**1AC**

### Framework

**I affirm Resolved: The appropriation of outer space by private entities is unjust.**

#### To enhance the clarity of the debate – I offer the following definitions

#### 1] Outer space is defined as the physical universe beyond the earth’s atmosphere according to Merriam Webster.

#### 2] Appropriation is defined as the act of taking something for one’s own use, typically without the owner’s permission

#### 3] Private entity is defined by Cornell University as any person or private group, organization or other commercial or nonprofit entity

#### With that, let’s move on to framework

#### I value justice – the resolution asks a question about whether something Is just or not, which means it’s the most contextual to the resolution

#### The value criterion is maximizing expected wellbeing.

#### 1] Actor spec – governments must use util because they don’t have intentions and are constantly dealing with tradeoffs—takes out their arguments because countries use my framework in the status quo

#### 2] Extinction outweighs – magnitude, irreversibility, uncertainty.

MacAskill 14 [William MacAskill, Associate Professor in Philosophy and Research Fellow at the Global Priorities Institute, University of Oxford, “Normative Uncertainty,” 2014, University of Oxford PhD Thesis, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.677.4121&rep=rep1&type=pdf]

However, even if we believe in a moral view according to which human extinction would be a good thing, we still have strong reason to prevent near-term human extinction. To see this, we must note three points. First, we should note that the extinction of the human race is an extremely high stakes moral issue. Humanity could be around for a very long time: if humans survive as long as the median mammal species, we will last another two million years. 188 On this estimate, the number of humans in existence in the future, given that we don’t go extinct anytime soon, would be 2×10^14. 189 So if it is good to bring new people into existence, then it’s very good to prevent human extinction.

Second, human extinction is by its nature an irreversible scenario. If we continue to exist, then we always have the option of letting ourselves go extinct in the future (or, perhaps more realistically, of considerably reducing population size). But if we go extinct, then we can’t magically bring ourselves back into existence at a later date.

Third, we should expect ourselves to progress, morally, over the next few centuries, as we have progressed in the past. So we should expect that in a few centuries’ time we will have better evidence about how to evaluate human extinction than we currently have.

### 1AC – Advantage 1

#### Contention 1 is space debris

#### Private mining ventures cause resource wars – empirics prove.

Kelvey 14 [Jon Kelvey, writer and journalist based in central Maryland. Is It Legal to Mine Asteroids?,” 10/13/14, *Slate*, https://slate.com/technology/2014/10/asteroid-mining-and-space-law-who-gets-to-profit-from-outer-space-platinum.html]

If these mining ventures are successful, the world could see billions of dollars flowing down from space to American companies. Is there a system for dealing with any conflicts that asteroid mining will likely arouse? The historical record certainly suggests the possibility of bitter, even violent disputes.

Just consider the Arctic. Impenetrable ice was once the foil for those who dreamed of a Northwest Passage, but global warming has made the oil- and natural-gas-rich Arctic seabed accessible for the first time, and there has been a rush to lay claims to territory. The United States and Canada have been making careful geological measurements in order to determine territorial boundaries. Russia has pursued a different path: In 2007, the country used a submersible to plant its flag on the seabed at the North Pole. It’s an example of how contested things can get even when there is a system of rules in place, according to Joanne Gabrynowicz, a space lawyer and editor emeritus of the Journal of Space Law at the University of Mississippi School of Law. There is a system of international governance in place for the Arctic, but she says it is being strained by the recent thaw because, “it’s so much easier to govern something when you can’t get to it.”

If emerging space technologies can be thought of as melting Arctic ice, it might be time to start discussing some basic rules before everything thaws.

#### Specifically, confusion over space property undermines peace.

Renstrom 15 [Joelle Renstrom, Lecturer of Rhetoric at Boston University, “Will Mining Celestial Bodies Ruin Space?,” 12/09/15, WBUR, https://www.wbur.org/cognoscenti/2015/12/09/asteroid-mining-joelle-renstrom, EA]

We could certainly use these resources on Earth — especially water, if catastrophic drought predictions are accurate. Of course, asteroid mining companies that sell water to the rest of the world would need to be regulated, but that’s not really a new proposition. As with oil and gas companies, extracting, processing and selling water could promote worldwide competition and boost the economy. But how, exactly, would that competition work?

Planetary Resources might be the first asteroid mining company, but it won’t be the last. Once the technology and resources are in place, other companies from the U.S. and elsewhere will join them in the hunt for viable, resource-rich asteroids. And then what?

Earth has a history of oil crises, embargoes and conflicts. What’s to prevent similar clashes from arising in space?

Perhaps enough asteroids exist to keep companies from various countries out of each other’s way if they can’t share. But the situation could get tricky, especially because the asteroids themselves would remain sovereign territory, as dictated by the 1967 Outer Space Treaty. The new law makes clear its consistency with this Treaty: “the United States does not thereby assert sovereignty or sovereign or exclusive rights or jurisdiction over, or the ownership of, any celestial body.”

So no one would own the asteroids, but people would own the spoils. Would other countries recognize that? Would we recognize it if a Chinese or Russian company found a stockpile of platinum on an asteroid? Would asteroid mining become a first-come, first-served proposition?

