# Case Neg – China Heg + Space Debris (Coppell )

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### 1

#### CP: The United States federal government should

#### Establish a national space debris removal program;

#### Engage the commercial sector in space debris removal;

#### Establish special funds at the expense of parties who generate debris;

#### Prioritize transparency in space debris removal.

#### US debris removal solves best — it generates international follow on BUT avoids the downfalls of international cooperation that make solvency impossible.

Ansdell ’10 (Megan; is a graduate student at the George Washington University Elliot School of International Affairs, focusing on space policy; *Active Space Debris Removal: Needs, Implications, and Recommendations for Today’s Geopolitical Environment*; <https://jpia.princeton.edu/sites/jpia/files/space-debris-removal.pdf>; accessed 8/29/19; Julia/MSCOTT)//ww pbj

VI. US Leadership by Example Need to Initiate Unilateral Action International cooperation in space has rarely resulted in cost-effective or expedient solutions, especially in politically-charged areas of uncertain technological feasibility. The International Space Station, because of both political and technical setbacks, has taken over two decades to deploy and cost many billions of dollars—far more time and money than was originally intended. Space debris mitigation has also encountered aversion in international forums. The topic was brought up in COPUOS as early as 1980, yet a policy failed to develop despite a steady flow of documents on the increasing danger of space debris (Perek 1991). In fact, COPUOS did not adopt debris mitigation guidelines until 2007 and, even then, they were legally non-binding. Space debris removal systems could take decades to develop and deploy through international partnerships due to the many interdisciplinary challenges they face. Given the need to start actively removing space debris sooner rather than later to ensure the continued benefits of satellite services, international cooperation may not be the most appropriate mechanism for instigating the first space debris removal system. Instead, one country should take a leadership role by establishing a national space debris removal program. This would accelerate technology development and demonstration, which would, in turn, build-up trust and hasten international participation in space debris removal. Possibilities of Leadership As previously discussed, a recent NASA study found that annually removing as little as five massive pieces of debris in critical orbits could significantly stabilize the long-term space debris environment (Liou and Johnson 2007). This suggests that it is feasible for one nation to unilaterally develop and deploy an effective debris removal system. As the United States is responsible for creating much of the debris in Earth’s orbit, it is a candidate for taking a leadership role in removing it, along with other heavy polluters of the space environment such as China and Russia. There are several reasons why the United States should take this leadership role, rather than China or Russia. First and foremost, the United States would be hardest hit by the loss of satellites services. It owns about half of the roughly 800 operating satellites in orbit and its military is significantly more dependent upon them than any other entity (Moore 2008). For example, GPS precision-guided munitions are a key component of the “new American way of war” (Dolman 2006, 163-165), which allows the United States to remain a globally dominant military power while also waging war in accordance with its political and ethical values by enabling faster, less costly war fighting with minimal collateral damage (Sheldon 2005). The U.S. Department of Defense recognized the need to protect U.S. satellite systems over ten years ago when it stated in its 1999 Space Policy that, “the ability to access and utilize space is a vital national interest because many of the activities conducted in the medium are critical to U.S. national security and economic well-being” (U.S. Department of Defense 1999, 6). Clearly, the United States has a vested interest in keeping the near-Earth space environment free from threats like space debris and thus assuring U.S. access to space. Moreover, current U.S. National Space Policy asserts that the United States will take a “leadership role” in space debris minimization. This could include the development, deployment, and demonstration of an effective space debris removal system to remove U.S. debris as well as that of other nations, upon their request. There could also be international political and economic advantages associated with being the first country to develop this revolutionary technology. However, there is always the danger of other nations simply benefiting from U.S. investment of its resources in this area. Thus, mechanisms should also be created to avoid a classic “free rider” situation. For example, techniques could be employed to ensure other countries either join in the effort later on or pay appropriate fees to the United States for removal services. Recommendations for Leadership in Space Debris Removal Going forward, the U.S. government should engage the commercial sector in space debris removal. Government contracts with several commercial firms would create a competitive environment, encouraging innovation and cost minimization. Having several companies working on the problem at the same time would also accelerate remediation as several critical orbits could be addressed at once. Furthermore, early investments in a domestic space debris removal industry would give the United States a head start in what may become a critical industry over the coming decades. The aforementioned 2009 International Conference on Orbital Debris Removal, co-hosted by DARPA and NASA, suggests that these two agencies could lead U.S. government efforts in space debris removal. However, it is important to recognize that DARPA and NASA are driven by very different motives: one is a civilian space agency, while the other is a defense research agency. Failure to appreciate these differences when establishing mission requirements could lead to a situation like that of the National Polar Environmental Satellite System (NPOESS), where the attempt to combine civil and military requirements into a single satellite resulted in doubling project costs, a launch delay of five years, and ultimately splitting the project into two separate programs (Clark 2010). Furthermore, any system developed through a joint NASA-DARPA partnership would need to be transferred to an operational agency, as both NASA and DARPA are research and development entities. The U.S. Air Force, as it is the primary agency responsible for national security space operations, is a possible option. Funding the development of a national space debris removal system carries risks because, due to the nascent state of the field, detailed cost-benefit estimates have not yet been carried out. The Space Frontier Foundation, however, proposes that the government should establish special funds at the expense of parties who generate debris (Dunstan and Werb 2009). Suggested mechanisms for raising the funds include charging fees for U.S. launches based on the debris potential of the mission, with the size of the fee determined by relevant factors such as the mass of the anticipated debris resulting from the mission and the congestion of the orbit into which the space object is being launched. Satellite manufacturers, operators, and service providers could all share responsibility for payment into such funds. Once debris removal systems are in operation, additional funds could also come from service fees. For example, entities that created debris could pay a specified amount to removal providers in return for the service rendered. Any national space debris removal program must also be kept transparent with ongoing international dialogue in forums such as COPUOS so that other nations can build-up trust in the effectiveness and efficiency of the program. A proven debris removal program will result in more productive discussions in these international forums. VII. Conclusion If the United States and other powerful governments do not take steps now to avert the potentially devastating effects of space debris, the issue risks becoming stalemated in a manner similar to climate change. Given the past hesitation of international forums in addressing the space debris issue, unilateral action is the most appropriate means of instigating space debris removal within the needed timeframe. The United States is well poised for a leadership role in space debris removal. Going forward, the U.S. government should work closely with the commercial sector in this endeavor, focusing on removing pieces of U.S. debris with the greatest potential to contribute to future collisions. It should also keep its space debris removal system as open and transparent as possible to allow for future international cooperation in this field.

