally from fragmentations, with effects of the 2007 Chinese anti-satellite test and the 2009 Kosmos-2251/Iridium-33 collisions being evident on the graph.

Figure 1

[Figure 1 omitted]

Cumulative on-orbit distribution functions (all orbits). Deorbited objects are not included. The 2007 and 2009 spikes are a Chinese anti-satellite test and the Iridium 33-Kosmos 2251 collision, respectively. The recent, rapid rise of the orange curve represents NewSpace (see "Methods").

Full size image

Although the volume of space is large, individual satellites and satellite systems have specific functions, with associated altitudes and inclinations (Fig. 2). This increases congestion and requires active management for station keeping and collision avoidance9, with automatic collision-avoidance technology still under development. Improved space situational awareness is required, with data from operators as well as ground- and space-based sensors being widely and freely shared10. Improved communications between satellite operators are also necessary: in 2019, the European Space Agency moved an Earth observation satellite to avoid colliding with a Starlink satellite, after failing to reach SpaceX by e-mail. Internationally adopted ‘right of way’ rules are needed10 to prevent games of ‘chicken’, as companies seek to preserve thruster fuel and avoid service interruptions. SpaceX and NASA recently announced11 a cooperative agreement to help reduce the risk of collisions, but this is only one operator and one agency.

Figure 2

[Figure 2 omitted]

Orbital distribution and density information for objects in Low Earth Orbit (LEO). (Left) Distribution of payloads (active and defunct satellites), binned to the nearest 1 km in altitude and 1° in orbital inclination. The centre of each circle represents the position on the diagram, and the size of the circle is proportional to the number of satellites within the given parameter space. (Right) Number density of different space resident objects (SROs) based on 1 km radial bins, averaged over the entire sky. Because SRO objects are on elliptical orbits, the contribution of a given object to an orbital shell is weighted by the time that object spends in the shell. Despite significant parameter space, satellites are clustered in their orbits due to mission requirements. The emerging Starlink cluster at 550 km and 55° inclination is already evident in both plots (Left and Right).

Full size image

When completed, Starlink will include about as many satellites as there are trackable debris pieces today, while its total mass will equal all the mass currently in LEO—over 3000 tonnes. The satellites will be placed in narrow orbital shells, creating unprecedented congestion, with 1258 already in orbit (as of 30 March 2021). OneWeb has already placed an initial 146 satellites, and Amazon, Telesat, GW and other companies, operating under different national regulatory regimes, are soon likely to follow.

Enhanced collision risk

Mega-constellations are composed of mass-produced satellites with few backup systems. This consumer electronic model allows for short upgrade cycles and rapid expansions of capabilities, but also considerable discarded equipment. SpaceX will actively de-orbit its satellites at the end of their 5–6-year operational lives. However, this process takes 6 months, so roughly 10% will be de-orbiting at any time. If other companies do likewise, thousands of de-orbiting satellites will be slowly passing through the same congested space, posing collision risks. Failures will increase these numbers, although the long-term failure rate is difficult to project. Figure 3 is similar to the righthand portion of Fig. 2 but includes the Starlink and OneWeb mega-constellations as filed (and amended) with the FCC (see “Methods”). The large density spikes show that some shells will have satellite number densities in excess of n=10−6 km−3.

Figure 3

[Figure 3 omitted]

Satellite density distribution in LEO with the Starlink and OneWeb mega-constellations as filed (and amended) with the FCC. Provided that the orbits are nearly circular, the number densities in those shells will exceed 10–6 km−3. Because the collisional cross-section in those shells is also high, they represent regions that have a high collision risk whenever debris is too small to be tracked or collision avoidance manoeuvres are impossible for other reasons.

Full size image

Deorbiting satellites will be tracked and operational satellites can manoeuvre to avoid close conjunctions. However, this depends on ongoing communication and cooperation between operators, which at present is ad hoc and voluntary. A recent letter12 to the FCC from SpaceX suggests that some companies might be less-than-fully transparent about events13 in LEO.

Despite the congestion and traffic management challenges, FCC filings by SpaceX suggest that collision avoidance manoeuvres can in fact maintain collision-free operations in orbital shells and that the probability of a collision between a non-responsive satellite and tracked debris is negligible. However, the filings do not account for untracked debris6, including untracked debris decaying through the shells used by Starlink. Using simple estimates (see “Methods”), the probability that a single piece of untracked debris will hit any satellite in the Starlink 550 km shell is about 0.003 after one year. Thus, if at any time there are 230 pieces of untracked debris decaying through the 550 km orbital shell, there is a 50% chance that there will be one or more collisions between satellites in the shell and the debris. As discussed further in “Methods”, such a situation is plausible. Depending on the balance between the de-orbit and the collision rates, if subsequent fragmentation events lead to similar amounts of debris within that orbital shell, a runaway cascade of collisions could occur.

Fragmentation events are not confined to their local orbits, either. The India 2019 ASAT test was conducted at an altitude below 300 km in an effort to minimize long-lived debris. Nevertheless, debris was placed on orbits with apogees in excess of 1000 km. As of 30 March 2021, three tracked debris pieces remain in orbit14. Such long-lived debris has high eccentricities, and thus can cross multiple orbital shells twice per orbit. A major fragmentation event from a single satellite could affect all operators in LEO.

Even if debris collisions were avoidable, meteoroids are always a threat. The cumulative meteoroid flux15 for masses m > 10–2 g is about 1.2 × 10–4 meteoroids m−2 year−1 (see “Methods”). Such masses could cause non-negligible damage to satellites16. Assuming a Starlink constellation of 12,000 satellites (i.e. the initial phase), there is about a 50% chance of 15 or more meteoroid impacts per year at m > 10–2 g. Satellites will have shielding, but events that might be rare to a single satellite could become common across the constellation.

One partial response to these congestion and collision concerns is for operators to construct mega-constellations out of a smaller number of satellites. But this does not, individually or collectively, eliminate the need for an all-of-LEO approach to evaluating the effects of the construction and maintenance of any one constellation.