The Asteroid Resources Property Act also paves the way for resource exploitation on planets, such as Mars. One of the primary arguments made for colonizing the Red Planet is its resources. Mars Society founder and colonization advocate Robert Zubrin argues that Mars “is endowed with all the resources needed to support not only life but the actual development of a technological civilization.” These resources include water, carbon, nitrogen, hydrogen, oxygen and deuterium, a rare (on Earth) and valuable hydrogen isotope used to make rocket fuel. As such endeavors become more feasible, their implications raise some slippery-slope fears -- namely, that in addition to lifeless asteroids, planets with the potential for microbial life such as Mars may become competitive mining stations.

#### That turns good mining – only reclassifying space property solves.

Yan 18 [Laura Yan, citing Ramin Skibba, an astrophysicist, ”Should We Really Be Mining in Space?,” 05/05/18, *Popular Mechanics*, https://www.popularmechanics.com/space/a20195040/should-we-be-really-be-mining-in-space/]

Imagine, for instance, an asteroid that contains as many platinum-group metals as all reserves on Earth. Businesses will compete for the precious resource, and the competing may soon turn into battle by armed satellites, which can lead back to conflicts on Earth. The act of mining itself could also be dangerous: if space-mining break up asteroids, it could harm other satellites, spacecrafts and astronauts.

Commerical space mining could lead to conflicts between profitability and public interest. "Once you’re on board with the commercial space industry, then you as a researcher must accept, if not support, everything that comes with it," Skibba writes. "To succeed, these businesses will seek profitable missions, while science, exploration, and discovery—goals that stimulate public interest—will inevitably have lower priority,"

The solution, according to Skibba, is to treat outer space as we do Antarctica: a place to encourage scientific investigation and discourage territorial claims. It's a commendable idea, but is it likely? Last week, President Trump has already suggested the idea of adding a "Space Force" to the military. According to The Independent, "experts have warned that space will be increasingly contested in years to come, as increasingly complex weapons are built and more opportunities are opened up for exploring the area outside the Earth."

#### 2 – Redirection – private asteroid mining causes proliferation of NEO redirection capabilities – accidents and terrorism cause extinction.

Drmola 15 [Jakub Drmola and Miroslav Mareš, \* PhD Security Studies, International Relations and Political Science at Masaryk University, \*\* Professor, at the Division of Security and Strategic Studies, Masaryk University, “Revisiting the deflection dilemma,” 2015, *Astronomy & Geophysics*, Vol. 56, Issue 5, pp. 5.15-5.18, https://academic.oup.com/astrogeo/article/56/5/5.15/235650, EA]

These authors presented a stark dilemma. We now know that the planet Earth orbits our Sun among thousands of other objects of varying sizes and trajectories. So far, well over 12 000 near-Earth objects (NEOs) have been discovered. Such objects are known to have collided with the Earth in the past and are certain to hit it in the future, with potentially catastrophic results. All the known rocky planets and moons are dotted with impact craters (with the notable exception of Jupiter's geologically hyperactive moon Io). Even the surface of the Earth, despite all its weathering, erosion, volcanic activity and cover of the biosphere, bears clear marks of past impacts, with dozens of craters of more than 10 km in diameter still discernible today. It is a dangerous neighbourhood that we live in – sometimes described as a shooting gallery.

The role of the Chicxulub impactor in the Cretaceous–Paleogene mass extinction event some 65 million years ago helps to make the severity of this point fairly apparent. Direct observations of events such as the jovian impact of the Shoemaker-Levy 9 comet in July 1994 further emphasized that we live in an active solar system and large collisions are not a thing of the past. The recent Chelyabinsk bolide (or the less recent but somewhat larger Tunguska airburst) remind us that Jupiter is not the only planet that can be hit by sizable objects (Chapman 2004).

The Shoemaker-Levy 9 collision made its mark not only in Jupiter's upper atmosphere, where it left blotches the size of our entire planet, but it also shook our perceptions and served as an inspiration for Hollywood films as well as for “planetary defence” concepts – often calling on nuclear weapons to break up the object or deflect it away from the Earth. The 2013 deluge of videos, injuries and damage reports from Chelyabinsk reinvigorated interest.

Sooner or later, in order to avoid the fate of the dinosaurs, humanity needs to develop scientific and technological capabilities to prevent extinction-level impact events. But most solutions bring about new challenges, because new technologies rarely have only one application. Here lies the dilemma: any technology allowing us to deflect asteroids from a collision trajectory with the Earth could also be used to direct them towards the Earth. This means we could potentially turn any future near-miss into an impact, with all its devastating consequences.

Sagan & Ostro (1994b) concluded that this is a risk not worth taking. Considering the very low probabilities of impacts with objects larger than 1 km (generally less than 1 in 5000 for a given century), they were more worried about the misuse of such trajectory-altering technology than the undiverted asteroids themselves. Humans visited a great deal of violence upon each other during the 20th century; war has been prevalent and increasingly technological. The beginning of the 21st century does not seem overly promising either. The risk that one of humanity's irrational totalitarian powers decides to have some nearby asteroid steered towards Earth might simply be too high. Many people still see the default cosmic odds as preferable to the lessons of recent history.

