# OFF

## 1

#### Interpretation: Debaters must disclose all positions they have read on the 2020-2021 NDCA Wiki at least 30 minutes before the following round.

#### Violation: you didn’t, I have screenshots – ask and I’ll send, or go visit their wiki (https://hsld.debatecoaches.org/Ramsay/Frazier%20Aff)

#### Net benefits:

#### 1] Education

#### ---A] Evidence Quality – Disclosure creates a public information database which streamlines case writing and encourages debaters to find the best evidence on the topic.

Nails 13 [(Jacob, NDT Policy Debater at Georgia State University), “A Defense of Disclosure (Including Third Party Disclosure)”, NSD Update, 10/10/2013] DD  
I fall squarely on the side of disclosure. I find that the largest advantage of widespread disclosure is the educational value it provides. First, disclosure streamlines research. Rather than every team and every lone wolf researching completely in the dark, the wiki provides a public body of knowledge that everyone can contribute to and build off of. Students can look through the different studies on the topic and choose the best ones on an informed basis without the prohibitively large burden of personally surveying all of the literature. The best arguments are identified and replicated, which is a natural result of an open marketplace of ideas. Quality of evidence increases across the board.

#### ---B] Incentivizes quality arguments and research – Disclosure discourages cheap shot strategies and a lack of clash --- which rely on obfuscation -- to win rounds.

Nails 13 [(Jacob, NDT Policy Debater at Georgia State University), “A Defense of Disclosure (Including Third Party Disclosure)”, NSD Update, 10/10/2013] DD  
Lastly, and to my mind most significantly, disclosure weeds out anti-educational arguments. I have in mind the sort of theory spikes and underdeveloped analytics whose strategic value comes only from the fact that the time to think of and enunciate responses to them takes longer than the time spent making the arguments themselves. If these arguments were made on a level playing field where each side had equal time to craft answers, they would seldom win rounds, which is a testimony to the real world applicability (or lack thereof) of such strategies. A model in which arguments have to withstand close scrutiny to win rounds creates incentive to find the best arguments on the topic rather than the shadiest. Having transitioned from LD to policy where disclosure is more universal, I can say that debates are more substantive, developed, and responsive when both sides know what they’re getting into prior to the round.

#### 2] Ev Ethics – Full text disclosure allows debaters to ensure that evidence has been accurately tagged and cut.

#### Tambe and Ghandra 14 [(Arjun, ToC Quarterfinalist) and (Akhil, Three time ToC qualifier), “Evidence Ethics in LD Debate: A Proposal by Akhil Ghandra and Arjun Tambe”, VBriefly, 10/24/2014] DDFirst, we think debaters should disclose the full text of their positions on the NDCA wiki. Many articles have already been written on the importance of disclosure, so we won’t repeat those arguments here. However, we think disclosure can help address the issue of miscutting or fabricating evidence since debaters can verify whether a piece of evidence read by their opponent has been cut ethically by reading the article the evidence is cut from. Full text disclosure would also elevate the quality of disclosure. Providing the first and last three words of an article can make it difficult to reconstruct a debater’s case since not everyone has access to all the databases articles may have been accessed from. Full text disclosure expands access to debaters’ evidence.

#### Voters: Fairness, Education

### 1NC – Paradigm Issues

#### Use competing interpretations:

#### 1] Reasonability is arbitrary -- invites judge intervention

#### 2] Competing interps deters future abuse by generating norms

#### 3] Reasonability causes a race to the bottom -- debaters try to be as abusive as possible while staying “reasonable”

#### 4] Reasonability collapses to competing interps -- you still need to read a counter-interp to prove that you are being reasonable.

**DTD -- Deters future abuse since debaters don’t want to lose, and DTA is to drop any undisclosed args which is ALL of their args**

## 2

#### The United States federal government, the Russian Federation and People’s Republic of China should establish:

#### - an international “debris credits” trading system that distributes tradeable quotas for debris production and rewards members of the international agreement with additional credits if they implement mitigation protocols.

#### -an international fund collected via a fee upon launch starting at 5% and moving upwards pending international agreement that functions as a partial rebate and victims restitution fund by providing partial compensation to countries who create “debris free” launches and implement post-mission disposal mechanisms as well as providing full compensation to countries in the events of collisions with orbital debris.