### 2

#### Private companies are set to mine in space – new tech and profit motives make space lucrative

Gilbert 21, (Alex Gilbert is a complex systems researcher and PhD student in Space Resources at the Colorado School of Mines, “Mining in Space is Coming”), 4-26-21, Milken Institute Review, https://www.milkenreview.org/articles/mining-in-space-is-coming // MNHS NL

Space exploration is back. after decades of disappointment, a combination of better technology, falling costs and a rush of competitive energy from the private sector has put space travel front and center. indeed, many analysts (even some with their feet on the ground) believe that commercial developments in the space industry may be on the cusp of starting the largest resource rush in history: mining on the Moon, Mars and asteroids. While this may sound fantastical, some baby steps toward the goal have already been taken. Last year, NASA awarded contracts to four companies to extract small amounts of lunar regolith by 2024, effectively beginning the [era of commercial space mining](https://payneinstitute.mines.edu/wp-content/uploads/sites/149/2020/09/Payne-Institute-Commentary-The-Era-of-Commercial-Space-Mining-Begins.pdf). Whether this proves to be the dawn of a gigantic adjunct to mining on earth — and more immediately, a key to unlocking cost-effective space travel — will turn on the answers to a host of questions ranging from what resources can be efficiently. As every fan of science fiction knows, the resources of the solar system appear virtually unlimited compared to those on Earth. There are whole other planets, dozens of moons, thousands of massive asteroids and millions of small ones that doubtless contain humungous quantities of materials that are scarce and very valuable (back on Earth). Visionaries including Jeff Bezos [imagine heavy industry moving to space](https://www.fastcompany.com/90347364/jeff-bezos-wants-to-save-earth-by-moving-industry-to-space) and Earth becoming a residential area. However, as entrepreneurs look to harness the riches beyond the atmosphere, access to space resources remains tangled in the realities of economics and governance. Start with the fact that space belongs to no country, complicating traditional methods of resource allocation, property rights and trade. With limited demand for materials in space itself and the need for huge amounts of energy to return materials to Earth, creating a viable industry will turn on major advances in technology, finance and business models. That said, there’s no grass growing under potential pioneers’ feet. Potential economic, scientific and even security benefits underlie an emerging geopolitical competition to pursue space mining. The United States is rapidly emerging as a front-runner, in part due to its ambitious Artemis Program to lead a multinational consortium back to the Moon. But it is also a leader in creating a legal infrastructure for mineral exploitation. The United States has adopted the world’s first spaceresources law, recognizing the property rights of private companies and individuals to materials gathered in space. However, the United States is hardly alone. Luxembourg and the United Arab Emirates (you read those right) are racing to codify space-resources laws of their own, hoping to attract investment to their entrepot nations with business-friendly legal frameworks. China reportedly views space-resource development as a national priority, part of a strategy to challenge U.S. economic and security primacy in space. Meanwhile, Russia, Japan, India and the European Space Agency all harbor space-mining ambitions of their own. Governing these emerging interests is an outdated treaty framework from the Cold War. Sooner rather than later, we’ll need [new agreements](https://issues.org/new-policies-needed-to-advance-space-mining/) to facilitate private investment and ensure international cooperation.

Back up for a moment. For the record, space is already being heavily exploited, because space resources include non-material assets such as orbital locations and abundant sunlight that enable satellites to provide services to Earth. Indeed, satellite-based telecommunications and global positioning systems have become indispensable infrastructure underpinning the modern economy. Mining space for materials, of course, is another matter. In the past several decades, planetary science has confirmed what has long been suspected: celestial bodies are potential sources for dozens of natural materials that, in the right time and place, are incredibly valuabl**e**. Of these, water may be the most attractive in the near-term, because — with assistance from solar energy or nuclear fission — H2O can be split into hydrogen and oxygen to make rocket propellant, facilitating in-space refueling. So-called “rare earth” metals are also potential targets of asteroid miners intending to service Earth markets. Consisting of 17 elements, including lanthanum, neodymium, and yttrium, these critical materials (most of which are today mined in China at great environmental cost) are required for electronics. And they loom as bottlenecks in making the transition from fossil fuels to renewables backed up by battery storage. The Moon is a prime space mining target. Boosted by NASA’s mining solicitation, it is likely the first location for commercial mining. The Moon has several advantages. It is relatively close, requiring a journey of only several days by rocket and creating communication lags of only a couple seconds — a delay small enough to allow remote operation of robots from Earth. Its low gravity implies that relatively little energy expenditure will be needed to deliver mined resources to Earth orbit. The Moon may look parched — and by comparison to Earth, it is. But recent probes have confirmed substantial amounts of water ice lurking in [permanently shadowed craters](http://lroc.sese.asu.edu/posts/1105) at the lunar poles. Further, it seems that solar winds have implanted significant deposits of helium-3 (a light stable isotope of helium) across the equatorial regions of the Moon. Helium-3 is a potential fuel source for second and third-generation fusion reactors that one hopes will be in service later in the century. The isotope is packed with energy (admittedly hard to unleash in a controlled manner) that might augment sunlight as a source of clean, safe energy on Earth or to power fast spaceships in this century. Between its water and helium-3 deposits, the Moon could be the resource stepping-stone for further solar system exploration. Asteroids are another near-term [mining target](https://foreignpolicy.com/2016/04/28/the-asteroid-miners-guide-to-the-galaxy-space-race-mining-asteroids-planetary-research-deep-space-industries/). There are all sorts of space rocks hurtling through the solar system, with varying amounts of water, rare earth metals and other materials on board. The asteroid belt between the orbits of Mars and Jupiter contains most of them, many of which are greater than a kilometer in diameter. Although the potential water and mineral wealth of the asteroid belt is vast, the long distance from Earth and requisite travel times and energy consumption rule them out as targets in the near term. The prospects for space mining are being driven by technological advances across the space industry. The rise of reusable rocket components and the now-widespread use of off-the-shelf parts are lowering both launch and operations costs. Once limited to government contract missions and the delivery of telecom satellites to orbit, private firms are now emerging as leaders in developing “NewSpace” activities — a catch-all term for endeavors including orbital tourism, orbital manufacturing and mini-satellites providing specialized services. The space sector, with a market capitalization of $400 billion, could grow to as much as $1 trillion by 2040 as private investment soars.