Later on, a modification of sorts to the deflection dilemma appeared, positing that the “real” dilemma (Schweickart 2004, Morrison 2010) lies in putting various parts of the Earth and its population in harm's way during a deflection attempt. Inevitably, any mission to deflect an object that is on a collision course with the Earth will involve moving its supposed point of impact across the surface until it misses the planet entirely. Should such a deflection attempt fail to modify the trajectory sufficiently, the impact would still occur, albeit in a different area. This could expose to risk countries that were not originally threatened by the asteroid (depending on its size and path), while diminishing the risk to those living near the original point of impact. The damage and casualties around this new and modified point of impact would then, to some extent, be caused by those who tried but failed to deflect the asteroid. The repercussions of such an event would certainly be grave.

Privatization and industry

Both of these versions of the deflection dilemma are essentially state-centric and neither presumes that this technology might be wielded by private companies and non-state actors. But the current trend of greater involvement of private companies in space suggests that states might be unable (or unwilling) to maintain their exclusive hold on the advanced space technologies. The private sector is currently hot on the heels of national and international space agencies in exploring feasible and economically viable options. At the moment, private companies are already in the business (or at least in the process of making it a profitable business) of resupplying the International Space Station, taking tourists to the edge of space and operating communication satellites. And, recently, a new area of potential commercialization of space, asteroid mining, has received increased attention and investment. It has already spawned private companies (such as Deep Space Industries and Planetary Resources, Inc.); this industry is highly relevant to the deflection dilemma (Ostro 1999).

While the idea of mining asteroids carries with it an air of science fiction (as all space-based endeavours do, at some stage), it is based on science fact. One of the most significant facts on which to base a space mining industry is the apparent abundance of highly valued raw materials in asteroids. Platinum, rhodium and other precious metals are extremely useful because of their catalytic and electrical properties, but are also exceedingly rare in the Earth's crust. While such metals sank deep into the planet during core formation, asteroids retained their original composition and even delivered much of the accessible reserves to our planet in the form of meteorite bombardment (Willbold et al. 2011). Some of the largest known deposits of these metals on Earth are found within ancient impact craters.

Platinum-group metals are deemed critical to our modern technology-based civilization, without substitutes in many applications, and their supply is at risk of “geopolitical machinations” (Graedel 2013). The combination of natural scarcity and industrial demand leads to their high price, which easily rivals that of gold. Because space missions are inherently expensive, these precious metals are prime high-value candidates for economically viable asteroid mining. Since the projected market value of these metals within an asteroid is in the order of billions or even hundreds of billions of US dollars (depending on the size of the asteroid), the success of the industry comes down to developing technically feasible and cost-effective methods of mining them and retrieving them (Blair 2000, Gerlach 2005).

The other interesting and potentially worthwhile resource we could harvest from asteroids is water. Not only is liquid water required by astronauts to survive, but it can also be broken down into oxygen and hydrogen to be used as fuel. And, while water is abundant and cheap here on Earth, it is very expensive to transport it to orbit. It costs $3000–$10 000 per kilogramme to launch water (or anything else) to low Earth orbit and about two or three times more for geostationary transfer orbit (Jain & Trost 2013). It is not the prospect of procuring something we covet here on the surface of the Earth that makes this venture attractive, but rather the idea of not having to wage an expensive battle with Earth's gravity each time we want to make use of something as mundane as water in space.

If the costs associated with mining water from asteroids can be brought below the cost of launching water from Earth, this seemingly counter-intuitive industry might take off and become profitable. Additionally, through the use of some form of refuelling depots, it would probably in turn make space endeavours more affordable and sustainable. The same would apply if some of the more common metals found in asteroids (such as iron or nickel) were used to build structures directly in orbit instead of launching them from the Earth.

The risks of mining asteroids

There are two basic ways to go about moving the resources contained within a given asteroid to the Earth. They can be extracted from the asteroid during its natural orbit and then transported to the Earth, or the entire asteroid might be moved closer to a more convenient location before starting mining. Thus repositioned, it might even be used as a shielded habitat, once hollowed out (Ostro 1999). There are different speculative costs and benefits associated with either option, which would vary with the size, orbit and composition of the asteroid. But, crucially, the second option would entail putting asteroids into orbit around the Earth, the Moon or possibly at one of the Earth's Lagrangian points. Indeed, NASA has already planned a mission to capture a small asteroid and place it in a high cislunar orbit, where it would serve as a destination for future manned missions and experiments. This “Asteroid Redirect Mission” is to take place in the next decade and is being pitched mainly as a stepping stone towards a future mission to Mars (see box “NASA's Asteroid Redirect Mission”; Brophy et al. 2012, Burchell 2014, Gates et al. 2015).