#### 2] Solar storms.

Wild 15 (Jim Wild, Professor of Space Physics at Lancaster University, “With So Much Vested In Satellites, Solar Storms Could Bring Life To A Standstill,” July 30, 2015, https://theconversation.com/with-so-much-vested-in-satellites-solar-storms-could-bring-life-to-a-standstill-45204)

These can disrupt satellite operations by depositing electrical charge within the on-board electronics, triggering phantom commands or overloading and damaging sensitive components. The effects of space weather on the Earth’s upper atmosphere disrupts radio signals transmitted by navigation satellites, potentially introducing positioning errors or, in more severe cases, rendering them unusable.

These are not theoretical hazards: in recent decades, solar storms have caused outages for a number of satellites services – and a handful of satellites have been lost altogether. These were costly events – satellite operator losses have run into hundreds of millions of dollars. The wider social and economic impact was relatively limited, but even so it’s unclear how our growing amount of space infrastructure would fare against the more extreme space weather that we might face.

When Space Weather Becomes A Hurricane

The largest solar storm on record was the Carrington event in September 1859, named after the British astronomer who observed it. Of course there were no Victorian satellites to suffer the consequences, but the telegraph systems of the time were crippled as electrical currents induced in the copper wires interfered with signals, electrocuted operators and set telegraph paper alight. The geomagnetic storm it triggered was so intense that the northern lights, usually a polar phenomenon, were observed as far south as the Bahamas.

Statistical analysis of this and other severe solar storms suggests that we can expect an event of this magnitude once every few hundred years – it’s a question of “when” rather than “if”. A 2007 study estimated a Carrington event today would cause US$30 billion in losses for satellite operators and threaten vital infrastructure in space and here on the ground. It’s a risk taken sufficiently seriously that it appears on the UK National Risk Register and has led the government to draw up its preparedness programme.

#### 3] EMP attacks.

Graham 19 (William Graham, Chairman of the Congressional EMP Commission, White House Science Advisor to President Reagan, Ambassador R. James Woolsey, CIA Director and Senior Advisor to the Congressional EMP Commission, and Peter Vincent Pry, Chief of Staff of the Congressional EMP Commission, Served on the Staffs of the House Armed Services Committee and the CIA, “The EMP Executive Order — Where Were Bush and Obama?” The National Review. May 3, 2019. <https://www.nationalreview.com/2019/05/emp-executive-order-trump-administration-takes-threat-seriously/>) [language modified]

A threat that could literally mean the end of civilization is finally getting the attention it needs under Trump.

Washington and the press call almost everything an “existential threat” these days. But the threat from a natural or man-made electromagnetic pulse (EMP) really is one, as our congressional commission reported in 2017:

The critical national infrastructure in the United States faces a present and continuing existential threat from combined-arms warfare, including cyber and manmade electromagnetic pulse (EMP) attack, as well as EMP from a solar superstorm. During the Cold War, the U.S. was primarily concerned about an EMP attack generated by a high-altitude nuclear weapon as a tactic by which the Soviet Union could suppress the U.S. national command authority and the ability to respond to a nuclear attack — and thus negate the deterrence value of assured nuclear retaliation. Within the last decade, newly-armed adversaries, including North Korea, have been developing the ability and threatening to carry out an EMP attack against the United States.

The bottom line:

Such an attack would give countries that have only a small number of nuclear weapons the ability to cause widespread, long-lasting damage to critical national infrastructures, to the United States itself as a viable country, and to the survival of a majority of its population.

The EMP Commission warns that potential adversaries are developing a revolutionary new way of warfare combining cyber-attacks, sabotage, and nuclear EMP attack against national electric grids and other critical infrastructures to achieve quick and decisive victory:

Combined-Arms Cyber Warfare, as planned by Russia, China, North Korea, and Iran, may use combinations of cyber-, sabotage-, and ultimately nuclear EMP-attack to impair the United States quickly and decisively by blacking-out large portions of its electric grid and other critical infrastructures. Foreign adversaries may also consider nuclear EMP attack as the ultimate cyber “denial of service” weapon, one which can gravely damage the U.S. by striking at its technological Achilles’ heel, without having to engage the U.S. military. . . .

The synergism of such combined-arms is described in the military doctrines of all these potential adversaries as the greatest Revolution in Military Affairs (RMA) in history — one which anticipates rendering obsolete many, if not all, traditional instruments of military power.

Alarmingly, in the military doctrines of potential adversaries, nuclear EMP attack is considered a dimension of cyber warfare, because EMP is not directly injurious to people, only to electronics. High-altitude EMP attack entails exo-atmospheric detonation (30 to 500 kilometers high), so none of the blast, fire, radiation, radioactive fallout, or other effects associated with a nuclear attack on a city would occur — only the EMP.

Yet EMP, like a super-energetic radio wave that can destroy all kinds of electronics across a region as vast as North America with a single weapon, could in the long run kill far more Americans through its indirect effects than nuclear bombing of a city. Fatalities estimated from a protracted nationwide blackout lasting one year range from 67 to 90 percent of the U.S. population, due to starvation, disease, and societal collapse.

The EMP Commission tried, but could not figure out a way to keep 328 million Americans alive for a year without food and water. In 1880, just before the invention of the first electric grid in 1882, and long before the advent of our high-tech electronic civilization, the U.S. population was about 50 million, sustained by horse-drawn, coal-fired, and mechanical critical infrastructures that no longer exist.

Nuclear deterrence may not prevent an EMP attack, which can be executed anonymously using a balloon or a private jet or by doing a zoom-climb, with a short-range missile launched off a freighter (as practiced by Iran), or by satellite (as practiced by North Korea). Retaliatory threats are credible only if you know who attacked.

EMP also [destroys] ~~blinds~~, at the speed of light, satellites, radars, and other National Technical Means used for threat assessment and identifying attackers. Super-EMP weapons now possessed by Russia, China, and probably North Korea could generate 100,000 volts/meter or more, greatly exceeding the U.S. military hardening standard (50,000 volts/meter) and potentially [undermining] ~~paralyzing~~ U.S. nuclear and conventional retaliatory capabilities.