#### OST defines appropriation as occupation, use, or any other means – the aff definitely links

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Based on the premise of ‘res communis’, the magna carta of space law, the OST, illustrates outer space as “the province of all mankind”.[l] Under Article I, States are free to explore and use outer space and to access all celestial bodies “on the basis of equality and in accordance with international law.”[li] Although the OST does not explicitly mention “mining” activities, under Article II, outer space including the Moon and other celestial bodies are “not subject to national appropriation by claim of sovereignty” through use, occupation or any other means.[lii] Furthermore, the Moon Agreement, 1979, not only defines outer space as “common heritage of mankind” but also proscribes commercial exploitation of planets and asteroids by States unless an international regime is established to govern such activities for “rational management,” “equitable sharing” and “expansion of opportunities” in the use of these resources.[liii]

#### Private companies are key to space success

Ferholz 21, (Tim Ferholz covers space, the economy, and geopolitics for Quartz. He is the author of “Rock Billionaires: Elon Musk, Jeff Bezos, and the New Space Race, “NASA Has Always Needed Private Companies To Go To The Moon”), 6-24-21, Quartz, https://qz.com/2024339/nasa-has-always-needed-private-space-companies-to-go-to-the-moon/ // MNHS NL

“We got to the Moon without private contractors, if I’m not mistaken,” US rep. Jamaal Bowman [said yesterday](https://science.house.gov/hearings/a-review-of-the-presidents-fiscal-year-2022-budget-proposal-for-nasa), leading me to collapse in a frothing heap. NASA administrator Bill Nelson had a calmer response: “In the Apollo program, Mr. Congressman, we got to the Moon with American corporations.” A dozen major US companies worked closely with the US space agency to build the vehicles that took the first humans to the lunar surface. NASA scientists and engineers planned the mission and the technology needed to accomplish it, then worked with the most advanced tech firms of the day to produce rockets, capsules, landers, suits, and rovers. There’s no doubt Apollo was a big government program, but the private sector was essential. Why does this history matter? In the last decade, the US space program has made major leaps by handing more work directly to private firms. Rather than designing a new space vehicle to carry cargo or astronauts to the International Space Station and hiring someone to build it, NASA effectively told its needs to the marketplace, and accepted proposals from companies that would not only design the spacecraft, but operate them as a service. This choice launched SpaceX and a new era of private sector space in the US. The logic of this kind of partnership rests on several factors: These are tasks that have been done before, paving the way for new organizations to take them on more easily. Private firms are now willing to invest their own capital alongside the government, saving public money. They can take more risk, and use more advanced program management techniques than government-run programs. And they seem to result in more accountability for taxpayers when things go wrong: NASA shoulders the extra cost for Boeing’s long-delayed and over-budget SLS rocket, a traditional program; the same company is paying hundreds of millions of dollars to re-test its Starliner spacecraft, bought through a public-private partnership. As the US plans its return to the Moon, a debate is emerging about the role of private firms. NASA has hired them to do everything from sending robots on the lunar surface to developing the landers that will carry humans there. In the House, lawmakers like science committee chair Eddie Bernice Johnson are skeptical that companies can take on these tasks. This isn’t a crazy worry: Landing on another astronomical body is a greater challenge than flying to low-earth orbit, and there are far fewer obvious non-government customers in the lunar transit market. For now, NASA has hired Elon Musk’s SpaceX to build lunar landers. Jeff Bezos’ Blue Origin is challenging the government’s choice, delaying the whole program until at least August. The corporate tussle, and the two companies’ decision to market themselves as personal projects of their controversial billionaire founders, have led opponents to portray NASA’s partnerships as corporate handouts. But make no mistake: The alternative is still money for corporations—likely much more, and with fewer strings attached.

#### Squo private companies are willing to invest, but the plan crosses a perception barrier which destroys investment

Shaw 13 - Lauren E, J.D. from Chapman University School of Law, ”Asteroids, the New Western Frontier: Applying Principles of the General Mining Law of 1872 to Incentive Asteroid Mining”, JOURNAL OF AIR LAW AND COMMERCE, Volume 78, Issue 1, Article 2, <https://scholar.smu.edu/cgi/viewcontent.cgi?article=1307&context=jalc> // recut MNHS NL