Programmes to redirect asteroids and, especially, plans to mine asteroids on an industrial scale essentially resurrect the deflection dilemma. But it is no longer a matter of superpowers intentionally misusing technology designed to prevent dangerous impacts. It becomes an issue of proliferation among private entities. Once private mining companies acquire the technical ability to redirect suitable NEOs (Baoyin et al. 2011) in order to extract platinum or water from them, perilous inflections become more likely. The probability of accidents will rise with the number of asteroids whose trajectories we decide to manipulate. Such accidents might be very unlikely, but even a tiny technical or human error in the execution of an inflection meant to place an asteroid into the lunar or geocentric orbit might send it crashing into the Earth with potentially devastating consequences. And while we might find solace in the low probabilities associated with such an accident, even contemporary industries which are considered very safe suffer from unlikely tragedies. Despite being dependable and reliable, airliners do crash; there are a lot of them flying and very improbable accidents do happen if the dice are rolled often enough. Undoubtedly, we will not be steering as many asteroids as we steer planes any time soon, but industries tend to be more accident-prone during their infancy. Furthermore, a single asteroid can do a lot more damage than a single plane. And who is to say how much metal or water we are going to need in space over the course of the 21st century, or the next? The second source of risk is the intentional misuse, similar to the original deflection dilemma. But the entry barrier for asteroid weaponization gets much lower if mining them and moving them around becomes a common industrial activity. This is in stark contrast to the original scenario which envisioned this technology to be used solely for planetary defence and under control of a very small number of the most powerful countries (Morrison 2010). If such a powerful technology becomes widely and commercially available, even rogue states and well-funded terrorist groups might be tempted to use it for an unexpected and devastating attack. In addition, an active asteroid mining industry would make it more difficult to detect any hostile inflection attempts among the number of legitimate and benign ones.

#### Even smaller asteroids cause debris cascades hitting satellites.

Scoles 15 [Sarah Scoles, New Scientist. Dust from asteroid mining spells danger for satellite. May 27, 2015. https://www.newscientist.com/article/mg22630235-100-dust-from-asteroid-mining-spells-danger-for-satellites/]

IF THE gold mine is too far from home, why not move it nearby? It sounds like a fantasy, but would-be miners are already dreaming up ways to drag resource-rich space rocks closer to home. Trouble is, that could threaten the web of satellites around Earth.

Asteroids are not only stepping stones for cosmic colonisation, but may contain metals like gold, platinum, iron and titanium, plus life-sustaining hydrogen and oxygen, and rocket-fuelling ammonia. Space age forty-niners can either try to work an asteroid where it is, or tug it into a more convenient orbit.

NASA chose the second option for its Asteroid Redirect Mission, which aims to pluck a boulder from an asteroid’s surface and relocate it to a stable orbit around the moon. But an asteroid’s gravity is so weak that it’s not hard for surface particles to escape into space. Now a new model warns that debris shed by such transplanted rocks could intrude where many defence and communication satellites live – in geosynchronous orbit.

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

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

That may not have immediate consequences. But as Earth orbits get more crowded with spent rocket stages and satellites, we will have to worry about cascades of collisions like the one depicted in the movie Gravity.

#### Space wars trigger nuclear war – kills MAD.

Johnson 14 [Les Johnson is a NASA technologist and science writer. Living without Satellites. 2014. https://www.baen.com/living\_without\_satellites]

No matter the cause, once the cascade of collisions begins, the result may be the same: a debris cloud of increasing size will encircle the globe. The cloud will consist of thousands of debris objects, each traveling at over five miles per second. These objects will circle the globe every ninety minutes and on every orbit, each piece will have a small, but very real, probability of colliding with a functioning spacecraft. When these inevitable secondary collisions occur, more debris will be added to the cloud, increasing yet again the probability of future collisions. Like a nuclear chain reaction, the cascade of collisions will continue until the count of debris objects numbers in the millions. There are now nearly half a million pieces of debris with diameters of a few centimeters or more. Most of these objects are in orbits too high for them to naturally decay, enter the Earth’s atmosphere, and burn up. Once the cascade begins and the tipping point is crossed, no satellite will be completely safe. Is this inevitable? No. But unless we begin to take steps to clean up the existing debris, limit the creation of future debris, and harden our commercial satellites against extreme solar storms, then this frightening scenario may become a reality.

Some may be wondering why I call this scenario “frightening.” After all, space is out there and we’re down here. How can the loss of space satellites, things that didn’t exist in any significant number until the 1960s, possibly have any meaningful impact on our lives here on Earth? Most people don’t realize how their lives are affected by space technology and space satellites. When they think of space exploration, they think of the International Space Station, Apollo and sending people to Mars. What they should also be thinking about are the Global Positioning System (GPS), communications satellites, spy satellites and weather forecasting – among many other things.

GPS was developed first and foremost to support the needs of the U.S. military. It consists of a network of between 24 – 32 satellites that provide line-of-sight access for receivers on the ground from virtually any place on planet Earth. A receiver uses the signals from multiple satellites simultaneously, and the amount of time it took each signal to reach it (knowing that the signal travels at the speed of light), to calculate its position on the ground with very high accuracy. Since the early 1990s, GPS has allowed our armed forces to navigate and coordinate with precision unequaled in the history of warfare. GPS signals are used to navigate drones for reconnaissance and combat, soldiers on battlefields, ships at sea, and planes in the air. GPS allows precise navigation anywhere on the globe and under varied weather conditions including rain, fog and sand storms. A sudden loss of GPS for the modern warfighter would be akin to someone losing one of their primary senses – sight, sound, smell or touch. It would not necessarily be fatal, but it would certainly be debilitating.

It is so useful that other countries are building their own systems so as to not be dependent upon the US should we decide to turn off GPS signals. After all, if we can use it, so can our adversaries. The Global Navigation Satellite System (GLONASS) is Russia’s answer to GPS. Europe is building and deploying their Galileo positioning system and countries like India and China are building their own regional systems to provide comparable capability under their own control. Who can blame them?

