### 1AC – Plan

#### Plan: The appropriation of outer space by private entities in the People’s Republic of China is unjust.

#### Chinese space industrial base is set to surpass the US

Patel 21 [(Neel, space reporter for MIT Technology Review, and I also write The Airlock newsletter, your number one source for everything happening off this planet. 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 I 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. https://www.technologyreview.com/2021/01/21/1016513/china-private-commercial-space-industry-dominance/] BC

How did China get here—and why?

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.

A strong space industrial base makes government sponsored operations in space economically feasible   
Patel 21 [(Neel, space reporter for MIT Technology Review, and I also write The Airlock newsletter, your number one source for everything happening off this planet. 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 I 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. https://www.technologyreview.com/2021/01/21/1016513/china-private-commercial-space-industry-dominance/] BC

China’s space program might have been slowed by the pandemic in 2020, but it certainly didn’t stop. The year’s highlights included sending a rover to Mars, bringing moon rocks back to Earth, and testing out the next-generation crewed vehicle that should take taikonauts into orbit—and possibly to the moon—one day.

But there were a few achievements the rest of the world might not have noticed. One was the November 7 launch of Ceres-1, a new type of rocket that, at just 62 feet in height, is capable of taking 770 pounds of payload into low Earth orbit. The launch sent the Tianqi 11 communications satellite into space.

At first glance, the Ceres-1 launch might seem unremarkable. Ceres-1, however, wasn’t built and launched by China’s national program. It was a commercial rocket—only the second from a Chinese company ever to go into space. And the launch happened less than three years after the company was founded. The achievement is a milestone for China’s fledgling—but rapidly growing—private space industry, an increasingly critical part of the country’s quest to dethrone the US as the world’s preeminent space power.

The rivalry between the US and China, whose space program has surged over the last two decades, is what most people mean when they refer to the 21st-century's space race. China is set to build a new space station later this year and will likely attempt to send its taikonauts to the moon before the decade ends. But these big-picture projects represent just one aspect of the country’s space ambitions. Increasingly, the focus is now on the commercial space industry as well. The nation's growing private space business is less focused on bringing prestige and glory to the nation and more concerned with reducing the cost of spaceflight, increasing its international influence—and making money.

“The state is really great at large, ambitious projects like going to the moon or developing a large reconnaissance satellite,” says Lincoln Hines, a Cornell University researcher who focuses on Chinese foreign policy. “But it’s not responsive to meeting market needs”—one big way to encourage rapid technological growth and innovation. “I think the government thinks its commercial space sector can be complementary to the state,” he says.

What are the market needs that Hines is referring to? Satellites, and rockets that can launch them into orbit. The space industry is undergoing a renaissance thanks to two big trends spurred by the commercial industry: we can make satellites for less money by making them smaller and using off-the-shelf hardware; and we can also make rockets for less money, by using less costly materials or reusing boosters after they’ve already flown (which SpaceX pioneered with its Falcon 9). These trends mean it is now cheaper to send stuff into space, and the services and data that satellites can offer have come down in price accordingly.

China has seen an opportunity. A 2017 report by Bank of America Merrill Lynch estimates that the space industry could be worth up to $2.7 trillion by 2030. Setting foot on the moon and establishing a lunar colony might be a statement of national power, but securing a share of such a highly lucrative business is perhaps even more important to the country’s future.

“In the future, there will be tens of thousands of satellites waiting to launch, which is a major opportunity for Galactic Energy” says Wu Yue, a company spokesperson.

The problem is, China has to make up decades’ worth of ground lost to the West.

#### The PRC uses the private sector to develop “wish-list” military assets and pursue counterbalancing with Russia

Curcio 8/24 [(Blaine, an Affiliate Senior Consultant for Euroconsult, based in Hong Kong. Since joining Euroconsult in 2018, he has contributed to a wide range of consulting missions and research reports, primarily covering the satcom sector globally, and broader space industry in China.) “Developments in China's Commercial Space Sector” The National Bureau of Asian Research, 8/24/2021. https://www.nbr.org/publication/developments-in-chinas-commercial-space-sector/] BC

There has been discussion that China and Russia might partner to develop a lunar space station. How is this affecting China-Russia space cooperation as well as China’s commercial space sector?

The Russian and U.S. space industries are the two oldest. They have a lot of space programs, experts, and related intellectual property and have been integrated into the space ecosystem. The Chinese space sector has developed primarily independently from the U.S.-Russia system. There has been some collaboration between China and Europe since the Wolf Amendment, but the absence of any kind of commercial space companies until recently, combined with the sensitivity around the International Traffic in Arms Regulations (a U.S. export-control regime), has forced the Chinese space ecosystem to develop pretty much independently. Russia, though a nation in decline, still likes projects involving space to bolster national pride. As a result, there has been a broader trend over the last five to ten years of a gradual realignment of the Russian space sector toward China in terms of both the government and the industrial base.