To some, the mining of asteroids might sound like the premise of a science fiction novel' or the solution to the heartwrenching, fictional scenario depicted in the film Armageddon.2 To others, it evokes a fantastical idea that may come to fruition in a distant reality. However, impressively funded companies have plans to send spacecraft to begin prospecting on asteroids within the next two years.' The issues associated with the mining of asteroids should be addressed before these plans are set in motion. Much has been written about the issues that might arise from allowing nations to own these space bodies and the minerals they contain; one such issue is the impact on international treaties.4 However, little has been written about the applicability of preexisting mining laws-which provide a basic property right scheme for the private sector-such as the General Mining Law of 1872 (Mining Law) to the management of asteroid mining.' The literature to date on how to legally address asteroid mining is minimal.' The articles that do address it propose the creation of different systems, such as a "property rights-based system that relies on the doctrine of first possession"7 or an international authority that would regulate mining operations.' Implementing a scheme that offers ownership of extracted resources without bestowing complete sovereignty is necessary to avoid an impending legal limbo-that is, an outer space "Wild West" equivalent where there is neither certainty nor security in who owns what.9 If private sector miners of asteroids know this right already exists, they will have more incentive to extract resources.' 0 This, in turn, would increase the chances of successful missions, resulting in numerous scientific and explorative benefits, along with the potential replenishment of key elements that are becoming increasingly depleted on Earth yet are still needed for modern industry. Scientists speculate that key elements needed for modern industry, including platinum, zinc, copper, phosphorus, lead, gold, and indium, could become depleted on Earth within the next fifty to sixty years." Many of these metals, such as platinum, are chemical elements that, unlike oil or diamonds, have no synthetic alternative.12 Once the reserves on Earth are mined to complete depletion, industries will be forced to recycle the existing supply of minerals, which will result in increased costs due to increased scarcity.' 3 However, evidence is accumulating that asteroids only a few hundred thousand miles away from Earth may be composed of an abundance of natural resources-including many of the minerals being mined to depletion on Earth-that could lead to vast profits." Most of the minerals being mined on Earth, including gold, iron, platinum, and palladium, originally came from the many asteroids that hit the Earth after the crust cooled during the planet's formation.'

#### Space mining is the only way to solve climate change

Duran 21, (Paloma Duran is a journalist and industry analyst at Mexico Business News, “Is Space Mining the Best Option to Face Climate Change?”), 11-03-21, Mexico Business News, https://mexicobusiness.news/mining/news/space-mining-best-option-face-climate-change // MNHS NL

Going to net zero means that more mining is needed. Experts have said that the current supply cannot support the necessary metals demand for the green transition. As a result, new mining alternatives have gained greater relevance, among them is space mining. Several countries, including Mexico, have shown their interest in this alternative, creating a new space race. “The solar system can support a billion times greater industry than we have on Earth. When you go to vastly larger scales of civilization, beyond the scale that a planet can support, then the types of things that civilization can do are incomprehensible to us … We would be able to promote healthy societies all over the world at the same time that we would be reducing the environmental burden on the Earth,” said Dr. Phil Metzger, Planetary Scientist at the University of Central Florida. Currently, there are several attempts to address global warming and transition to a net zero carbon economy. There has been an increasing interest in renewable energy and infrastructure, which has increased demand for various minerals, especially lithium, cobalt, nickel, copper and rare earth elements. However, according to experts, the world is close to entering a metals supercycle, where demand will exceed available supply, causing prices to skyrocket. Consequently, the mining industry has sought alternatives to achieve the required supply. Options include recycling and improved mine waste management, sea mining and space mining. The latter is considered one of the alternatives with the greatest potential. However, a regulatory framework is still lacking and there is almost no experience in this regard. Despite the lack of knowledge regarding space mining, it has become a very attractive option since the planet is running out of resources. While some people believe that land-based mining is cheaper than space mining, experts believe this may change in the long term. Furthermore, within the solar system there are countless bodies rich in minerals, ores and elements that will accelerate the fight against climate change. “There will come a point when there is nothing left to mine on the surface, prompting mines to reach even further below. But even those resources are destined to run out and so we will aim toward ocean mining, which already has specific technologies that are being developed. Nevertheless, even those mines are limited as well. The mine of the future, which today may seem unlikely, will no longer be on our planet. There will be a time when space mining will be as common as an open leach mine,” Eder Lugo, Minerals Head at Siemens, told MBN. More than 150 million asteroids measuring approximately 100m are believed to be in the inner solar system alone. In addition, astronomers have also identified abundant minerals near the Earth’s space and the Main Asteroid Belt. There are three main groups into which asteroids are divided: C- type, S- type, and M- type. The last two groups are the most abundant in minerals such as gold, platinum, cobalt, zinc, tin, lead, indium, silver, copper and rare earth metals. "Energy is limited here. Within just a few hundred years, you will have to cover all of the landmass of Earth in solar cells. So, what are you going to do? Well, what I think you are going to do is you are going to move out in space … all of our heavy industry will be moved off-planet and Earth will be zoned residential and light-industrial,” said Jeff Bezos, Founder of Amazon and the Space Launch Provider Blue Origin.

#### Anthropogenic warming causes extinction --- mitigation efforts now are key

Griffin, 2015 (David, Professor of Philosophy at Claremont, “The climate is ruined. So can civilization even survive?”, CNN, 4/14/2015, <http://www.cnn.com/2015/01/14/opinion/co2-crisis-griffin/> )