Shortly after becoming operational, GPS entered the civilian economy like a tidal wave. Commercial electronics companies began selling portable GPS receivers for cars and trucks. Cell phone manufactures now have them embedded in virtually every cell phone produced. Google Maps changed the nature of mapping and how we travel, both in our cars and on foot. Local emergency personnel adopted the technology for E-911 services and for navigation. Cities have mapped the locations of fire hydrants and can direct emergency responders to the nearest one should the need arise.

Have you ever heard of Positive Train Control? In 2008, the U.S. Congress mandated that the nation’s rail system use GPS tracking to improve safety and reduce the risk of accidental collisions. Our rail system, which moves goods across the continent, is now dependent on GPS to function. And, as goes the rail system, so go the airlines. By 2025, U.S. air traffic control will move from ground-based beacons to space-based GPS tracking and navigation. Touted to increase the efficiency of air travel, with ever-increasing number of commercial airline flights, the Next Generation Air Transportation System will also be dependent upon satellites for routing planes and handling the complex traffic control near the nation’s airports.

Ships at sea already use GPS for navigation, with the thousands of cargo ships carrying everything from cars and electronics to food and diapers moving from country to country as international trade becomes increasingly globalized. Few countries make all the goods their citizens need within their own borders and GPS is one of the technologies that helped make massive international trade affordable.

The retail industry has embraced GPS for moving goods in a timely manner from warehouses to store shelves. Knowing where a particular shipment is located on its journey allows just in time manufacturing and inventory control, reducing costs and warehousing expenses. Retail companies also makes use of satellite technology in other ways. Credit card companies often use secure satellite links for card and check approvals at retail stores, bypassing the increasingly insecure Internet for transmitting financial data. The satellite dishes on the roofs of your favorite stores are not there for employees to watch DirecTV in the break room. They are likely VSAT (Very Small Aperture Terminal) antennas that are humming with the financial and inventory data needed for the store to keep its doors open and its shelves stocked. Some banks now use VSATs to transfer funds from one to the other, making them a part of the global financial infrastructure.

Cable television doesn’t originate at your local cable company and then get piped into your home. Instead, the myriad of channels conveniently aggregated into whatever bundle to which you happen to subscribe come to your local cable provider by satellite relay. Without satellites, news of what’s happening in Russia, China and other parts of the globe cannot otherwise make it into the daily newsfeed. Your favorite football team playing a game in another state this Monday night likely cannot be broadcast without going through a satellite relay. If our communications satellites are lost, your televisions and, to the extent that they play to a national audience, your radios, will become purveyors of only what’s happening locally.

We shouldn’t forget weather forecasting. A network of satellites provides critical data for forecasting the weather, particularly the outlook for several days in the future. Figure 2 shows a satellite image of Hurricane Ivan approaching Alabama’s gulf coast in 2004. This type of data saves lives and, almost as importantly, helps people and businesses determine if they are in the path of a storm and how to react appropriately. The vantage point of space allows the precise evacuation of the communities likely to be most affected and those that are not in the line of fire to know that they can remain in place, saving lives and millions of dollars.

Satellite imagery is used by the military and our political leaders to maintain the peace. When your potential adversaries can’t hide what they’re doing, where their armies are moving and what they are doing with their civilian and military infrastructure, then the danger of surprise attack is diminished. In our nuclear age with instant death only minutes away by missile attack, the doctrine of Mutual Assured Destruction (MAD) only works if both sides know whether or not they are being attacked. The launch of missiles or a bomber fleet can easily be seen from space far in advance of either reaching their potential targets halfway around the globe. The danger of surprise attack is therefore small, making an accidental war far less likely. So what does all this mean? And what do we do about it? First of all, it means that the advocates of space development, exploration and commercialization have succeeded far beyond their initial expectations and dreams. The economies and security of countries in the developed world are now dependent on space satellites. We space advocates should celebrate our success and be terrified of it at the same time. Should we lose these fragile assets in space, our economy would experience a disruption like no other: ship, air and train travel would stop and only restart/operate in a much-reduced capacity for years (GPS loss). Many banking and retail transactions would cease (VSAT loss). Distribution of news and vital national information would be crippled (communications satellite loss). Lives would be put at risk and the productivity of our farming would dramatically decrease (weather satellite loss). The risk of war, including nuclear war, would increase (loss of spy satellites) and our military’s ability to react to crises would be significantly reduced (loss of military logistics and intelligence gathering satellites).

### 1AC – Advantage 2

#### Contention 2 is China

#### China’s dependent on private companies for space expansion, satellite deployment, and mining

Fernandez 21 — (Ray Fernandez, Writer at ScreenRant, “Hundreds Chinese Companies Called To Boost Space “, ScreenRant, 11-27-2021, Available Online at https://screenrant.com/chinese-companies-boost-space-development/, accessed 1-11-2022, HKR-AR)

In a new move to boost space development, China has opened up space to private companies. China's space program is heavily linked with the military and wrapped up in secrecy. However, recent Chinese space accomplishments, rovers on the Moon and Mars, new satellites and new space stations were primarily developed by government efforts.