More Russian companies are looking to China to buy products. Historically these companies have bought material from Europe, but they have recently turned more to China because of how weak the Russian ruble is, making imports more expensive. At the same time, Chinese companies are looking to Russia as an export market as well as to Russia and former Soviet states as investment opportunities. There is synergy, for example, between a Chinese rocket company that sees a relatively cheap Ukrainian rocket company with specific technology that it wants and a Ukrainian company that has all the technology, intellectual property, and “know-how,” but does not have that much money.

The international lunar research station is beneficial to the commercial space sector to the extent that the national team would be occupied with the space station. As the national team gets bigger and takes on more sophisticated projects, this may help free up the kind of lower-end work companies were doing before and create more room for commercial competition.

Moving forward, if there are massive lunar projects and a large Chinese space station, these developments are all things that will occupy a lot of top engineers and SOEs. There will be a need for a bigger commercial sector to contribute to emerging projects and complete the technological development of the more commercial, as opposed to institutional or national-level, projects in the space sector.

What is the relationship between China’s space industry development and its Military-Civil Fusion strategy, and how is this affecting the commercial space sector?

There are two main types of impact: the technological impact and the broader policy impact. As part of the Military-Civil Fusion strategy, the Chinese government wants to develop specific capabilities and emphasize specific technologies, which produce the technological impact. From that perspective, this strategy dictates what the commercial space sector does in terms of R&D, and the technological direction it takes. Zhuhai satellite is an example of this strategy. Since Zhuhai satellite was a spinoff from the Harbin Institute of Technology, which has a military link, there is a possibility that it is pursuing more space technologies that are related to Military-Civil Fusion.

The second type is the broader policy impact. Because the central government makes Military-Civil Fusion a significant policy objective, there will be industrial bases that are built to support related technologies. More money and resources will be available for a startup that will support China’s strategic and tech ambitions. Because of the money and resources that are available, the development of the space industry will change as companies adapt their activities to what the government is emphasizing and to what kind of support they can get from different stakeholders in order to survive.

China does not currently have a huge commercial space sector. The only real way that these companies can grow is either by selling products to the existing space sector—which is not particularly easy at this stage—or by raising money from existing shareholders and trying to guess where the market is moving.

#### Scenario one is space militarization:

#### Sino-Russian space alliance undermines existing treaties and greenlights space militarization

Bowman and Thompson 3/31 [(Bradley Bowman, the senior director of the Center on Military and Political Power at the Foundation for Defense of Democracies) (Jared Thompson, a U.S. Air Force major and visiting military analyst at the Foundation for Defense of Democracies.) “Russia and China Seek to Tie America’s Hands in Space” Foreign Policy 3/31/2021. https://foreignpolicy.com/2021/03/31/russia-china-space-war-treaty-demilitarization-satellites/] BC

Consider the actions of the United States’ two great-power adversaries when it comes to anti-satellite weapons. China and Russia have sprinted to develop and deploy both ground-based and space-based weapons targeting satellites while simultaneously pushing the United States to sign a treaty banning such weapons.

To protect its vital space-based military capabilities—including communications, intelligence, and missile defense satellites—and effectively deter authoritarian aggression, Washington should avoid being drawn into suspect international treaties on space that China and Russia have no intention of honoring.

The Treaty on the Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects (PPWT), which Beijing and Moscow have submitted at the United Nations, is a perfect example. PPWT signatories commit “not to place any weapons in outer space.” It also says parties to the treaty may not “resort to the threat or use of force against outer space objects” or engage in activities “inconsistent” with the purpose of the treaty.

On the surface, that sounds innocuous. Who, after all, wants an arms race in space?

The reality, however, is that China and Russia are already racing to field anti-satellite weapons and have been for quite some time. “The space domain is competitive, congested, and contested,” Gen. James Dickinson, the head of U.S. Space Command, said in January. “Our competitors, most notably China and Russia, have militarized this domain.”

Beijing already has an operational ground-based anti-satellite missile capability. People’s Liberation Army units are training with the missiles, and the U.S. Defense Department believes Beijing “probably intends to pursue additional [anti-satellite] weapons capable of destroying satellites up to geosynchronous Earth orbit.” That is where America’s most sensitive nuclear communication and missile defense satellites orbit and keep watch.

Similarly, Moscow tested a ground-based anti-satellite weapon in December that could destroy U.S. or allied satellites in orbit. That attack capability augments a ground-based laser weapon that Russian President Vladimir Putin heralded in 2018. In a moment of candor, Russia’s defense ministry admitted the system was designed to “fight satellites.”

To make matters worse, both countries are also working to deploy space-based—or so-called “on-orbit”—capabilities to attack satellites.