### AT: Climate

#### Only solving emissions at their source solves -- asteroid mining does that best:

#### Commercial mining solves adaptation better

Pelton 17—(Director Emeritus of the Space and Advanced Communications Research Institute at George Washington University, PHD in IR from Georgetown). Pelton, Joseph N. 2017. The New Gold Rush: The Riches of Space Beckon! Springer. Accessed 8/30/19.

Are We Humans Doomed to Extinction? What will we do when Earth’s resources are used up by humanity? The world is now hugely over populated, with billions and billions crammed into our overcrowded cities. By 2050, we may be 9 billion strong, and by 2100 well over 11 billion people on Planet Earth. Some at the United Nations say we might even be an amazing 12 billion crawling around this small globe. And over 80 % of us will be living in congested cities. These cities will be ever more vulnerable to terrorist attack, natural disaster, and other plights that come with overcrowding and a dearth of jobs that will be fueled by rapid automation and the rise of artifi cial intelligence across the global economy. We are already rapidly running out of water and minerals. Climate change is threatening our very existence. Political leaders and even the Pope have cautioned us against inaction. Perhaps the naysayers are right. All humanity is at tremendous risk. Is there no hope for the future? This book is about hope. We think that there is literally heavenly hope for humanity. But we are not talking here about divine intervention. We are envisioning a new space economy that recognizes that there is more water in the skies that all our oceans. Th ere is a new wealth of natural resources and clean energy in the reaches of outer space—more than most of us could ever dream possible. There are those that say why waste money on outer space when we have severe problems here at home? Going into space is not a waste of money. It is our future. It is our hope for new jobs and resources. The great challenge of our times is to reverse public thinking to see space not as a resource drain but as the doorway to opportunity. The new space frontier can literally open up a “gold rush in the skies.” In brief, we think there is new hope for humanity. We see a new a pathway to the future via new ventures in space. For too long, space programs have been seen as a money pit. In the process, we have overlooked the great abundance available to us in the skies above. It is important to recognize there is already the beginning of a new gold rush in space—a pathway to astral abundance. “New Space” is a term increasingly used to describe radical new commercial space initiatives—many of which have come from Silicon Valley and often with backing from the group of entrepreneurs known popularly as the “space billionaires.” New space is revolutionizing the space industry with lower cost space transportation and space systems that represent significant cost savings and new technological breakthroughs. “New Commercial Space” and the “New Space Economy” represent more than a new way of looking at outer space. These new pathways to the stars could prove vital to human survival. If one does not believe in spending money to probe the mysteries of the universe then perhaps we can try what might be called “calibrated greed” on for size. One only needs to go to a cubesat workshop, or to Silicon Valley or one of many conferences like the “Disrupt Space” event in Bremen, Germany, held in April 2016 to recognize that entrepreneurial New Space initiatives are changing everything [ 1 ]. In fact, the very nature and dimensions of what outer space activities are today have changed forever. It is no longer your grandfather’s concept of outer space that was once dominated by the big national space agencies. The entrepreneurs are taking over. The hopeful statements in this book and the hard economic and technical data that backs them up are more than a minority opinion. It is a topic of growing interest at the World Economic Forum, where business and political heavyweights meet in Davos, Switzerland, to discuss how to stimulate new patterns of global economic growth. It is even the growing view of a group that call themselves “space ethicists.” Here is how Christopher J. Newman, at the University of Sunderland in the United Kingdom has put it: Space ethicists have offered the view that space exploration is not only desirable; it is a duty that we, as a species, must undertake in order to secure the survival of humanity over the longer term. Expanding both the resource base and, eventually, the habitats available for humanity means that any expenditure on space exploration, far from being viewed as frivolous, can legitimately be rationalized as an ethical investment choice. (Newman) On the other hand there are space ethicists and space exobiologists who argue that humans have created ecological ruin on the planet—and now space debris is starting to pollute space. Th ese countervailing thoughts by the “no growth” camp of space ethicists say we have no right to colonize other planets or to mine the Moon and asteroids—or at least no right to do so until we can prove we can sustain life here on Earth for the longer term. However, for most who are planning for the new space economy the opinion of space philosophers doesn’t really fl oat their boat. Legislators, bankers, and aspiring space entrepreneurs are far more interested in the views of the super-rich capitalists called the space billionaires. A number of these billionaires and space executives have already put some very serious money into enterprises intent on creating a new pathway to the stars. No less than five billionaires with established space ventures—Elon Musk, Paul Allen, Jeff Bezos, Sir Richard Branson, and Robert Bigelow—have invested millions if not billions of dollars into commercializing space. They are developing new technologies and establishing space enterprises that can bring the wealth of outer space down to Earth. This is not a pipe dream, but will increasingly be the economic reality of the 2020s. These wealthy space entrepreneurs see major new economic opportunities. To them space represents the last great frontier for enterprising pioneers. Th us they see an ever-expanding space frontier that offers opportunities in low-cost space transportation, satellite solar power satellites to produce clean energy 24h a day, space mining, space manufacturing and production, and eventually space habitats and colonies as a trajectory to a better human future. Some even more visionary thinkers envision the possibility of terraforming Mars, or creating new structures in space to protect our planet from cosmic hazards and even raising Earth’s orbit to escape the rising heat levels of the Sun in millennia to come. Some, of course, will say this is sci-fi hogwash. It can’t be done. We say that this is what people would have said in 1900 about airplanes, rocket ships, cell phones and nuclear devices. The skeptics laughed at Columbus and his plan to sail across the oceans to discover new worlds. When Thomas Jefferson bought the Louisiana Purchase from France or Seward bought Alaska, there were plenty of naysayers that said such investment in the unknown was an extravagant waste of money. A healthy skepticism is useful and can play a role in economic and business success. Before one dismisses the idea of an impending major new space economy and a new gold rush, it might useful to see what has already transpired in space development in just the past five decades. The world’s first geosynchronous communications satellite had a throughput capability of about 500 kb / s. In contrast, today’s state of the art Viasat 2 —a half century later— has an impressive throughput of some 140 Gb/s. Th is means that the relative throughput is nearly 300,000 greater, while its lifetime is some ten times longer (Figs. 1.1 and 1.2 ). Each new generation of communications satellite has had more power, better antenna systems, improved