#### Debris credits solve the case without having to share SSA data.

Prasad and Lochan 7 [(M.Y.S. Prasad, Space Applications Centre, Indian Space Research Organisation, Ahmedabad, India, and Rajeev Lochan Indian Space Research Organisation, Bangalore, India,) “COMMON BUT DIFFERENTIATED RESPONSIBILITY - A PRINCIPLE TO MAINTAIN SPACE ENVIRONMENT WITH RESPECT TO SPACE DEBRIS” ISBN: 9781563479625, Proceedings of the Fiftieth colloquium on the Law of outer space : 24-28 September 2007, Hyderabad, India] TDI

Space debris will be a concern for future for all the countries. Especially the developing countries which have limited Space assets will face serious consequences if any of their satellites is involved with incidents / accidents with Space debris. The manned missions of advanced countries requires absolutely high level of crew safety, and hence Space debris is a serious concern to them also. Even a close approach of the debris to the operational satellites may pose problems if the cloud of debris occupies larger volume. From these considerations, it is definitely essential to evolve strategies to limit the growth of Space debris, and also to evolve debris mitigation measures.

However the analysis of the Space debris presented in section 4 clearly brought out that the debris population is proportional to the number of launches carried out by each country in the past. Hence larger responsibility lies with the countries which carried out a number of launches in the past. So the maintenance of Space environment from the Space debris point of view is a case well suited for “Common but differentiated responsibility” . In this context this principle means that all countries capable of taking actions are responsible to maintain the Space environment relatively clean with respect to Space debris. Also the countries, which are responsible for the present level of the debris population, should take higher responsibility in respect of limiting the future growth of Space debris, and also in providing knowledge and technology in the areas of Space debris monitoring and mitigation to all countries.

In this context various measures can be contemplated for future. One of them had been achieved when UN-COPUOS adopted Space debris mitigation guidelines to be implemented by all countries on voluntary basis through national mechanisms.

Different countries have evolved their own national Space debris mitigation standards and regulations to be implemented by the companies involved in aerospace activities in their countries. Still many countries feel that an appropriate legal regime at a global level is essential to tackle the Space debris issue. This is where the models evolved in the Kyoto Protocol can be considered to be tailored and used with appropriate modifications for Space debris legal regime.

Some of the new mechanisms which can be derived from the principles of Kyoto Protocol are:

• To limit the future Space debris generation, launch quota caps for each Space-faring country can be evolved linked to their past generation of the Space debris.

• The countries can be rewarded with “debris credits” in case they implement Space debris mitigation measures in their missions.

• Some advanced Space-faring nations may have pressing commitments to carry out larger number of launches. They can be enabled to carry out such missions through purchase of “debris credits” from the other countries, who have earned “debris credits” through application of Space debris mitigation measures.

• The countries which do not have any Space activity for the present, but who have plans to develop either Space transportation or deploy satellites in orbit can be given fixed quota of “debris credits”. These credits can lapse after a certain period if they do not realize their Space missions. These countries can also be enabled to market their “debris credits” to the other countries, and benefit by acquiring Space technologies.

• A Trust Fund can be created to compensate the victims involved in the accidents with Space debris, to which the contributions can be linked to the debris generated in the past by different countries. This can be a part of larger aspect of Space debris damage liability regime.

• Special treatment can be considered for the countries willing to share their knowledge and technology in the area of Space debris with other countries, to take up the research and development to a higher level. Such cooperative ventures can be given special treatment as Joint Implementation Mechanisms to earn “Debris credits”.

These are some of the ideas which are derived from the Kyoto Protocol with application to Space debris area. They are not exhaustive but only indicative for friture legal experts to examine while developing Space debris legal regime.

6. CONCLUSIONS

This paper describes various multi-lateral initiatives in the area of analysis, and mitigation of Space debris. The specific features related to type of debris and the level of launches and other activities of Space-faring nations are detailed. The innovative mechanisms evolved in the Kyoto Protocol of UN FCCC are described and their applicability for Space debris case is argued. Possible measures which can be fashioned after the Kyoto Protocol are suggested to deal with the Space debris and maintenance of Outer Space environment. All the analysis is based on the conviction that ‘Common but Differentiated Responsibility’ is very well suited for the present Space debris scenario.

#### Global trust fund solves the aff and encourages companies to stay in countries party to the agreement

Pelton 13 [(Dr. Joseph N., Director of the Space and Advanced Communications Research Institute (SACRI) at George Washington University), Space debris and other threats from outer space. New York: Springer. 27-28, 2013] TDI

The missing element in many of these discussions is how to create the economic wherewithal to address the debris problem and how to create financial incentives to correct the problem. In this section the analysis is directed toward the merits of establishing national, regional and in time perhaps universal agreements to establish economic funds—as well as incentives or penalties—to mitigate the problem. The purpose of such funds would be several fold: (i) to create a rebate system to reward “clean and debris free” launches; (ii) to award a further rebate to reward clean disposal of satellites at the end-of life. Under this approach there would now be clear incentives to get rid of space debris as opposed to the current disincentives and potential liabilities associated with bringing debris and satellites down or into graveyard orbits. The creation of a fund—or perhaps several funds that could grow into a global fund—would create incentives to develop the best technology rather than a single approach that might ultimately prove to be suboptimal.