Meanwhile, at the United Nations and other international forums, China and Russia are pushing the PPWT and advocating for a “no first placement” resolution—saying all governments should commit not to be the first to put weapons in space.

Yet more than two years ago, the U.S. Defense Intelligence Agency noted that both China and Russia were already putting in space capabilities that could be used as weapons. The PPWT would thus protect their weapons while tying Washington’s hands.

In a thinly veiled attempt to mask their intentions, the two countries claim that their on-orbit capabilities are simply for peaceful purposes—for assessing the condition of broken satellites and conducting repairs as needed. This “dual-use” disguise permits Beijing and Moscow to put into orbit ostensibly peaceful or commercial capabilities that those countries can actually use to disable or destroy U.S. military and intelligence satellites.

China, for example, has tested several so-called scavenger satellites, which use grappling arms to capture other satellites. China has also demonstrated the capability to maneuver a satellite around the geosynchronous belt, allowing its satellites to sidle up to other satellites in space.

Not to be outdone, Russia deployed a pair of “nesting doll” satellites that shadowed a U.S. satellite in space. One Russian satellite birthed another, with Russia’s defense ministry claiming its purpose was to assess the “technical condition of domestic satellites.”

But later, the second satellite conducted a weapons test, firing what appeared to be a space torpedo. The Kremlin never explained how a fast-moving one-time projectile provided superior inspection benefits compared with the other Russian satellite flying persistently nearby.

Instead of falling prey to China and Russia’s treaty trap, Washington must urgently work with allies to improve spaced-based military and intelligence capabilities.

A well-crafted treaty that clearly defines acceptable and unacceptable actions in space and includes tough and realistic inspection and verification mechanisms could promote security and stability. But the PPWT is decidedly not that kind of treaty.

For starters, the proposed treaty does not explicitly prohibit the ground-based anti-satellite weapons that China and Russia have already fielded. Nor does the proposed treaty prevent the deployment of space-based weapons under the cloak of civilian or commercial capabilities. The PPWT also does not prohibit the development, testing, or stockpiling of weapons on Earth that could be quickly put into orbit.

Even if these deficiencies were addressed, the PPWT lacks any verification plan to ensure compliance. Instead, the treaty calls for “transparency and confidence-building measures” implemented on a “voluntary basis.” In other words, Beijing and Moscow want the United States to trust but never verify.

But then again, Americans should not be surprised by the PPWT. Moscow habitually seeks to use international arms control treaties to constrain the United States while viewing treaty strictures as optional when they become inconvenient or when the Kremlin sees an opportunity to seize a military advantage.

For more than a decade before its demise in 2019, Moscow used the Intermediate-Range Nuclear Forces Treaty to constrain the United States while the Kremlin produced, flight-tested, and fielded a ground-launched intermediate-range cruise missile in direct contravention of the treaty. Beijing, for its part, often exhibits an allergy to serious international arms control treaties. The willingness of the Chinese Communist Party to support the PPWT is, therefore, cause for some additional reflection in Washington.

So instead of falling prey to China and Russia’s PPWT trap, the United States must urgently work with allies to improve the resilience and redundancy of spaced-based military and intelligence capabilities.

Washington should also advance nascent efforts to establish rules of the road in space. “There are really no norms of behavior in space,” Gen. John Raymond, the chief of space operations at U.S. Space Force, said this month. “It’s the wild, wild West.”

In a notable and positive step, the U.N. General Assembly passed a British-introduced resolution in December that seeks to establish “norms, rules and principles of responsible behaviours” in space, which could reduce the chances for dangerous miscalculation.

The vote was 164 in favor, including the United States—and a mere 12 opposed.

Any guesses regarding who voted no? You guessed it: China and Russia. They were joined by their friends Iran, North Korea, Syria, Venezuela, and Cuba.

So much for a Chinese and Russian desire to pursue constructive and peaceful policies in space. Their duplicity continues.

#### Sino-Russian space militarization causes space war –

Rogin 11/30 [(Josh, a columnist for the Global Opinions section of The Washington Post. He writes about foreign policy and national security. Rogin is also a political analyst for CNN. He previously worked for Bloomberg View, the Daily Beast, Foreign Policy, Congressional Quarterly, Federal Computer Week and Japan's Asahi Shimbun newspaper.) “Opinion: A shadow war in space is heating up fast” Washington Post, 11/30/2021. https://www.washingtonpost.com/opinions/2021/11/30/space-race-china-david-thompson/] BC

When Russia blows up a satellite in space with a missile (as it did this month), or when China tests a new hypersonic missile (as it did last month), the ongoing arms race in space leaps into the news. But in between these “Sputnik”-like moments, outside the public’s view, the United States and its adversaries are battling in space every day.

While Washington officials and experts warn of the risks of an arms race in space, the United States’ adversaries are constantly conducting operations against U.S. satellites that skirt the line between intelligence operations and acts of war. The pace of conflict is intensifying, according to a top Space Force general, who told me that China could overtake the United States to become the number one power in space by the end of the decade.