The U.S. brought in the private sector as a strategy to boost its space program and develop expensive and ambitious new projects. Now China is doing the same. The last time China used national private companies to increase development was when it declared Artificial Intelligence a national priority. Fast forward a few years, Chinese AI dominates globally.

At the 7th China (International) Commercial Aerospace Forum, national private companies presented many new and ambitious projects, including spaceplanes, space resources, a massive constellation of satellites and more. One of the companies at the event was the space giant China Aerospace Science and Industry Corp. (CASIC). The Ministry of Science and Technology, China National Space Administration, and other government arms sponsored and supervised the event.

CASIC said that the Xingyun constellation — made up of 80 satellites is moving full speed ahead. The corporation announced that the intelligent space satellite production factory was operating. They are now launching rockets from their own rocket park in the city of Wuhan. Today the rocket park and smart sat factory produce 20 solid-fuel launches and 100 satellites per year but plans to increase capacities are on their way. CASIC is also working on the Tengyun spaceplane, recently flight-testing an advanced turbine-based combined cycle engine in the Gobi desert.

CASIC is not the only private company developing space planes in China. The China Aerospace Science and Technology Corp. and iSpace also presented their plans for space planes and space crafts. iSpace has designed two missions to the Moon, which they assure will be the first commercial missions to the natural satellite. China is getting some **inspiration from U.S. companies**. Local companies in China are looking into space tourism with suborbital and orbital flights. And Deep Blue Aerospace is developing a reusable launcher that looks very much like the Heavy Falcon of SpaceX.

The event's **main themes** were IoT space networks, multi-purpose satellite constellations, **space** resources (mining) and taking the Chinese space sector to a new level with private participation. While the U.S. has its eye on Chinese military space vehicles, it may have overlooked and underestimated the impact that the Chinese private sector will have. Hundreds of new companies have responded to the government's call to "start a new journey for commercial aerospace" in China. It is only a matter of time until their full power and capabilities are unleashed into space.

#### Xi commitments, manufacturing capacity, and FDI make the CCP’s private sector integral to 21st century space competition

Patel 21 — (Neel V. Patel, Neel is the space reporter for MIT Technology Review, and he writes The Airlock newsletter. Before joining, he worked as a freelance science and technology journalist, contributing stories to Popular Science, The Daily Beast, Slate, Wired, the Verge, and elsewhere. Prior to that, he was an associate editor for Inverse, where he grew and led the website’s space coverage., “China’s surging private space industry is out to challenge the US“, MIT Technology Review, 1-21-2021, Available Online at https://www.technologyreview.com/2021/01/21/1016513/china-private-commercial-space-industry-dominance, accessed 1-11-2022, HKR-AR) Until recently, China’s space activity has been overwhelmingly dominated by two state-owned enterprises: the China Aerospace Science & Industry Corporation Limited (CASIC) and the China Aerospace Science and Technology Corporation (CASC). A few private space firms have been allowed to operate in the country for a while: for example, there’s the China Great Wall Industry Corporation Limited (in reality a subsidiary of CASC), which has provided commercial launches since it was established in 1980. But for the most part, China’s commercial space industry has been nonexistent. Satellites were expensive to build and launch, and they were too heavy and large for anything but the biggest rockets to actually deliver to orbit. The costs involved were too much for anything but national budgets to handle. That all changed this past decade as the costs of making satellites and launching rockets plunged. In 2014, a year after Xi Jinping took over as the new leader of China, the Chinese government decided to treat civil space development as a key area of innovation, as it had already begun doing with AI and solar power. It issued a policy directive called Document 60 that year to enable large private investment in companies interested in participating in the space industry. “Xi’s goal was that if China has to become a critical player in technology, including in civil space and aerospace, it was critical to develop a space ecosystem that includes the private sector,” says Namrata Goswami, a geopolitics expert based in Montgomery, Alabama, who’s been studying China’s space program for many years. “He was taking a cue from the American private sector to encourage innovation from a talent pool that extended beyond state-funded organizations.” As a result, there are now 78 commercial space companies operating in China, according to a 2019 report by the Institute for Defense Analyses. More than half have been founded since 2014, and the vast majority focus on satellite manufacturing and launch services. For example, Galactic Energy, founded in February 2018, is building its Ceres rocket to offer rapid launch service for single payloads, while its Pallas rocket is being built to deploy entire constellations. Rival company i-Space, formed in 2016, became the first commercial Chinese company to make it to space with its Hyperbola-1 in July 2019. It wants to pursue reusable first-stage boosters that can land vertically, like those from SpaceX. So does LinkSpace (founded in 2014), although it also hopes to use rockets to deliver packages from one terrestrial location to another. Spacety, founded in 2016, wants to turn around customer orders to build and launch its small satellites in just six months. In December it launched a miniaturized version of a satellite that uses 2D radar images to build 3D reconstructions of terrestrial landscapes. Weeks later, it released the first images taken by the satellite, Hisea-1, featuring three-meter resolution. Spacety wants to launch a constellation of these satellites to offer high-quality imaging at low cost. To a large extent, China is following the same blueprint drawn up by the US: using government contracts and subsidies to give these companies a foot up. US firms like SpaceX benefited greatly from NASA contracts that paid out millions to build and test rockets and space vehicles for delivering cargo to the International Space Station. With that experience under its belt, SpaceX was able to attract more customers with greater confidence. Venture capital is another tried-and-true route. The IDA report estimates that VC funding for Chinese space companies was up to $516 million in 2018—far shy of the $2.2 billion American companies raised, but nothing to scoff at for an industry that really only began seven years ago. At least 42 companies had no known government funding. And much of the government support these companies do receive doesn’t have a federal origin, but a provincial one. “[These companies] are drawing high-tech development to these local communities,” says Hines. “And in return, they’re given more autonomy by the local government.” While most have headquarters in Beijing, many keep facilities in Shenzhen, Chongqing, and other areas that might draw talent from local universities. There’s also one advantage specific to China: manufacturing. “What is the best country to trust for manufacturing needs?” asks James Zheng, the CEO of Spacety’s Luxembourg headquarters. “It’s China. It’s the manufacturing center of the world.” Zheng believes the country is in a better position than any other to take advantage of the space industry’s new need for mass production of satellites and rockets alike. Making friends The most critical strategic reason to encourage a private space sector is to create opportunities for international collaboration—particularly to attract customers wary of being seen to mix with the Chinese government. (US agencies and government contractors, for example, are barred from working with any groups the regime funds.) Document 60 and others issued by China’s National Development and Reform Commission were aimed not just at promoting technological innovation, but also at drawing in foreign investment and maximizing a customer base beyond Chinese borders. “China realizes there are certain things they cannot get on their own,” says Frans von der Dunk, a space policy expert at the University of Nebraska–Lincoln. Chinese companies like LandSpace and MinoSpace have worked to accrue funding through foreign investment, escaping dependence on state subsidies. And by avoiding state funding, a company can also avoid an array of restrictions on what it can and can’t do (such as constraints on talking with the media). Foreign investment also makes it easier to compete on a global scale: you’re taking on clients around the world, launching from other countries, and bringing talent from outside China.