The 20-year sunset for the fund(s) would create a specific goal to complete the mission, and if success is achieved there would not be the additional issue of having to disband an international agency. The fund (or collection of national/regional funds) could be established over time in an “organic manner” with countries forming such a fund on a national basis, or perhaps Europe could form such a fund on a regional basis. This type of national, regional, and in time ultimately universal fund would be formed by space actors for the specific purpose of addressing the space debris issue. This approach would thus become a pro-active “forward looking” approach to financing a solution to the problem rather than seeking a “backwards-looking” approach to addressing space debris with no financing mechanism in place and nations being “coerced” into doing the “right thing”. The money to capitalize this type of space debris fund would be collected prior to all launches and would equivalent to perhaps 3-5 % of the total cost of various space-related missions. Under this approach LEO/polar orbit missions might be required to pay in 5 % of mission costs. MEO and GEO orbit and deep space missions might be asked to pay in a lower amount. This fund would be collected for a period of perhaps 20 years but would have a sunset provision on the premise that migitation of orbital debris could be successfully accomplished over this length of time. Thus there would need to be an active agreement to extend the fund or it would otherwise elapse.

Such a fund (or network of funds) would be formed by means of a specific assessment paid into a designated bank account (or space insurance company) prior to launch. This fund would apply to all those deploying spacecraft into Earth orbit, or, if on a national or regional basis, would apply to all launches from that country or region. Organizations launching satellites beyond Earth orbit would also pay into the fund but a lower amount. After each launch there would be a partial rebate, assuming it was a certified as a clean “debris-free” launch as independently verified. When a spacecraft was de-orbited at end of life or successfully placed in a graveyard orbit there would be a further rebate. The size of the “clean launch” and “successful disposal” rebates would be specified at the time the fund(s) were established. Approximately half of the payments into the fund, however, would always be retained to compensate those entities involved in removing “officially designated” debris from orbit or moving defunct space objects to a graveyard orbit.

The prime purpose of the national, regional or hopefully, global space debris fund would be to compensate those entities “licensed under an appropriate regulatory framework” to remove debris from Earth orbit or those that develop and operate systems to avoid collisions. This licensing process for entities designated to undertake orbit debris removal or collision avoidance activities might, for example, be formally assigned to the United Nations Office of Outer Space Affairs or in time spelled out in a new international space convention. Other entities might also be “licensed” by the U. N. Office of Outer Space Affairs to undertake activities associated with the prevention of space debris or space debris mediation or collision avoidance activities separate from the active removal of space debris from orbit. Such activities, however, would be limited to no more than a set percentage of the available funds.

Payment into this fund would “seem and feel” to satellite operators and governmental space agencies conducting space operations very much like buying launch insurance for a spacecraft mission. Indeed the fund could possibly be administered by launch insurance companies. These payments would be different in that it would only represent about a third of the cost associated with purchasing launch insurance, and rebates would eventually return half of the money paid into the fund. Further, the projected end date for the fund would establish a very real goal for accomplishing “a largely space debris-free world”. The creation of this fund and the rebate payments would reverse the current incentives that actually “encourage” the increase of orbital debris. Under current space law the owners and operators of space objects not only lack an incentive to remove their space debris from orbit; they actually face substantial financial penalties if the removal process somehow adversely affects another space object and creates liabilities which they are compelled to pay. The payments into the fund are actually modest when compared to the damages that will ensue once we reach the Kessler syndrome stage and debris continues to cascade out of control on an exponentially increasing basis. Indeed payments for launch insurance operations over the last three decades have varied from a low of about 6 % of total mission costs to as much as 20 % of total costs. Today typically 15 % of mission costs is for launch insurance. If one considers this wide range of payments for launch insurance and the importance of the long term sustainability of space and safe space access one should consider a 5 % orbital debris fund as not being at all excessive or unreasonable, especially if half of the money is ultimately rebated in the advent of a “clean” launch with upper stage rocket motors and launcher fairings being removed from orbit and the satellite eventually disposed of as well. There would appear to be merit to a flexible “economic fund” approach as opposed to seeking to create a single international agency charged with space debris remediation that would likely focus on a preferred technology and a single approach to debris removal. Licensed international entities, under the fund approach, would not be restricted to a single country. Each country or region that acted first to create orbital debris funds could also give research grants to entities embarked on developing new technology to remove debris from orbit with the latest technology.