“The threats are really growing and expanding every single day. And it’s really an evolution of activity that’s been happening for a long time,” Gen. David Thompson, the Space Force’s first vice chief of space operations, told me in an interview on the sidelines of the recent Halifax International Security Forum. “We’re really at a point now where there’s a whole host of ways that our space systems can be threatened.”

Right now, Space Force is dealing with what Thompson calls “reversible attacks” on U.S. government satellites (meaning attacks that don’t permanently damage the satellites) “every single day.” Both China and Russia are regularly attacking U.S. satellites with non-kinetic means, including lasers, radio frequency jammers and cyber attacks, he said.

Thompson repeatedly declined to comment on whether China or Russia has attacked a U.S. military satellite in a way that did permanent or significant damage, telling me that would be classified if it had happened. The Chinese military is quickly deploying ground-based systems for doing battle in space, such as lasers that can damage nosy U.S. intelligence community satellites, which could be considered an act of war.

“The Chinese are actually well ahead [of Russia],” Thompson said. “They're fielding operational systems at an incredible rate.”

Both the Russians and the Chinese are working on satellites that can attack other satellites, he said. For some time now there have been reports that China was developing a satellite that could claw another satellite or grab one with a robotic arm or a grappling hook. The Chinese government has several reasons to want to disable U.S. satellites, which have been useful in revealing concentration camps built to intern Uyghur Muslims and new Chinese nuclear missile silo fields.

In 2019, Russia deployed a small satellite into an orbit so close to a U.S. “national security satellite” that the U.S. government didn’t know whether it was attacking or not, Thompson said. Then, the Russian satellite backed away and conducted a weapons test. It released a small target and then shot it with a projectile.

“It maneuvered close, it maneuvered dangerously, it maneuvered threateningly so that they were coming close enough that there was a concern of collision,” he said. “So clearly, the Russians were sending us a message.”

China is building its own version of satellite-based global positioning systems, said Thompson. That’s in addition to the “couple of hundred” intelligence, surveillance and reconnaissance satellites China has now deployed to watch over any part of the globe. China is also putting satellites into space at twice the rate of the United States, meaning that if nothing changes on our end, China will surpass the United States in capability in space in a few years, he estimated.

“We are still the best in the world, clearly in terms of capability. They're catching up quickly,” he said. “We should be concerned by the end of this decade if we don't adapt.”

While China is quickly weaponizing space, its government points fingers at United States, claiming that Washington is the diplomatic stumbling black. There are reports that the Biden administration is reaching out to Beijing to establish new negotiations for a nuclear arms control, as well as international norms for cyberspace and space, but U.S. officials say that China won’t meaningfully engage.

The U.S. military is trying to speed up the procurement and deployment of space assets by creating structures like the Space Rapid Capabilities Office and the Space Development Agency, he said. Thompson’s idea is to deploy a large number of relatively low-cost satellites in constellations that increase the resiliency of U.S. space assets if they come under attack.

Conventional thinking about how to deter an enemy from attacking on the ground, by sea or in the air doesn’t really apply to space. New doctrines and norms for space need to be established, mostly by diplomats. That work will take years. Meanwhile, the arms race in space is heating up, and the United States risks losing it if it doesn’t recognize this reality.

#### Nuclear war causes extinction – famine and climate change

Starr 15 [(Steven, Director of the University of Missouri’s Clinical Laboratory Science Program and a senior scientist at the Physicians for Social Responsibility) “Nuclear War, Nuclear Winter, and Human Extinction,” Federation of American Scientists, 10/14/2015] DD  
While it is impossible to precisely predict all the human impacts that would result from a nuclear winter, it is relatively simple to predict those which would be most profound. That is, a nuclear winter would cause most humans and large animals to die from nuclear famine in a mass extinction event similar to the one that wiped out the dinosaurs.

Following the detonation (in conflict) of US and/or Russian launch-ready strategic nuclear weapons, nuclear firestorms would burn simultaneously over a total land surface area of many thousands or tens of thousands of square miles. These mass fires, many of which would rage over large cities and industrial areas, would release many tens of millions of tons of black carbon soot and smoke (up to 180 million tons, according to peer-reviewed studies), which would rise rapidly above cloud level and into the stratosphere. [For an explanation of the calculation of smoke emissions, see Atmospheric effects & societal consequences of regional scale nuclear conflicts.]

The scientists who completed the most recent peer-reviewed studies on nuclear winter discovered that the sunlight would heat the smoke, producing a self-lofting effect that would not only aid the rise of the smoke into the stratosphere (above cloud level, where it could not be rained out), but act to keep the smoke in the stratosphere for 10 years or more. The longevity of the smoke layer would act to greatly increase the severity of its effects upon the biosphere.