pointing and stabilization, and an extended lifetime. And the capabilities represented by remote sensing satellites , meteorological satellites , and navigation and timing satellites have also expanded their capabilities and performance in an impressive manner. When satellite applications first started, the market was measured in millions of dollars. Today commercial satellite services exceed a quarter of a billion dollars. Vital services such as the Internet, aircraft traffi c control and management, international banking, search and rescue and much, much more depend on application satellites. Th ose that would doubt the importance of satellites to the global economy might wish to view on You Tube the video “If Th ere Were a Day Without Satellites?” [ 2 ]. Let’s check in on what some of those very rich and smart guys think about the new space economy and its potential. (We are sorry to say that so far there are no female space billionaires, but surely this, too, will come someday soon.) Of course this twenty-fi rst century breakthrough that we call the New Space economy will not come just from new space commerce. It will also come from the amazing new technologies here on Earth. Vital new terrestrial technologies will accompany this cosmic journey into tomorrow. Information technology, robotics, artificial intelligence and commercial space travel systems have now set us on a course to allow us humans to harvest the amazing riches in the skies—new natural resources, new energy, and even totally new ways of looking at the purpose of human existence. If we pursue this course steadfastly, it can be the beginning of a New Space renaissance. But if we don’t seek to realize our ultimate destiny in space, Homo sapiens can end up in the dustbin of history—just like literally millions of already failed species. In each and every one of the five mass extinction events that have occurred over the last 1.5 billion years on Earth, some 50–80 % of all species have gone the way of the T. Rex, the woolly mammoth, and the Dodo bird along with extinct ferns, grasses and cacti. On the other hand, the best days of the human race could be just beginning. If we are smart about how we go about discovering and using these riches in the skies and applying the best of our new technologies, it could be the start of a new beginning for humanity. Konstantin Tsiokovsky, the Russian astronautics pioneer, who fi rst conceived of practical designs for spaceships, famously said: “A planet is the cradle of mankind, but one cannot live in a cradle forever.” Well before Tsiokovsky another genius, Leonardo da Vinci, said, quite poetically: “Once you have tasted flight, you will forever walk the earth with your eyes turned skyward, for there you have been, and there you will always long to return.” The founder of the X-Prize and of Planetary Resources, Inc., Dr. Peter Diamandis, has much more brashly said much the same thing in quite diff erent words when he said: “The meek shall inherit the Earth. The rest of us will go to Mars.” The New Space Billionaires Peter Diamandis is not alone in his thinking. From the list of “visionaries” quoted earlier, Elon Musk, the founder of SpaceX; Sir Richard Branson, the founder of Virgin Galactic; and Paul Allen, the co-founder of Microsoft and the man who financed SpaceShipOne, the world’s first successful spaceplane have all said the future will include a vibrant new space economy. Th ey, and others, have said that we can, we should and we soon shall go into space and realize the bounty that it can offer to us. Th e New Space enterprise is today indeed being led by those so-called space billionaires , who have an exciting vision of the future. They and others in the commercial space economy believe that the exploitation of outer space may open up a new golden age of astral abundance. They see outer space as a new frontier that can be a great source of new materials, energy and various forms of new wealth that might even save us from excesses of the past. Th is gold rush in the skies represents a new beginning. We are not talking about expensive new space ventures funded by NASA or other space agencies in Europe, Japan, China or India. No, these eff orts which we and others call New Space are today being forged by imaginative and resourceful commercial entrepreneurs. Th ese twenty-fi rst century visionaries have the fortitude and zeal to look to the abundance above. New breakthroughs in technology and New Space enterprises may be able to create an “astral life raft” for humanity. Just as Columbus and the Vikings had the imaginative drive that led them to discover the riches of a new world, we now have a cadre of space billionaires that are now leading us into this New Space era of tomorrow. These bold leaders, such as Paul Allen and Sir Richard Branson, plus other space entrepreneurs including Jeff Bezos of Amazon and Blue Origin, and Robert Bigelow, Chairman of Budget Suites and Bigelow Aerospace, not only dream of their future in the space industry but also have billions of dollars in assets. These are the bright stars of an entirely new industry that are leading us into the age of New Space commerce. These space billionaires, each in their own way, are proponents of a new age of astral abundance. Each of them is launching new commercial space industries. They are literally transforming our vision of tomorrow. These new types of entrepreneurial aerospace companies—the New Space enterprises—give new hope and new promise of transforming our world as we know it today. The New Space Frontier What happens in space in the next few decades, plus corresponding new information technologies and advanced robotics, will change our world forever. These changes will redefi ne wealth, change our views of work and employment and upend almost everything we think we know about economics, wealth, jobs, and politics. Th ese changes are about truly disruptive technologies of the most fundamental kinds. If you thought the Internet, smart phones, and spandex were disruptive technologies, just hang on. You have not seen anything yet. In short, if you want to understand a transition more fundamental than the changes brought to the twentieth century world by computers, communications and the Internet, then read this book. There are truly riches in the skies. Near-Earth asteroids largely composed of platinum and rare earth metals have an incredible value. Helium-3 isotopes accessible in outer space could provide clean and abundant energy. There is far more water in outer space than is in our oceans. In the pages that follow we will explain the potential for a cosmic shift in our global economy, our ecology, and our commercial and legal systems. These can take place by the end of this century. And if these changes do not take place we will be in trouble. Our conventional petro-chemical energy systems will fail us economically and eventually blanket us with a hydrocarbon haze of smog that will threaten our health and our very survival. Our rare precious metals that we need for modern electronic appliances will skyrocket in price, and the struggle between “haves” and “have nots” will grow increasingly ugly. A lack of affordable and readily available water, natural resources, food, health care and medical supplies, plus systematic threats to urban security and systemic warfare are the alternatives to astral abundance. The choices between astral abundance and a downward spiral in global standards of living are stark. Within the next few decades these problems will be increasingly real. By then the world may almost be begging for new, out of- the-box thinking. International peace and security will be an indispensable prerequisite for exploitation of astral abundance, as will good government for all. No one nation can be rich and secure when everyone else is poor and insecure. In short, global space security and strategic space defense, mediated by global space agreements, are part of this new pathway to the future.