Although most of us worry about other things, climate scientists have become increasingly worried about the survival of civilization. For example, Lonnie Thompson, who received the U.S. National Medal of Science in 2010, said that virtually all climatologists "are now convinced that global warming poses a clear and present danger to civilization." Informed journalists share this concern. The climate crisis "threatens the survival of our civilization," said Pulitzer Prize-winner Ross Gelbspan. Mark Hertsgaard agrees, saying that the continuation of global warming "would create planetary conditions all but certain to end civilization as we know it." These scientists and journalists, moreover, are worried not only about the distant future but about the condition of the planet for their own children and grandchildren. James Hansen, often considered the world's leading climate scientist, entitled his book "Storms of My Grandchildren." The threat to civilization comes primarily from the increase of the level of carbon dioxide (CO2) in the atmosphere, due largely to the burning of fossil fuels. Before the rise of the industrial age, CO2 constituted only 275 ppm (parts per million) of the atmosphere. But it is now above 400 and rising about 2.5 ppm per year. Because of the CO2 increase, the planet's average temperature has increased 0.85 degrees Celsius (1.5 degrees Fahrenheit). Although this increase may not seem much, it has already brought about serious changes. The idea that we will be safe from "dangerous climate change" if we do not exceed a temperature rise of 2C (3.6F) has been widely accepted. But many informed people have rejected this assumption. In the opinion of journalist-turned-activist Bill McKibben, "the one degree we've raised the temperature already has melted the Arctic, so we're fools to find out what two will do." His warning is supported by James Hansen, who declared that "a target of two degrees (Celsius) is actually a prescription for long-term disaster." The burning of coal, oil, and natural gas has made the planet warmer than it had been since the rise of civilization 10,000 years ago. Civilization was made possible by the emergence about 12,000 years ago of the "Holocene" epoch, which turned out to be the Goldilocks zone - not too hot, not too cold. But now, says physicist Stefan Rahmstorf, "We are catapulting ourselves way out of the Holocene." This catapult is dangerous, because we have no evidence civilization can long survive with significantly higher temperatures. And yet, the world is on a trajectory that would lead to an increase of 4C (7F) in this century. In the opinion of many scientists and the World Bank, this could happen as early as the 2060s. What would "a 4C world" be like? According to Kevin Anderson of the Tyndall Centre for Climate Change Research (at the University of East Anglia), "during New York's summer heat waves the warmest days would be around 10-12C (18-21.6F) hotter [than today's]." Moreover, he has said, above an increase of 4C only about 10% of the human population will survive. Believe it or not, some scientists consider Anderson overly optimistic. The main reason for pessimism is the fear that the planet's temperature may be close to a tipping point that would initiate a "low-end runaway greenhouse," involving "out-of-control amplifying feedbacks." This condition would result, says Hansen, if all fossil fuels are burned (which is the intention of all fossil-fuel corporations and many governments). This result "would make most of the planet uninhabitable by humans." Moreover, many scientists believe that runaway global warming could occur much more quickly, because the rising temperature caused by CO2 could release massive amounts of methane (CH4), which is, during its first 20 years, 86 times more powerful than CO2. Warmer weather induces this release from carbon that has been stored in methane hydrates, in which enormous amounts of carbon -- four times as much as that emitted from fossil fuels since 1850 -- has been frozen in the Arctic's permafrost. And yet now the Arctic's temperature is warmer than it had been for 120,000 years -- in other words, more than 10 times longer than civilization has existed. According to Joe Romm, a physicist who created the Climate Progress website, methane release from thawing permafrost in the Arctic "is the most dangerous amplifying feedback in the entire carbon cycle." The amplifying feedback works like this: The warmer temperature releases millions of tons of methane, which then further raise the temperature, which in turn releases more methane. The resulting threat of runaway global warming may not be merely theoretical. Scientists have long been convinced that methane was central to the fastest period of global warming in geological history, which occurred 55 million years ago. Now a group of scientists have accumulated evidence that methane was also central to the greatest extinction of life thus far: the end-Permian extinction about 252 million years ago. Worse yet, whereas it was previously thought that significant amounts of permafrost would not melt, releasing its methane, until the planet's temperature has risen several degrees Celsius, recent studies indicate that a rise of 1.5 degrees would be enough to start the melting. What can be done then? Given the failure of political leaders to deal with the CO2 problem, it is now too late to prevent terrible developments. But it may -- just may -- be possible to keep global warming from bringing about the destruction of civilization. To have a chance, we must, as Hansen says, do everything possible to "keep climate close to the Holocene range" -- which means, mobilize the whole world to replace dirty energy with clean as soon as possible.

## 1NC – Case

### AT: Inequality

#### Space privatization is good—it prevents war and ensures sustainably-sourced space projects for public good – turns inequality

Frankowski 17 [(Paweł, assistant Professor at the Chair of International Relations and Foreign Policy, Institute of Political Science and International Relations, Jagiellonian University) “Outer Space and Private Companies: Consequences for Global Security,” 2017, pg. 144-145] TDI

In the terms of privatization and space security, space remains relatively untapped, but commercial and military benefits from space exploration/exploitation could even lead to ‘privatization of space’. Such privatization will result from growing pressure on spacefaring countries to defect from cooperation, since is less viable with good number of multiple actors who entered the space.36 However, space policy and space research are characterized by very high costs, which are rather impossible to bear by private companies, limited by economic calculation. As pointed out earlier, under-investment in technological development by private companies it is related to the fact that these actors are not focused on profits of a social nature, such as improving the quality of life of the recipient of the product.37 This makes some technology, potentially beneficial to society, not developed or introduced into use, because the profit margin is too small to make this viable for commercial players.

To conclude, privatization of space security can develop in unexpected way, but in today’s space environment private actors would rather play the role of security regulators than security providers. When investment in space technologies is less profitable than other areas of economy, private actors would focus on soft law and conflict prevention in space, and new private initiatives will appear. For example, apart from important space companies, as SpaceX or Blue Origin active in outer space, other private actors as Secure World Foundation (SWF), who focus on space sustainability, will play more important role in crafting international guidelines for space activities.38 This path the way for future solutions and projects, as cleaning the space debris, extracting resources from asteroids and planetoids, refuelling satellites, providing payload capabili-ties for governmental entities on market-based logic, will be based on activity non-state actors, providing soft law and regulatory solutions, where space faring states are unable to find any compromise. Therefore private companies will be in fact global (or space) regulators, as part of UNCOPUS, being involved in space activities.39

The last argument for private involvement in space security comes from an approach based on common good and resilience of space assets, emphasized by the Project Ploughshares, as an important part of space security. As of 2017 there are more than 700,000 man-made objects on the Earth’s orbit bigger than 1 cm, while 17,000 of them are bigger than 10 cm.40 Some of them are traced by SSA systems, both American and European, but these systems are public-military owned, and private operators are not granted any access to this data. Any collision of space object with space debris, even with small particles, might result in a chain reaction, called Kessler’s syndrome, and not only private but public, and military assets will be destroyed or impaired. In such conditions, a reluctant cooperation between the public and private sector, and unwillingness to share vulnerable data by public actors seem to confirm that private space activity is more than necessary. This is an apparent case when logic of mistrust between state powers must be overcome by private actors, perhaps by suggesting common preferences for debris mitigation, and space situational awareness. In the case of space debris, Space Data Association, an initiative supported by private sector, with its main aim to enhance data sharing between commercial satellite operators, could be an example of nascent public good provided by private actors for the sake of global security.