Once in the stratosphere, the smoke (predicted to be produced by a range of strategic nuclear wars) would rapidly engulf the Earth and form a dense stratospheric smoke layer. The smoke from a war fought with strategic nuclear weapons would quickly prevent up to 70% of sunlight from reaching the surface of the Northern Hemisphere and 35% of sunlight from reaching the surface of the Southern Hemisphere. Such an enormous loss of warming sunlight would produce Ice Age weather conditions on Earth in a matter of weeks. For a period of 1-3 years following the war, temperatures would fall below freezing every day in the central agricultural zones of North America and Eurasia. [For an explanation of nuclear winter, see Nuclear winter revisited with a modern climate model and current nuclear arsenals: Still catastrophic consequences.]

Nuclear winter would cause average global surface temperatures to become colder than they were at the height of the last Ice Age. Such extreme cold would eliminate growing seasons for many years, probably for a decade or longer. Can you imagine a winter that lasts for ten years?

The results of such a scenario are obvious. Temperatures would be much too cold to grow food, and they would remain this way long enough to cause most humans and animals to starve to death.

Global nuclear famine would ensue in a setting in which the infrastructure of the combatant nations has been totally destroyed, resulting in massive amounts of chemical and radioactive toxins being released into the biosphere. We don’t need a sophisticated study to tell us that no food and Ice Age temperatures for a decade would kill most people and animals on the planet.  Would the few remaining survivors be able to survive in a radioactive, toxic environment?

#### Scenario two is hegemony:

#### Chinese space leadership encourages ASAT proliferation – only the plan solves - China will not honor international commitments

Rajagopalan 5/12 [(Dr Rajeswari (Raji) Pillai Rajagopalan is the Director of the Centre for Security, Strategy and Technology (CSST) at the Observer Research Foundation, New Delhi. Dr Rajagopalan was the Technical Advisor to the United Nations Group of Governmental Experts (GGE) on Prevention of Arms Race in Outer Space (PAROS) (July 2018-July 2019). She was also a Non-Resident Indo-Pacific Fellow at the Perth USAsia Centre from April-December 2020. As a senior Asia defence writer for The Diplomat, she writes a weekly column on Asian strategic issues. Dr Rajagopalan joined ORF after a five-year stint at the National Security Council Secretariat (2003-2007), Government of India, where she was an Assistant Director. Prior to joining the NSCS, she was Research Officer at the Institute of Defence Studies and Analyses, New Delhi. She was also a Visiting Professor at the Graduate Institute of International Politics, National Chung Hsing University, Taiwan in 2012. Dr Rajagopalan has authored or edited nine books including Global Nuclear Security: Moving Beyond the NSS (2018), Space Policy 2.0 (2017), Nuclear Security in India (2015), Clashing Titans: Military Strategy and Insecurity among Asian Great Powers (2012), The Dragon's Fire: Chinese Military Strategy and Its Implications for Asia (2009). She has published research essays in edited volumes, and in peer reviewed journals such as India Review, Strategic Studies Quarterly, Air and Space Power Journal, International Journal of Nuclear Law and Strategic Analysis. She has also contributed essays to newspapers such as The Washington Post, The Wall Street Journal, Times of India, and The Economic Times. She has been invited to speak at international fora including the United Nations Disarmament Forum (New York), the UN Committee on the Peaceful Uses of Outer Space (COPUOS) (Vienna), Conference on Disarmament (Geneva), ASEAN Regional Forum (ARF) and the European Union.) “China’s irresponsible behaviour: A threat to space security” Observer Research Foundation, 5/12/2021. https://www.orfonline.org/expert-speak/chinas-irresponsible-behaviour-a-threat-to-space-security/] BC

With China planning an ambitious space programme that includes its own space station, it is likely that there will be more such risky incidents in the future as well. It is somewhat disturbing because China’s space programme has advanced to a degree that it undertakes missions including landing on the South Pole-Aitken Basin (on the far side of the Moon), returning rocks from the moon, and an interplanetary mission to Mars, which clearly demonstrates China has the technical capability to design and launch rockets whose spent stages can land without putting others at risk. That it has not done so is odd. It is not exactly what can be characterised as responsible behaviour in space.

Another example of China breaking norms and engaging in irresponsible behaviour in space is its ASAT test. China’s first successful anti-satellite (ASAT) test in January 2007, at an altitude of 850 kilometres, resulted in creating around 3,000 pieces of space debris. More significantly, it broke the unwritten moratorium that was in place for two decades. Beijing also started developing various counterspace capabilities with the goal of competing with the US. Nevertheless, each of China’s actions have led to a spiral effect, with others seeking to match China’s actions, especially in the Indo-Pacific region, given the contested nature of Asian and global geopolitics. For example, China’s repeated ASAT tests have led to the US’ own ASAT test (Operation Burnt Frost in 2008), and India’s ASAT test (Mission Shakti in 2019). India had no plans to go down this path until China’s first ASAT test, which became a gamechanging moment for India. Even so, India did not react to it for more than a decade, but the final decision was a carefully calibrated and a direct response to China’s growing military space capabilities and its less-than responsible behaviour. Other countries like Japan and France are also contemplating moves in this direction. Australia may not be far behind either.