#### Asteroid mining solves emissions from terrestrial platinum mining---independently solves warming.

MIT Review 18 Emerging Technology [Our mission is to bring about better-informed and more conscious decisions about technology through authoritative, influential, and trustworthy journalism.], 10-19-2018, "Asteroid mining might actually be better for the environment," MIT Technology Review, <https://www.technologyreview.com/2018/10/19/139664/asteroid-mining-might-actually-be-better-for-the-environment/> // ella

For a certain kind of investor, asteroid mining is a path to untold riches. Astronomers have long known that asteroids are rich in otherwise scarce resources such as platinum and water. So an obvious idea is to mine this stuff and return it to Earth—or, in the case of water, to a moon base or Earth-orbiting space station. There is no shortage of interest in these ventures. In the last decade, investors have funded half a dozen companies that have set their sights on various nearby rocks. To many observers, it’s only a matter of time before such a mission gets the green light. But profit margins are only part of the picture. A potentially more significant aspect of these missions is the impact they will have on Earth’s environment. But nobody has assessed this environmental impact in detail. Today, that changes thanks to the work of Andreas Hein and colleagues at the University of Paris-Saclay in France. These guys have calculated the greenhouse-gas emissions from asteroid-mining operations and compared them with the emissions from similar Earth-based activities. Their results provide some eyebrow-raising insights into the benefits that asteroid mining might provide. The calculations are relatively straightforward. Rocket launches release significant amounts of greenhouse gases into the atmosphere. The fuel on board the first stage of a rocket burns in Earth’s atmosphere to form carbon dioxide. For kerosene-burning rockets, one kilogram of fuel creates three kilograms of CO2. (The second and third stages operate outside the Earth’s atmosphere and so can be ignored.) Reentries are just as damaging. That’s because a significant mass of a re-entering vehicle ablates in the upper atmosphere, producing NOx such as nitrous oxide (N2O), a greenhouse gas that is about 300 times more potent than CO2. By one estimate, the space shuttle released about 20% of its mass in the form of N2O every time it returned to Earth. Hein and co use these numbers to calculate that a kilogram of platinum mined from an asteroid would release some 150 kilograms of CO2 into Earth’s atmosphere. However, economies of scale from large asteroid-mining operations could lower this to about 60 kilograms of CO2 per kilogram of platinum. That needs to be compared with the emission from Earth-based mining. Here, platinum mining generates significant greenhouse gases, mostly from the energy it takes to remove this stuff from the ground. Indeed, the numbers are huge. The mining industry estimates that producing one kilogram of platinum on Earth releases around 40,000 kilograms of carbon dioxide. “The global warming effect of Earth-based mining is several orders of magnitude larger,” say Hein and co. The figures for water are also encouraging. In this case, the authors calculate the greenhouse-gas emissions from an asteroid-mining operation that returns water to anywhere within the moon’s orbit, a so-called cis-lunar orbit. They compare this to the emissions from sending the same volume of water from Earth into orbit. The big difference is that a water-carrying vehicle from Earth can haul only a small percentage of its mass as water. But an asteroid-mining spacecraft can transport a significant multiple of its mass as water to cis-lunar orbit. “Substantial savings in greenhouse gas emissions can be achieved,” say Hein and co.

#### Independently, the dust itself is good: it shields the earth from warming and buys us time.

Choi 12 Charles Q. Choi [a contributing writer for Space.com and Live Science. He covers all things human origins and astronomy as well as physics, animals and general science topics. Charles has a Master of Arts degree from the University of Missouri-Columbia, School of Journalism and a Bachelor of Arts degree from the University of South Florida. Charles has visited every continent on Earth, drinking rancid yak butter tea in Lhasa, snorkeling with sea lions in the Galapagos and even climbing an iceberg in Antarctica], 9-28-2012, "Asteroid Dust Could Fight Climate Change on Earth," Space, [https://www.space.com/17830-asteroid-dust-geoenineering-global-warming.html //](https://www.space.com/17830-asteroid-dust-geoenineering-global-warming.html%20//) ella

To combat global warming, scientists in Scotland now suggest an out-of-this-world solution — a giant dust cloud in space, blasted off an asteroid, which would act like a sunshade for Earth. The world is warming and the climate is changing. Although many want to prevent these shifts by reducing emissions of greenhouse gases that trap heat from the sun, some controversially suggest deliberating manipulating the planet's climate with large-scale engineering projects, commonly called geoengineering. Instead of altering the climate by targeting either the oceans or the atmosphere, some researchers have suggested geoengineering projects that would affect the entire planet from space. For instance, projects that reduced the amount of solar radiation Earth receives by 1.7 percent could offset the effects of a global increase in temperature of 3.6 degrees F (2 degrees C). The United Nations' Intergovernmental Panel on Climate Change (IPCC) has noted climate models suggest average global temperatures will likely rise by 2 to 11.5 degrees F (1.1 to 6.4 degrees C) by the end of this century. "A 1.7 percent reduction is very small and will hardly be noticeable on Earth," said researcher Russell Bewick, a space scientist at the University of Strathclyde in Scotland. "People sometimes get the idea of giant screens blocking the entire sun. This is not the case ... as [the device] is constantly between the sun and the Earth, it acts merely as a very light shade or filter." Shading Earth One proposal to shade the Earth from the sun would place giant mirrors in space. The main problem with this concept is the immense cost and effort needed either to build and launch such reflectors or to construct them in outer space — the current cost to launch an object into low Earth orbit runs into thousands of dollars per pound. Another would use blankets of dust to blot out the sun, just as clouds do for Earth. These offer the virtue of simplicity compared with mirrors, but run the risk of getting dispersed over time by solar radiation and the gravitational pull of the sun, moon and planets. Now instead of having a dust cloud floating by itself in space, researchers suggest an asteroid could essentially gravitationally anchor a dust cloud in space to block sunlight and cool the Earth. "I would like to make it clear that I would never suggest geoengineering in place of reducing our carbon emissions," Bewick told LiveScience. Instead, he said, "We can buy time to find a lasting solution to combat Earth’s climate change. The dust cloud is not a permanent cure, but it could offset the effects of climate change for a given time to allow slow-acting measures like carbon capture to take effect."