### AT: China War

#### Prisoners’ dilemma means circumvention will always happen

Chanock 13 (Alexander Chanock, J.D. 2014, UCLA School of Law, “THE PROBLEMS AND POTENTIAL SOLUTIONS RELATED TO THE EMERGENCE OF SPACE WEAPONS IN THE 21ST CENTURY,” Journal of Air, Law, and Commerce. Volume 78, Issue 3. 2013. <https://scholar.smu.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1327&context=jalc)//ww> pbj

Although space doves have many valid arguments for reducing the danger of space weaponization, in reality, it is unlikely that their ideas will prevail. One problem with a complete ban on space weaponization is that it invokes the problems of the prisoners' dilemma.116 If the United States decides to stop production of space weapons and the other superpowers, such as China and Russia, do the same, then all of the parties win. However, if a country like China or Russia decides to violate a prohibition agreement by developing weapons, it could potentially have a significant head start in the space weapons race, which would weaken the United States' military ability. Whether such a scenario will occur is difficult to predict, but the principles of the prisoners' dilemma indicate that there remains a strong possibility that the parties will secretly develop the weapons to gain an advantage. The incentive to "defect" will always remain, which makes a long-term solution addressing space weaponization almost impossible to achieve, even if the United States spearheads the effort."' Thus, there is a strong argument against space doves that the most rational choice is to develop space weapons to ensure that the United States gets placed in an advantageous position in the prisoners' dilemma.

#### Alt Cause – China’s Space Program IS the military program; that means the government will appropriate directly or be helped by private entities.

Lee and Singer 21 (By TAYLOR A. LEE and PETER W. SINGER, July 16, 2021, China’s Space Program Is More Military Than You Might Think Proposals for U.S.-Chinese cooperation must proceed carefully, Defense One, <https://www.defenseone.com/ideas/2021/07/chinas-space-program-more-military-you-might-think/183790/)//ww> pbj

On the 4th of July, China celebrated its taikonauts’ first-ever space walk outside the country’s first permanent space station, the Tiangong (“Heavenly Palace”). The extravehicular activity marked yet another major step for the country’s ambitious space program, and a vivid sign of what is to come. In the next five years, China intends to collect samples from a near-Earth asteroid, conduct two lunar polar exploration missions, and finish construction of its 60-ton space station. This remarkable growth has led to a spate of recent international space cooperation programs with China, including European Space Agency and taikonauts training together and a reported 42 applications of interest for joint research programs. Some are urging the U.S. and China to collaborate in space as a means to dampen great power tension, though the Wolf Amendment has since 2011 effectively barred NASA from such cooperation. The militarized tilt of the Chinese space program complicates these plans. Space planning and directing organizations, the ground infrastructure supporting its space programs, and the taikonauts themselves are all under the purview of the People’s Liberation Army. Understanding these connections is important for any plans to cooperate with China in space, whether governmental or commercial. On the organizational side, China’s equivalent to NASA is the civilian China National Space Administration, which has a focus on the space program’s international exchanges. It falls under the State Administration for Science, Technology and Industry for National Defense, which handles defense-related science and technology, including China’s state-owned defense conglomerates. However, unlike NASA, the CNSA doesn’t oversee China’s astronauts. The organization actually in charge of China’s manned space program is the China Manned Space Engineering Office, which is under China’s Central Military Commission Equipment Development Department. Likewise, the infrastructure of China’s space program is also heavily militarized. The launch sites, control centers, and many of the satellites are directly run by the PLA. Taikonauts lift off from the Jiuquan Satellite Launch Center (aka Base 20 of the PLA’s Strategic Support Force, its space and cyber arm); directed by the PLASSF’s Beijing Aerospace Flight Control Center, with Telemetry, Tracking and Control support from the Xi’an Satellite Control Center (aka the PLASSF’s Base 26); and land at one of two sites in Inner Mongolia operated by the two bases. Finally, there is the human element. While most NASA astronauts are members of the U.S. military, others are civilian scientists and even teachers. In contrast, all taikonauts are active members of the PLASSF. They make up the Astronaut Corps under the PLASSF Space Systems Department’s China Astronaut Research and Training Center. The first astronauts to fully undergo training at the Center, which began operations in the late 1990s, were all chosen from the PLA Air Force. (An earlier effort to establish a manned space program in the 1960s and ’70s faltered.) Since then, China has held two more rounds of taikonaut selection, with the most recent apparently taking some candidates outside the military, but as noted above serving under the PLASSF.

#### They’ll say the aff bans private entities helping the government, but the aff can’t ban private entities helping the government appropriate since that’s infinitely regressive – means the aff would ban companies selling water to the government since that helps out astronauts which the aff obviously doesn’t

#### Economic interdependence checks conflict—both China and the US rely on each other’s economic gains

Michael **Mandelbaum 2019**--(Michael Mandelbaum, The New Containment, Foreign Affairs, March/April 2019 Issue, https://www.foreignaffairs.com/articles/china/2019-02-12/new-containment)//ND

Economic interdependence will complicate containment. China, for example, may be a political and military rival, but it is also a crucial economic partner. The United States depends on China to finance its deficits. China depends on the United States to buy its exports. Containment in Asia will thus require other policies as well, because although a Chinese military collapse would enhance Asian security, a Chinese economic collapse would bring economic disaster. Together, these differences make today’s containment a less urgent challenge than its Cold War predecessor. The United States does not have to deal with a single mortal threat from a country committed to remaking the entire world in its own image. It must address three serious but lesser challenges, mounted by countries seeking not heaven on earth but greater regional power and autonomy. But if today’s challenges are less epic, they are far more complicated. The old containment was simple, if not easy. The new containment will have to blend a variety of policies, carefully coordinated with one another in design and execution. This will tax the ingenuity and flexibility of the United States and its allies.