#### Mining basing competition risks war

Jamasmie 21 — (Cecilia Jamasmie, Cecilia has covered mining for more than a decade. She is particularly interested in Corporate Social Responsibility (CSR), Diamonds and Latin America. Cecilia has been interviewed by BBC News and CBC among others and has been a guest speaker at mining conventions, including MINExpo 2016 and the World’s Copper Conference 2018. She is also member of the expert panel on Social License to Operate (SLO) at the European project MIREU (Mining and Metallurgic Regions EU). She holds a Master of Journalism from the University of British Columbia, and is based in Nova Scotia., “Experts warn of brewing space mining war among US, China and Russia“, MINING, 4-29-21, Available Online at https://www.mining.com/experts-warn-of-brewing-space-mining-war-among-us-china-and-russia/, accessed 1-11-2022, HKR-AR)

A brewing war to set a mining base in space is likely to see China and Russia joining forces to keep the US increasing attempts to dominate extra-terrestrial commerce at bay, experts warn.

The Trump Administration took an active interest in space, announcing that America would return astronauts to the moon by 2024 and creating the Space Force as the newest branch of the US military.

It also proposed global legal framework for mining on the moon, called the Artemis Accords, encouraging citizens to mine the Earth’s natural satellite and other celestial bodies with commercial purposes.

The directive classified outer space as a “legally and physically unique domain of human activity” instead of a “global commons,” paving the way for mining the moon without any sort of international treaty.

Spearheaded by the US National Aeronautics and Space Administration (NASA), the Artemis Accords were signed in October by Australia, Canada, England, Japan, Luxembourg, Italy and the United Emirates.

“Unfortunately, the Trump Administration exacerbated a national security threat and risked the economic opportunity it hoped to secure in outer space by failing to engage Russia or China as potential partners,” says Elya Taichman, former legislative director for then-Republican Michelle Lujan Grisham.

“Instead, the Artemis Accords have driven China and Russia toward increased cooperation in space out of fear and necessity,” he writes.

Russia’s space agency Roscosmos was the first to speak up, likening the policy to colonialism.

“There have already been examples in history when one country decided to start seizing territories in its interest — everyone remembers what came of it,” Roscosmos’ deputy general director for international cooperation, Sergey Saveliev, said at the time.

China, which made history in 2019 by becoming the first country to land a probe on the far side of the Moon, chose a different approach. Since the Artemis Accords were first announced, Beijing has approached Russia to jointly build a lunar research base.

President Xi Jinping has also he made sure China planted its flag on the Moon, which happened in December 2020, more than 50 years after the US reached the lunar surface.

#### China space commercialization uniquely risks cascades – they ignore norms and don’t register satellites which prevents tracking

Swinhoe 21 – Editor at Datacenter Dynamics. Previously he was at IDG in roles including UK Editor at CSO Online and Senior Staff Writer at IDG Connect. [Dan, “China’s moves into mega satellite constellations could add to space debris problem,” 4/20/2021, <https://www.datacenterdynamics.com/en/analysis/chinas-moves-into-mega-satellite-constelations-could-add-to-space-debris-problem/>]

Of the 3,000-odd operational satellites currently in orbit, a little over 400 belong to China or Chinese companies. The number of commercial companies in the West launching satellites has skyrocketed in recent years, and SpaceX now operates more satellites than any other company or government.

But refusing to be left behind, China is planning both state and commercial deployments of constellation satellites in huge numbers in the coming years, which could post an increased risk to in-orbit operations if Chinese companies don’t take due care in how they behave.