#### However, the legal framework that strikes the best balance of providing economic incentives for mining while preventing unbeneficial land claims requires a doctrine of appropriation – the plan prevents that

**Meyers 15** Meyers, Ross. J.D. candidate at the University of Oregon Law School. "The doctrine of appropriation and asteroid mining: incentivizing the private exploration and development of outer space." Or. Rev. Int'l L. 17 (2015): 183. Italics in original. [Quality Control]

The **doctrine of appropriation** is a reasonable rule for adjudicating asteroid claims, and it could **easily be modified to apply to asteroid mining**. In the context of water rights, the doctrine of appropriation requires that the claimant be a landowner in order to claim the right to use a water source. It does not make sense, however, for the international community to grant complete ownership over asteroids toa single entity, so the landowner requirement of the rule should be removed. A similar modification would need to be made to the "beneficial use" language of the doctrine.

In the context of water rights, an appropriator obtains rights only to water that he or she can reasonably put to beneficial use. The metals contained in asteroids have a high level of marketability. For that reason, a mining entity could potentially put any amount of obtained metal to beneficial use, in the sense that the resources can be sold. This, however, would defeat the purpose of the rule, which is to limit such unreasonable claims. To ameliorate this problem, the doctrine of appropriation could be modified to define "beneficial use "constructively by providing that beneficial use is assumed for any resources that have been removed from the asteroid that the mining entity can reasonably hope to transport to market in a return journey. With the **astronomical cost** of undertaking a trip to such an asteroid, this modification would limit mining entities to only what they can carry back, thereby leaving the untapped resources available to other entities capable of making the same trip. Considering the size and profitability of metal deposits on asteroids, this modification to the doctrine of appropriation would **not be overly burdensome to corporate interests**. At the same time, it would **satisfy the economic imperative of promoting the rapid development of asteroid resources.**

By changing the landowner requirement, and qualifying the “beneficial use" language, the doctrine of appropriation would be essentially ready for application to asteroid mining claims. The only other changes necessary would be some additional requirements that are common to other space related provisions, like those found in the Outer Space Treaty of 1968. For example, a reporting requirement or clause guaranteeing asylum for other astronauts. A functional rule might read something like this:

*State parties or private entities may, upon actual possession, lay claim to natural resources found on or below the surface of asteroids. Rights to appropriate are given in order of seniority, starting with the first party to land on the surface of the asteroid and establish control over the resources, be it water, methane, metal, or any other beneficial substances. A party will be said to have established control over a resource once he has mined the substance and removed it from the asteroid. A senior appropriator may use as much of the asteroid's resources as he can take from the asteroid and put to beneficial use, and may continue to enlarge his share until another junior appropriator begins to appropriate resources from source for beneficial use. For the purposes of this Agreement, "beneficial use “refers to the amount of resources that an appropriator has removed from the asteroid that the actor may reasonably hope to bring home in a return voyage. Resources in excess of what an appropriator can reasonably hope to transport to market in a single voyage do not qualify as having a beneficial use, and are therefore not yet claimed. This means that the extraction of metal from an asteroid does not serve to provide ownership if the appropriator plans on letting the resources languish until another voyage is undertaken to secure the resources and bring them back to Earth. Junior appropriators receive rights in the source of resources (the asteroid) as they find it, and may prevent the senior appropriator from enlarging his share to the junior appropriator’s detriment under a no-injury rule. No state party will attempt to hinder other parties from landing on or using the asteroid, and parties will assist other entities on an asteroid, should they need emergency assistance. Mining claims on asteroids will be reported to the Secretary-General of the United Nations, and state parties agree to release the location of the asteroid, and any scientific findings to the United Nations, the general public, and the scientific community. In the event that the asteroid is on a collision course with any other celestial body, all state parties agree to follow the course of action suggested by the United Nations. Should the United Nations decide the asteroid must be destroyed, no state party may claim liability for resources contained within the asteroid, but not yet captured. This provision applies only to asteroids as classified by the scientific community, and does not apply to planets, comets, meteorites, or any other celestial body not mentioned.*

There is no doubt that asteroids may be **extremely beneficial to mankind,** both as a **source of resources** and as a jumping-off point to **far off locations in space**. The human-race has progressed scientifically and technologically to the point that space travel is within commercial reach, and the need for new international laws governing the ownership of space has never been more apparent. The Outer Space Treaty of 1968made great strides in developing rational rules for space and many of its provisions should be maintained in their original form. However, by allowing ownership of asteroids under the doctrine of **appropriation**, the international community can **incentivize the exploration and development of space in a way that reflects the needs of society in general**, **without vesting an absolute monopoly in a single entity.** The doctrine of appropriation helped drive American westward expansion, and its application to space mining would help drive the human race in its expansion into the space, the final frontier.

### AT: Kessler---1NC

#### No Kessler syndrome.

**Mosher ’19** [Dave; September 3rd; Journalist with more than a decade of experience reporting and writing stories about space, science, and technology; Business Insider, “Satellite collisions may trigger a space-junk disaster that could end human access to orbit. Here’s How,” <https://www.usafa.edu/app/uploads/Space_and_Defense_2_3.pdf>; GR]