#### Space hotline checks miscalc

Jones 15 – (Sam, 11/20/15, “US and China set up ‘space hotline’,” https://www.ft.com/content/900870f4-8f9f-11e5-a549-b89a1dfede9b, Accessed 12/17/16, HWilson)//ww pbj

Washington and Beijing have established an emergency “space hotline” to reduce the risk of accidental conflict. As fears grow of an orbital arms race, the new communications channel between the US and China — like the nuclear hotlines of the cold war — will serve as a diplomatic safety valve. By sharing technical information, officials hope that misunderstandings can be avoided and problems quickly resolved.

#### Chinese pursuit of heg inevitable – already happening

Wagner 19 – Daniel Wagner, founder and CEO of Country Risk. He has three decades of experience assessing cross-border risk, is an authority on political risk insurance and analysis, and has worked for some of the world’s most respected and best-known companies, such as AIG, GE, the Asian Development Bank and the World Bank Group. He is the author of six books — "China Vision," "AI Supremacy," "Virtual Terror," "Global Risk Agility and Decision-Making," "Managing Country Risk" and "Political Risk Insurance Guide" — as well as more than 600 articles on current affairs and risk management. “The Coming Chinese World Order”, 2,19,19, (<https://www.fairobserver.com/region/asia_pacific/china-rising-new-world-order-us-trade-war-news-16521)> // JQ

China and the United States remain engaged in the most serious trade dispute the world has seen in generations. Today, English remains the world’s predominant language, the US is the world’s largest economy and the dollar its reserve currency, Google is the world’s primary search engine and Facebook the largest social media platform. But in 30 years, **once China’s Belt and Road Initiative is completed, Beijing’s ability to project its soft and hard power will be greatly enhanced. If predictions prove correct, China will in a few years become the world’s largest economy, and parents around the world will ensure that their children speak Mandarin (if they do not already).** Once the Chinese government makes the yuan fully convertible, it could well become the world’s reserve currency, and given the growth in Chinese speakers, it could well be Baidu that becomes the world’s predominant search engine, and Weibo that supplants Facebook. **The growth in the Chinese middle class,** already larger than the US, will help ensure that **China weans itself of overdependence on exports to sustain growth and becomes increasingly self-reliant for economic development.** If President Xi Jinping has his way, it will be China that is the world’s center of gravity. The coming Chinese world order is likely to be devoid of the kinds of checks and balances we take for granted in the post-World War II system. Rather, **it is more likely to be akin to a transaction-driven landscape where the strongest party rules, and the weak are considered collateral damage. This transformation has already begun**, and as it is occurring, the US and many other countries are essentially asleep at the wheel. As domestic crisis upon crisis piles up, the world’s leading **Western economies continue to turn their attention inward**, preoccupied with political and economic issues at home and functioning with unipolar blinders on. **Many of the world’s leaders fail to see all that Beijing is doing and fail to appreciate the implications for the future.** Not since the modern liberal order was born in the 1940s has the world had to grapple with the possibility of its demise — at the hands of a rising China. Just at a time when the world is in need of the stability and good governance it has had the luxury of relying upon for decades, it must contemplate transitioning to a world order not of the West’s choosing. **Clearly, the era of US hegemony is coming to an end.** Will the global institutions it was so instrumental in creating become less relevant and influential with time? Will Beijing be successful in crafting new institutions derived from a Chinese footprint? If so, will good governance and rule of law be consistent with such organizations? Only time will tell, of course. What is certain is that Beijing’s realization of the Chinese century is sure to be infused with precepts and applications that are uniquely Chinese. The world has yet to fully contemplate all that this portends, but **President Xi wants to achieve a pathway that guarantees the supremacy of China throughout this century and beyond**. He is likely to do just that, for he has a vision not only for how China reigns supreme in the economic, political, diplomatic, technological and, eventually, military arena, but also how it gets there. That is certainly more than can be said for the United States at this juncture, much less of other Western powers that appear to be sitting on the sidelines as Beijing smashes barrier after barrier for how things get done. **Xi deserves credit for having a vision of the future and for acting swiftly and decisively to achieve it** — whether in the **area of technology** (where China is outspending Silicon Valley to achieve AI supremacy), **building the world’s largest navy** by number of ships (currently in second place behind North Korea), landing a probe on the dark side of the moon as evidence of its growing strength in the field of science, or seeking to influence the world’s media. **China is engaged in a multi-pronged effort to become influential in a wide spectrum of areas** of global importance.

### AT: Space Debris

#### Collision is unlikely – all countries receive collision warnings THREE days ahead AND their evidence doesn’t assume new technology.

**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]//ww pbj

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).

#### No debris impact at every layer of space

Fange 17 (Daniel von Fange. Web Application Engineer. “Kessler Syndrome is Over Hyped,” *Braino*, 5/21/17, <http://braino.org/essays/kessler_syndrome_is_over_hyped/>) dwc 19)//ww pbj