Even though it may not be linked to the uncontrolled re-entry of the Chinese rocket, Jonathan McDowell, an astrophysicist at the Astrophysics Center at Harvard University noted that “about six minutes after Tianhe and the CZ-5B separated, they both came close to the ISS—under 300 km, which given uncertainties in trajectory is a tad alarming.” Making this point, he added “it’s \*possible\* that this ISS/Tianhe close encounter was one of those unlikely coincidences. I’m open to that possibility, but they should still have spotted the closeness and warned NASA (or better, called a collision avoidance hold in the count).”

Rocket re-entries are not uncommon, but space powers have tried to avoid the freefalls by usually conducting controlled re-entries so that they may fall in the ocean, or they may be directed towards the so-called “graveyard” orbits that may lie there for decades. But Jonathan McDowell, an astrophysicist at the Astrophysics Center at Harvard University argues that the Chinese rocket was designed in a manner that “leaves these big stages in low orbit.” And even in the case of controlled re-entries, there are failures sometimes and they can be dangerous too. SpaceX’s rocket debris landing on a farm in Washington in March this year is a case in point.

Moriba Jah, an Associate Professor at The University of Texas at Austin argues in a media interview that such events are going to become more common, and will happen more frequently and, therefore, humanity should come together to “jointly manage near earth space as a commons in need of coordination, protocols, and practices to maximise safety, security, and sustainability.” On the NASA Administrator’s statement, Jah said this should not be “singling out China.” Certainly, this is not about apportioning blame, but China’s actions cannot be condoned either.

What can be done? Given that usable orbits in space are finite in nature, there will need to be steps taken by all the space players to ensure that their actions do not contribute to further pollution of space and make it unusable in the near term. States have to invest in technologies that would aid in cleaning up and getting rid of some of the debris. States also need to come together in developing norms, rules of the road, and legally binding and political instruments on large rocket body re-entries.

The Long March 5B episode has yet again rekindled the debate on the need for rules for rocket and large body re-entries. Brian Weeden of the Secure World Foundation, for instance, questioned why, despite all ranting about China’s rocket re-entry issues, the US State Department has “consistently oppose[d] anything stronger than voluntary guidelines.” Weeden has provided a useful Twitter thread on the US hesitancy to get on board with legal agreements on outer space. One problem is that while the US abides by international obligations, other do not. This is a concern that Weeden notes “has a grain of truth” but adds the caveat that “reality is not that definitive”.

While he is correct to note that the issue is complicated, it is also true that countries like China have a terrible track record when it comes to meeting their treaty commitments. China’s violation of its own commitments with respect to nuclear non-proliferation, or in the South China Sea and East China Sea are well-known. Given this history, it is difficult to believe that China will allow itself to be bound by any restraints on its space programme, even if it signs any of these agreements. But given the US’ almost allergic reaction to signing legal agreements that others like China may violate, it doesn’t hurt China to keep bringing up PPWT-like (Prevention of the Placement of Weapons in Outer Space, the Threat or Use of Force Against Outer Space Objects) measures every now and then. This puts the whole international community in a bind. If we have to ensure safe and uninterrupted access to space, creating a secure, sustainable, and predictable outer space framework is essential. But unless all states demonstrate a commitment to living up to existing rules and norms, creating new ones will be difficult.

#### Chinese ASAT development emboldens Taiwan invasion – either US doesn’t follow through on its defense commitments, which kills alliances, or it defends Taiwan, which goes nuclear

Chow and Kelley 8/21 [(Brian G., policy analyst for the Institute of World Politics, Ph.D in physics from Case Western Reserve University, MBA and Ph.D in finance from the University of Michigan,and Brandon, graduate of Georgetown’s School of Foreign Service) “China’s Anti-Satellite Weapons Could Conquer Taiwan—Or Start a War,” National Interest, 8/21/2021] JL

If current trends hold, then China’s Strategic Support Force will be capable by the late 2020s of holding key U.S. space assets at risk. Chinese military doctrine, statements by senior officials, and past behavior all suggest that China may well believe threatening such assets to be an effective means of deterring U.S. intervention. If so, then the United States would face a type of “Sophie’s Choice”: decline to intervene, potentially leading allies to follow suit and Taiwan to succumb without a fight, thereby enabling Xi to achieve his goal of “peacefully” snuffing out Taiwanese independence; or start a war that would at best be long and bloody and might well even cross the nuclear threshold.