The Kessler syndrome plays center-stage in the movie "Gravity," in which an accidental space collision endangers a crew aboard a large space station. But Gossner said that type of a runaway space-junk catastrophe is unlikely. "Right now I don't think we're close to that," he said. "I'm not saying we couldn't get there, and I'm not saying we don't need to be smart and manage the problem. But I don't see it ever becoming, anytime soon, an unmanageable problem." There is no current system to remove old satellites or sweep up bits of debris in order to prevent a Kessler event. Instead, space debris is monitored from Earth, and new rules require satellites in low-Earth orbit be deorbited after 25 years so they don't wind up adding more space junk. "Our current plan is to manage the problem and not let it get that far," Gossner said. "I don't think that we're even close to needing to actively remove stuff. There's lots of research being done on that, and maybe some day that will happen, but I think that — at this point, and in my humble opinion — an unnecessary expense." A major part of the effort to prevent a Kessler event is the Space Surveillance Network (SSN). The project, led by the US military, uses 30 different systems around the world to identify, track, and share information about objects in space. Many objects are tracked day and night via a networkof radar observatories around the globe. Optical telescopes on the ground also keep an eye out, but they aren't always run by the government. "The commercial sector is actually putting up lots and lots of telescopes," Gossner said. The government pays for their debris-tracking services. Gossner said one major debris-tracking company is called Exoanalytic. It uses about 150 small telescopes set up around the globe to detect, track, and report space debris to the SSN. Telescopes in space track debris, too. Far less is known about them because they're likely top-secret military satellites. Objects detected by the government and companies get added to a catalog of space debris and checked against the orbits of other known bits of space junk. New orbits are calculated with supercomputers to see if there's a chance of any collisions. Diana McKissock, a flight lead with the US Air Force's 18th Space Control Squadron, helps track space debris for the SSN. She said the surveillance network issues warnings to NASA, satellite companies, and other groups with spacecraft, based on two levels of emergency: basic and advanced. The SSN issues a basic emergency report to the public three days ahead of a 1-in-10,000 chance of a collision. It then provides multiple updates per day until the risk of a collision passes. To qualify for such reporting, a rogue object must come within a certain distance of another object. In low-Earth orbit, that distance must be less than 1 kilometer (0.62 mile); farther out in deep space, where the precision of orbits is less reliable, the distance is less than 5 kilometers (3.1 miles). Advanced emergency reports help satellite providers see possible collisions much more than three days ahead. "In 2017, we provided data for 308,984 events, of which only 655 were emergency-reportable," McKissock told Business Insider in an email. Of those, 579 events were in low-Earth orbit (where it's relatively crowded with satellites).

#### Kessler syndrome is a process not an event---timeframe is decades and intervening actors check.

Burns Interviewing Kessler **’**13 Corrinne Burns, interviewing Donald Kessler, who made up the concept. [Space junk apocalypse: just like Gravity? 11-15-2013, https://www.theguardian.com/science/blog/2013/nov/15/space-junk-apocalypse-gravity]//BPS

Now? Are we in trouble? Not yet. Kessler syndrome isn't an acute phenomenon, as depicted in the movie – it's a slow, decades-long process. "It'll happen throughout the next 100 years – we have time to deal with it," Kessler says. "The time between collisions will become shorter – it's around 10 years at the moment. In 20 years' time, the time between collisions could be reduced to five years." Fortunately, communications satellites are, in the main, situated high up in geosynchronous orbit (GEO), whereas the risk of collisions lies mainly in the much lower, and more crowded, low Earth orbit (LEO). But that doesn't mean we can relax. "We've got to get a handle on it – we need to prevent the cascade process from speeding up." And the only way to do that is, he says, to begin actively removing junk from space. Charlotte Bewick agrees. She's a mission concepts engineer with the German space technology company OHB System, with special expertise in space junk – specifically, how we can capture it and bring it back to Earth. While agreeing with Kessler that the movie scenario is exaggerated, she remains concerned. "Fragments of junk can naturally re-enter the atmosphere [and so be removed from orbit]. But we're at the stage where the rate of creation of new debris fragments is higher than the rate of natural removal. The orbits most at risk harbour important space assets – satellites for weather forecasting, oil spill and bush fire detection, and polar ice monitoring." Bewick highlights the case of Envisat, a defunct 8,000kg spacecraft circling Earth in an orbit that is very popular with space agencies and, hence, pretty crowded. "If Envisat collides with a piece of debris or a micrometeorite, the fragments could render the whole orbital region unusable." So can we get the junk down, I asked Massimiliano Vasile, part of the Mechanical & Aerospace Department at the University of Strathclyde and co-ordinator of the Stardust network. He told me defunct satellites in the high GEO region have, for some time, been shifted to higher "graveyard orbits" to keep them out of the way. But that's not an option for items in low Earth orbit. For this, he tells me, researchers are looking seriously into active debris removal – in-orbit capture techniques like harpooning, netting and tethering, the use of contactless systems like ion-beams or lasers, and even onboard robotics to position the junk away from high-risk orbital regions. As for middle Earth orbit – well, ideas are welcome, he says. We're in no immediate danger from Kessler syndrome – but it's not a problem that's going away. Despite Gravity's artistic license, Donald Kessler is pleased to see the phenomenon represented on the big screen. "It is very improbable that events would play out as they did in the film," he says. "But if it raises awareness, then that's great."

### AT: War---1NC

#### Kessler induces restraint, not war.

Bowen 18 [Bleddyn, Lecturer in International Relations at the University of Leicester; ELN; 20 Februrary 2018; “The Art of Space Deterrence,” <https://www.europeanleadershipnetwork.org/commentary/the-art-of-space-deterrence/>] brett

Fourth, the ubiquity of space infrastructure and the fragility of the space environment may create a degree of existential deterrence. As space is so useful to modern economies and military forces, a large-scale disruption of space infrastructure may be so intuitively escalatory to decision-makers that there may be a natural caution against a wholesale assault on a state’s entire space capabilities because the consequences of doing so approach the mentalities of total war, or nuclear responses if a society begins tearing itself apart because of the collapse of optimised energy grids and just-in-time supply chains. In addition, the problem of space debris and the political-legal hurdles to conducting debris clean-up operations mean that even a handful of explosive events in space can render a region of Earth orbit unusable for everyone. This could caution a country like China from excessive kinetic intercept missions because its own military and economy is increasingly reliant on outer space, but perhaps not a country like North Korea which does not rely on space. The usefulness, sensitivity, and fragility of space may have some existential deterrent effect. China’s catastrophic anti-satellite weapons test in 2007 is a valuable lesson for all on the potentially devastating effect of kinetic warfare in orbit.