Kessler Syndrome is overhyped. A chorus of online commenters great any news of upcoming low earth orbit satellites with worry that humanity will to lose access to space. I now think they are wrong. //// What is Kessler Syndrome? Here’s the popular view on Kessler Syndrome. Every once in a while, a piece of junk in space hits a satellite. This single impact destroys the satellite, and breaks off several thousand additional pieces. These new pieces now fly around space looking for other satellites to hit, and so exponentially multiply themselves over time, like a nuclear reaction, until a sphere of man-made debris surrounds the earth, and humanity no longer has access to space nor the benefits of satellites.//// It is a dark picture.//// Is Kessler Syndrome likely to happen? I had to stop everything and spend an afternoon doing back-of-the-napkin math to know how big the threat is. To estimate, we need to know where the stuff in space is, how much mass is there, and how long it would take to deorbit. //// The orbital area around earth can be broken down into four regions. //// Low LEO - Up to about 400km. Things that orbit here burn up in the earth’s atmosphere quickly - between a few months to two years. The space station operates at the high end of this range. It loses about a kilometer of altitude a month and if not pushed higher every few months, would soon burn up. For all practical purposes, Low LEO doesn’t matter for Kessler Syndrome. If Low LEO was ever full of space junk, we’d just wait a year and a half, and the problem would be over.///// High LEO - 400km to 2000km. This where most heavy satellites and most space junk orbits. The air is thin enough here that satellites only go down slowly, and they have a much farther distance to fall. It can take 50 years for stuff here to get down. This is where Kessler Syndrome could be an issue. /// Mid Orbit - GPS satellites and other navigation satellites travel here in lonely, long lives. The volume of space is so huge, and the number of satellites so few, that we don’t need to worry about Kessler here. //// GEO - If you put a satellite far enough out from earth, the speed that the satellite travels around the earth will match the speed of the surface of the earth rotating under it. From the ground, the satellite will appear to hang motionless. Usually the geostationary orbit is used by big weather satellites and big TV broadcasting satellites. (This apparent motionlessness is why satellite TV dishes can be mounted pointing in a fixed direction. You can find approximate south just by looking around at the dishes in your northern hemisphere neighborhood.) For Kessler purposes, GEO orbit is roughly a ring 384,400 km around. However, all the satellites here are moving the same direction at the same speed - debris doesn’t get free velocity from the speed of the satellites. Also, it’s quite expensive to get a satellite here, and so there aren’t many, only about one satellite per 1000km of the ring. Kessler is not a problem here. //// How bad could Kessler Syndrome in High LEO be? Let’s imagine a worst case scenario. //// An evil alien intelligence chops up everything in High LEO, turning it into 1cm cubes of death orbiting at 1000km, spread as evenly across the surface of this sphere as orbital mechanics would allow. Is humanity cut off from space? //// I’m guessing the world has launched about 10,000 tons of satellites total. For guessing purposes, I’ll assume 2,500 tons of satellites and junk currently in High LEO. If satellites are made of aluminum, with a density of 2.70 g/cm3, then that’s 839,985,870 1cm cubes. A sphere for an orbit of 1,000km has a surface area of 682,752,000 square KM. So there would be one cube of junk per .81 square KM. If a rocket traveled through that, its odds of hitting that cube are tiny - less than 1 in 10,000. ////// So even in the worst case, we don’t lose access to space. // Now though you can travel through the debris, you couldn’t keep a satellite alive for long in this orbit of death. Kessler Syndrome at its worst just prevents us from putting satellites in certain orbits. //// In real life, there’s a lot of factors that make Kessler syndrome even less of a problem than our worst case though experiment.//// Debris would be spread over a volume of space, not a single orbital surface, making collisions orders of magnitudes less likely.//// Most impact debris will have a slower orbital velocity than either of its original pieces - this makes it deorbit much sooner.//// Any collision will create large and small objects. Small objects are much more affected by atmospheric drag and deorbit faster, even in a few months from high LEO. Larger objects can be tracked by earth based radar and avoided.//// The planned big new constellations are not in High LEO, but in Low LEO for faster communications with the earth. They aren’t an issue for Kessler.//// Most importantly, all new satellite launches since the 1990’s are required to include a plan to get rid of the satellite at the end of its useful life (usually by deorbiting)//// So the realistic worst case is that insurance premiums on satellites go up a bit. Given the current trend toward much smaller, cheaper micro satellites, this wouldn’t even have a huge effect.

#### Alternative measures solve misclac from satellite takeout

Lambakis 01 (Steven Lambakis is a senior defense analyst at the National Institute for Public Policy and the author of On the Edge of Earth: The Future of American Space Power (University Press of Kentucky, 2001). “Space Weapons: Refuting the Critics” <http://www.hoover.org/publications/policy-review/article/6612>, Donnie)//ww pbj

In other words, it is not at all self-evident that a sudden loss of a communications satellite, for example, would precipitate a wider-scale war or make warfare termination impossible. In the context of U.S.-Russian relations, communications systems to command authorities and forces are redundant. Urgent communications may be routed through land lines or the airwaves. Other means are also available to perform special reconnaissance missions for monitoring a crisis or compliance with an armistice. While improvements are needed, our ability to know what transpires in space is growing — so we are not always in the dark.

#### Kessler’s Syndrome wrong and super long timeframe

Kurt 15 – JD-William & Mary Joseph Kurt, JD- William & Mary School of Law, BA-Marquette University, NOTE: TRIUMPH OF THE SPACE COMMONS: ADDRESSING THE IMPENDING SPACE DEBRIS CRISIS WITHOUT AN INTERNATIONAL TREATY, 40 Wm. & Mary Envtl. L. & Pol'y Rev. 305 (2015)//ww pbj

A. Practical Considerations: Feasible Solutions to the Space Debris Problem Are on Their Way One key question in assessing whether an international treaty is a requisite for solving the space debris problem is just how difficult it will be to fashion a remedy. The more complex and costly are feasible solutions, the more likely it is that a comprehensive regime is necessary to bind the various actors together. 93Link to the text of the note A good place to begin is to determine just how imminent is the onset of the cascade of exponentially more frequent debris-creating collisions, known as the Kessler Syndrome. 94Link to the text of the note To be certain, no one can be sure--this phenomenon being subject to highly complex probabilities. 95Link to the text of the note Indeed, experts' estimates of when such a cascade will become irreversible vary [\*316] widely. 96Link to the text of the note The National Research Council produced a report in 2011 that suggested that "space might be just 10 or 20 years away from severe problems." 97Link to the text of the note In fact, the cascading effect has already begun, albeit at a modest pace. 98Link to the text of the note However, Donald Kessler, who first described the eponymous effect in 1978, has significantly recalibrated his own outlook over the years. 99Link to the text of the note Originally, Kessler predicted that catastrophe would result by the year 2000. 100Link to the text of the note That date long passed, Kessler now speaks of a century-long process that "we have time to deal with." 101Link to the text of the note