This emerging crisis has been three decades in the making. In 1991, China watched from afar as the United States used space-enabled capabilities to obliterate the Iraqi military from a distance in the first Gulf War. The People’s Liberation Army quickly set to work developing capabilities targeted at a perceived Achilles’ heel of this new American way of war: reliance on vulnerable space systems.

This project came to fruition with a direct ascent ASAT weapons test in 2007, but the test was limited in two key respects. First, it only reached low Earth orbit. Second, it generated thousands of pieces of long-lasting space junk, provoking immense international ire. This backlash appears to have taken China by surprise, driving it to seek new, more usable ASAT types with minimal debris production. Now, one such ASAT is nearing operational status: spacecraft capable of rendezvous and proximity operations (RPOs).

Such spacecraft are inevitable and cannot realistically be limited. The United States, European Union, China, and others are developing them to provide a range of satellite services essential to the new space economy, such as in situ repairs and refueling of satellites and active removal of space debris. But RPO capabilities are dual-use: if a satellite can grapple space objects for servicing, then it might well be capable of grappling an adversary’s satellite to move it out of its servicing orbit. Perhaps it could degrade or disable it by bending or disconnecting its solar panels and antennas all while producing minimal debris.

This is a serious threat, primarily because no international rules presently exist to limit close approaches in space. Left unaddressed, this lacuna in international law and space policy could enable a prospective attacker to pre-position, during peacetime, as many spacecraft as they wish as close as they wish to as many high-value targets as they wish. The result would be an ever-present possibility of sudden, bolt-from-the-blue attacks on vital space assets—and worse, on many of them at once.

China has conducted at least half a dozen tests of RPO capabilities in space since 2008, two of which went on for years. Influential space experts have noted that these tests have plausible peaceful purposes and are in many cases similar to those conducted by the United States. This, however, does not make it any less important to establish effective legal, policy, and technical counters to their offensive use. Even if it were certain that these capabilities are intended purely for peaceful applications—and it is not at all clear that that is the case—China (or any other country) could at any time decide to repurpose these capabilities for ASAT use.

There is still time to get out ahead of this threat, but likely not for much longer. China’s RPO capabilities have, thus far, lagged about five years behind those of the United States. There are reasons to believe this gap may close, but even assuming that it holds, we should expect to see China demonstrate an operational dual-use rendezvous spacecraft by around 2025. (The first instance of a U.S. commercial satellite docking with another satellite to change its orbit occurred in February 2020.)

At the same time, China is expanding its capacity for rapid spacecraft manufacturing. The Global Times reported in January that China’s first intelligent mass production line is set to produce 240 small satellites per year. In April, Andrew Jones at SpaceNews reported that China is developing plans to quickly produce and loft a thirteen thousand-satellite national internet megaconstellation. It is not unreasonable to assume that China could manufacture two hundred small rendezvous ASAT spacecraft by 2029, possibly more.

If this happens, and Beijing was to decide in 2029 to launch these two hundred small RPO spacecraft and position them in close proximity to strategically vital assets, then China would be able to simultaneously threaten disablement of the entire constellations of U.S. satellites for missile early warning (about a dozen satellites with spares included); communications in a nuclear-disrupted environment (about a dozen); and positioning, navigation, and timing (about three dozen); along with several dozen key communications, imagery, and meteorology satellites. Losing these assets would severely degrade U.S. deterrence and warfighting capabilities, yet once close pre-positioning has occurred such losses become almost impossible to prevent. For this reason, such pre-positioning could conceivably deter the United States from coming to Taiwan’s aid due to the prospect that intervention would spur China to disable these critical space systems. Without their support, the war would be much bloodier and costlier—a daunting proposition for any president.

Should the United States fail to intervene, the consequences would be disastrous for both Washington and its allies in East Asia, and potentially the credibility of U.S. defense commitments around the globe. Worse yet, however, might be what could happen if China believes that such a threat will succeed but proves to be wrong. History is rife with examples of major wars arising from miscalculations such as this, and there are many pathways by which such a situation could easily escalate out of control to a full-scale conventional conflict or even to nuclear use.

#### Cementing America’s lead in the commercial space industry is key to preserve hegemony

Autry and Kwast 19 [(Greg, a clinical professor of space leadership, policy, and business at Arizona State University’s Thunderbird School of Global Management. He served on the 2016 NASA transition team and as the White House liaison at NASA in 2017. He is the chair of the Safety Working Group for the U.S. Federal Aviation Administration’s Commercial Space Transportation Advisory Committee.) (Steve, a Lieutenant General and commander of Recruiting, Training, Educating and Development for the Air Force. He is an astronautical engineer and Harvard Fellow in Public Policy.) “America Is Losing the Second Space Race to China” Foreign Policy, 8/22/2019. https://foreignpolicy.com/2019/08/22/america-is-losing-the-second-space-race-to-china/] BC

The private sector can give the United States a much-needed rocket boost.