#### No miscalc from satellite disruptions or space dust -- empirically denied.

Mazur 12 (Jonathan Mazur, Manager Engineering at Northrop Grumman, writing in Space & Defense, from the Eisenhower Center for Space and Defense Studies. Past U.S. Actions: Redlines in Space. Space & Defense, Volume 6, Number 1, Fall 2012. https://inss.ndu.edu/Portals/97/Space\_and\_Defense\_6\_1.pdf?ver=2018-09-06-135424-147)

U.S. Reactions To Foreign Disruption Of U.S. Capabilities

In the 1970s, it was suspected that a U.S. maritime communications satellite was turned off by the Soviets when it was outside of the range of U.S. tracking stations.25 There does not appear to be any documented U.S. reaction, and I suspect there was none. In the mid-1990s, satellite hackers in Brazil began hijacking U.S. military communication satellite signals to broadcast their own information, though it took until 2009 for Brazil to crack down on the illegal activity with the support of the DoD.26 In 1998, a U.S.-German satellite known as ROSAT was rendered useless after it turned suddenly toward the sun. NASA investigators later determined the accident was possibly linked to a cyber-intrusion by Russia.

The fallout? Though there was an ongoing criminal investigation as of 2008; NASA security officials have seemed determined to publicly minimize the seriousness of the threat.27 In 2003, a signal originating from Cuba—later determined to be coming from Iranian embassy property— was jamming a U.S. communications satellite that was transmitting Voice of America programming over Iran, which was publicly referred to as an “act of war” by a U.S. official. 28 Press reporting indicates the U.S. administration was [frozen]“paralyzed” about how to cope with the jamming that continued for at least a month, even after U.S. diplomatic protests to Cuba.29 In 2005, U.S. diplomats protested to the Libyan government after two international satellites were illegally jammed disrupting American diplomatic, military, and FBI communications.30 In 2006, press reporting indicates that China hit a U.S. spy satellite with a ground-based laser. This action was acknowledged by the then director of the NRO, though the DoD remained tight lipped about the incident.31

“We’re at a point where the technology’s out there, and the capability for people to do things to our satellites is there. I’m focused on it beyond any single event.” – Air Force Space Command Commander, General Chilton, 2006 32

In 2009, a U.S. commercial Iridium communications satellite—extensively used by the DoD—was accidently destroyed by a collision with a dead Russian satellite.33 The U.S. company, Iridium, was able to minimize any loss of service by implementing a network solution within a few days.34 As of early 2011, no legal action had been taken by the company either because it is not clear who was at fault or because it might be politically problematic for the United States, which is trying to enter into bi-lateral transparency and confidence-building measures (TCBM) with Russia regarding space activities.35 Since August of 2010, North Korea has been intermittently using GPS jamming equipment, which reportedly has been interfering with U.S. and South Korean military operations and civilian use south of the North Korean border.36 Reportedly, only South Korea and the United Nations International Telecommunications Union—at the request of South Korea—have issued letters to Pyongyang demanding the cessation of disruptive communications signals in South Korea.37

It appears that the only time the U.S. military has responded with force to a disruption in U.S. space capabilities was in 2003, a few days after the start of the Iraq war.38 According to U.S. officials, Iraq was using multiple GPS jammers—which supposedly did not affect military GPS functionality. However, the U.S. military bombed the jammers anyway after a diplomatic complaint to Russia.39 The use of military force against the GPS jamming threat was possibly because the United States was already intervening in Iraq, and the bombing probably would not have occurred if the United States was not at war.

#### No one’s going to war over a downed satellite

Bowen 18 [Bleddyn Bowen, Lecturer in International Relations at the University of Leicester. The Art of Space Deterrence. February 20, 2018. <https://www.europeanleadershipnetwork.org/commentary/the-art-of-space-deterrence/>] brett

Space is often an afterthought or a miscellaneous ancillary in the grand strategic views of top-level decision-makers. A president may not care that one satellite may be lost or go dark; it may cause panic and Twitter-based hysteria for the space community, of course. But the terrestrial context and consequences, as well as the political stakes and symbolism of any exchange of hostilities in space matters more. The political and media dimension can magnify or minimise the perceived consequences of losing specific satellites out of all proportion to their actual strategic effect.

### 1NC---Circumvention

#### The plan must occur through ratifying a binding treaty, otherwise governments can re-interpret it in domestic courts to get out of any obligation not to appropriate space. 1AC Johnson iis a neg argument—if debris is appropriation under the OST it proves it’s not binding since they’re just ignoring it.

#### SPACE Act proves states will reinterpret the law however they want if they’re left to implement domestically.

Durrani 19 [Haris A. \*J.D. candidate, Columbia Law School; Ph.D. candidate, Princeton University, Department of History (Program in History of Science). “Interpreting Space Resources Obtained: Historical and Postcolonial Interventions in the Law of Commercial Space Mining” <https://www.jtl.columbia.edu/volume57-3/interpreting-space-resources-obtained-historical-and-postcolonial-interventions-in-the-law-of-commercial-space-mining>] brett

This Note addresses a fundamental ambiguity in the U.S. Commercial Space Launch Competitiveness Act of 2015 (“CSLCA”). It is unclear whether the statute authorizes U.S. citizens to extract natural resources from asteroids and other celestial bodies, as is commonly assumed. Alternatively, the statute can be read to merely entitle citizens to resources that have already been obtained, where the regime for actually obtaining such resources remains undetermined. The Note resolves this issue in favor of the interpretation that best aligns with international law and policy. It first shows that the relevant elements of international law—the Outer Space Treaty of 1967 (“OST”) and customary international law (“CIL”)—do not resolve the issue. The Note then adopts a broader approach by considering the OST’s anti-imperial policy. By engaging scholarship on law, colonialism, and empire, this approach centers Global South States in space law discourse. This approach reveals two ways in which the more commonly accepted interpretation of the CSLCA cuts against the anti-imperial policy of the OST, related to the distinction between private and State extraction and to State conferral of property rights. To avoid contradicting these policy concerns, the CSLCA should be read narrowly, such that it leaves open future determination of the space resources regime. Finally, the Note offers guidance for such a regime. It argues that CIL development based on subsequent legislation or mining would let Global North States asymmetrically shape international law, which would contradict the OST’s anti-imperial policy. Instead, the Note recommends multilateral agreements that employ organizationally diverse models, which mix collective and private ownership. The Note ends by reflecting on lingering questions in the context of development and the Global South.