The new commercial space race

A report by the Secure World Foundation says a 2014 document from the Chinese Government known as “Document 60” (Official English Language Title: Guiding Opinions of the State Council on Innovating the Investment and Financing Mechanisms in Key Areas and Encouraging Social Investment) was the start of China’s modern commercial space sector. And in 2020, satellite Internet was included in the scope of China’s New Infrastructure policy initiative. Space is also part of China’s expansive Belt and Road initiative, which all combined have led to an explosion in the country’s commercial space ambitions.

China is beginning to “get its act together” around commercial use of space, Jonathan McDowell of the Harvard-Smithsonian Center for Astrophysics tells DCD. Whereas in previous years he says China has had many government satellites and some quasi-commercial satellites with strong ties to government, but now there are true commercial Chinese companies in space.

“We have the same phenomenon as the US companies in that they're moving fast and they're innovative and doing new things.”

But as Chinese companies look to follow the likes of SpaceX and OneWeb in deploying large numbers of satellites, he warns their lack of care in operations could potentially damage space for everyone.

China’s commercial space industry blasts off

A number of private space companies including LinkSpace, OneSpace, iSpace, LandSpace, and ExPace, have all launched in recent years. As well developing their own rockets, these companies are launching satellites of all shapes and sizes into Low Earth Orbit (LEO) with the aim of forming their own constellations to rival those of Western companies.

Bao Weimin, member of the National Committee of the Chinese People’s Political Consultative Conference and director of the Science and Technology Committee of the Aerospace Science and Technology Group, recently announced plans to establish a national satellite network company to be responsible for “coordinating the planning and operation of space satellite Internet network construction.”

The China Aerospace Science and Industry Corporation (CASIC), a state-owned enterprise, outlined its plans to preliminarily finish the construction of the Xingyun project, an 80-satellite LEO narrowband Internet of Things constellation, by 2025 in addition to 320 Hongyan communications satellites.

China Telecom’s satellite communications reportedly has plans to launch 10,000 satellites in the next five to ten years under the name ‘China StarNet’. Spacety is also launching a constellation of imagery satellites and has launched at least 20 so far. Another company called GW has filed for spectrum allocation from the International Telecommunication Union for two broadband constellations called GW-A59 and GW-2 that would include almost 13,000 satellites.

A report from IDA into China’s commercial space industry found others including Zhuhai Orbita, GalaxySpace, MinoSpace, LaserFleet, Head Aerospace and numerous others are also developing constellations from which, like US counterparts, these companies aim to provide satellite broadband, 5G, IoT, and various data services. Though many are in the early stages of development, most plan to launch the first of what could be hundreds or even thousands of satellites within the next few years.

While most companies can’t boast the same level of funding as US space companies – VC funding for Chinese space companies was up to $516 million in 2018 compared to the $2.2 billion US companies raised – they are bringing in investment; earlier this year Beijing Commsat received more than $4.5 billion in funding from the China Internet Investment fund, with more than $10 billion in additional funding promised in the future.

Xie Tao, founder of Beijing Commsat Technology Development Co., Ltd, told China Money Network he expects the country to launch 30,000 to 40,000 Satellites in the future, compared to 40,000 to 60,000 launched by the US.

“Space in the orbit is allocated on a first-come, first-served basis and the onus will be on these latecomers to ensure their satellites will not collide with existing ones,” Commsat’s Xie previously said. “The low-Earth orbit is becoming increasingly crowded and the space land grab is on.”

China isn’t up to speed in orbital norms

While the UN tightly controls GEO orbits, offering countries licenses for a set number of slots in the closely-packed and highly valuable planes, there is no such limit at lower orbits. The number of satellites that companies can launch at LEO is limited only by what local regulators will permit, despite the machines circling the entire planet in around 90 minutes.

And space is becoming increasingly crowded. The number of satellites being launched annually is beginning to reach the thousands, leftovers parts from previous launches and satellites can mount up if not properly disposed of, and debris from previous in-orbit incidents means LEO is full of thousands of pieces of potentially satellite-destroying junk and debris.

Around 28,200 pieces of space junk and debris are currently being tracked in orbit but ESA estimates there could be up to hundreds of thousands of potentially harmful pieces in orbit. At its most extreme, Kessler syndrome predicts a scenario where the space around Earth is so full of satellites and debris that it becomes unmanageable and collisions begin to cascade, causing a chain reaction of collisions which render many orbits out of use for generations.

China has as much right to operate satellites as Western companies, but the current lack of adherence to ‘space norms’ could increase risks further. McDowell warns the ‘explosion’ of Chinese activity could have a massive impact on the usability of space.

“Chinese adherence to things like space debris norms and registration norms is, I would say, about 10 years behind everybody else, if not more” he says. “In UN registration of satellites, they're being very incomplete. They're not registering a lot of their CubeSats and things like that. They're not really being as careful, and they're not as transparent in what's going on.”

Chinese commercial satellites are subject the same risks as Western ones in space; extreme temperatures, crowded operating environment, and new companies seeing large numbers of failures as they go through rapid development. But a lack of proper registration can create more risk of collisions, which can have catastrophic effects, especially with larger satellites at higher orbits.