The current U.S. space defense strategy is inadequate and on a path to failure. President Donald Trump’s vision for a Space Force is big enough. As he said on June 18, “It is not enough to merely have an American presence in space. We must have American dominance in space.” But the Air Force is not matching this vision. Instead, the leadership is currently focused on incremental improvements to existing equipment and organizational structures. Dominating the vast and dynamic environment of space will require revolutionary capabilities and resources far deeper than traditional Department of Defense thinking can fund, manage, or even conceive of. Success depends on a much more active partnership with the commercial space industry— and its disruptive capabilities.

U.S. military space planners are preparing to repeat a conflict they imagined back in the 1980s, which never actually occurred, against a vanished Soviet empire. Meanwhile, China is executing a winning strategy in the world of today. It is burning hard toward domination of the future space markets that will define the next century. They are planning infrastructure in space that will control 21st-century telecommunications, energy, transportation, and manufacturing. In doing so, they will acquire trillion-dollar revenues as well as the deep capabilities that come from continuous operational experience in space. This will deliver space dominance and global hegemony to China’s authoritarian rulers.

Despite the fact that many in the policy and intelligence communities understand exactly what China is doing and have been trying to alert leadership, Air Force leadership has convinced the White House to fund only a slightly better satellite command with the same leadership, while sticking a new label onto their outmoded thinking. A U.S. Space Force or Corps with a satellite command will never fulfill Trump’s call to dominate space. Air Force leadership is demonstrating the same hubris that Gen. George Custer used in convincing Congress, over President Ulysses S. Grant’s better experience intuition, that he could overtake the Black Hills with repeating rifles and artillery. That strategy of technological overconfidence inflamed conflict rather than subduing it, and the 7th Cavalry were wiped out at the Battle of the Little Bighorn.

The West was actually won by the settlers, ranchers, miners, and railroad barons who were able to convert the wealth of the territory itself into the means of holding it. They laid the groundwork that made the 20th century the American Century and delivered freedom to millions of people in Europe and Asia. Of course, they also trampled the indigenous people of the American West in their wake—but empty space comes with no such bloody cost. The very emptiness and wealth of this new, if not quite final, frontier, however, means that competition for resources and strategic locations in cislunar space (between the Earth and moon) will be intense over the next two decades. The outcome of this competition will determine the fate of humanity in the next century.

China’s impending dominance will neutralize U.S. geopolitical power by allowing Beijing to control global information flows from the high ground of space. Imagine a school in Bolivia or a farmer in Kenya choosing between paying for a U.S. satellite internet or image provider or receiving those services for free as a “gift of the Chinese people.” It will be of little concern to global consumers that the news they receive is slanted or that searches for “free speech” link to articles about corruption in Western democracies. Nor will they care if concentration camps in Tibet and the Uighur areas of western China are obscured, or if U.S. military action is presented as tyranny and Chinese expansion is described as peacekeeping or liberation.

China’s aggressive investment in space solar power will allow it to provide cheap, clean power to the world, displacing U.S. energy firms while placing a second yoke around the developing world. Significantly, such orbital power stations have dual use potential and, if properly designed, could serve as powerful offensive weapons platforms.

China’s first step in this process is to conquer the growing small space launch market. Beijing is providing nominally commercial firms with government-manufactured, mobile intercontinental ballistic missiles they can use to dump launch services on the market below cost. These start-ups are already undercutting U.S. pricing by 80 percent. Based on its previous success in using dumping to take out U.S. developed industries such as solar power modules and drones, China will quickly move upstream to attack the leading U.S. launch providers and secure a global commercial monopoly. Owning the launch market will give them an unsurmountable advantage against U.S. competitors in satellite internet, imaging, and power.

The United States can still build a strategy to win. At this moment, it holds the competitive advantage in every critical space technology and has the finest set of commercial space firms in the world. It has pockets of innovative military thinkers within groups like the Defense Innovation Unit, under Mike Griffin, the Pentagon’s top research and development official. If the United States simply protects the intellectual property its creative minds unleash and defend its truly free markets from strategic mercantilist attack, it will not lose this new space race. The United States has done this before. It beat Germany to the nuclear bomb, it beat the Soviet Union to the nuclear triad, and it won the first space race.

None of those victories was achieved by embracing the existing bureaucracy. Each of them depended on the president of the day following the only proven path to victory in a technological domain: establish a small team with a positively disruptive mindset and empower that team to investigate a wide range of new concepts, work with emerging technologies, and test innovative strategies. Today that means giving a dedicated Space Force the freedom to easily partner with commercial firms and leverage the private capital in building sustainable infrastructure that actually reduces the likelihood of conflict while securing a better economic future for the nation and the world.

#### US leadership in this decade solves global war and results in a peaceful end to Chinese revisionism **Erickson and Collins 10/21**