In short it is believed that there would be “economic and political efficiency” in having a number of licensed commercial entities capable of developing a diversity of innovative technologies to carry out space debris removal. Overall it is believed that the “economic fund” mechanism could help to create all the right incentives: (a) to reward entities for a clean launch of the satellite and removal of upper stage rockets and protective fairing covers from orbit; (b) to reward operators for removing debris properly at end of life; (c) using the “sunset provision” to establish a specific goal to get the job done; (d) using the “fund approach” (or alternatively even a prize approach) that would allow the competitive development of the best and most cost efficient technology and (e) there would be no need to “dismantle” an international agency at the end of the process.

## 3

#### Xi’s regime is stable now, but its success depends on strong growth and private sector development.

**Mitter and Johnson 21** [Rana Mitter and Elsbeth Johnson, [Rana Mitter](https://hbr.org/search?term=rana%20mitter&search_type=search-all) is a professor of the history and politics of modern China at Oxford. [Elsbeth Johnson](https://hbr.org/search?term=elsbeth%20johnson&search_type=search-all), formerly the strategy director for Prudential PLC’s Asian business, is a senior lecturer at MIT’s Sloan School of Management and the founder of SystemShift, a consulting firm. May-June 2021, "What the West Gets Wrong About China," Harvard Business Review, [https://hbr.org/2021/05/what-the-west-gets-wrong-about-china accessed 12/14/21](https://hbr.org/2021/05/what-the-west-gets-wrong-about-china%20accessed%2012/14/21)] Adam

In China, however, growth has come in the context of stable communist rule, suggesting that democracy and growth are not inevitably mutually dependent. In fact, many Chinese believe that the country’s recent economic achievements—large-scale poverty reduction, huge infrastructure investment, and development as a world-class tech innovator—have come about because of, not despite, China’s authoritarian form of government. Its aggressive handling of Covid-19—in sharp contrast to that of many Western countries with higher death rates and later, less-stringent lockdowns—has, if anything, reinforced that view.

China has also defied predictions that its authoritarianism would inhibit its capacity to [innovate](https://hbr.org/2011/06/what-the-west-doesnt-get-about-china). It is a global leader in AI, biotech, and space exploration. Some of its technological successes have been driven by market forces: People wanted to buy goods or communicate more easily, and the likes of Alibaba and Tencent have helped them do just that. But much of the technological progress has come from a highly innovative and well-funded military that has invested heavily in China’s burgeoning new industries. This, of course, mirrors the role of U.S. defense and intelligence spending in the development of Silicon Valley. But in China the consumer applications have come faster, making more obvious the link between government investment and products and services that benefit individuals. That’s why ordinary Chinese people see Chinese companies such as Alibaba, Huawei, and TikTok as sources of national pride—international vanguards of Chinese success—rather than simply sources of jobs or GDP, as they might be viewed in the West.

Thus July 2020 polling data from the Ash Center at Harvard’s Kennedy School of Government revealed 95% satisfaction with the Beijing government among Chinese citizens. Our own experiences on the ground in China confirm this. Most ordinary people we meet don’t feel that the authoritarian state is solely oppressive, although it can be that; for them it also provides opportunity. A cleaner in Chongqing now owns several apartments because the CCP reformed property laws. A Shanghai journalist is paid by her state-controlled magazine to fly around the world for stories on global lifestyle trends. A young student in Nanjing can study propulsion physics at Beijing’s Tsinghua University thanks to social mobility and the party’s significant investment in scientific research.

#### Xi has committed to the commercial space industry as the linchpin of China’s rise – the plan is seen as a complete 180

**Patel 21** [Neel V. Patel, Neel is a space reporter for MIT Technology Review. 1-21-2021, "China’s surging private space industry is out to challenge the US," MIT Technology Review, <https://www.technologyreview.com/2021/01/21/1016513/china-private-commercial-space-industry-dominance/> accessed 12/14/21] Adam

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](https://archive.md/o/bc9l4/www.cpppc.org/en/zy/994006.jhtml) 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](https://archive.md/o/bc9l4/https:/www.ida.org/-/media/feature/publications/e/ev/evaluation-of-chinas-commercial-space-sector/d-10873.ashx). 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](https://archive.md/o/bc9l4/https:/spacenews.com/spacety-releases-first-sar-images/), 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.

Although China is taking inspiration from the US in building out its private industry, the nature of the Chinese state also means these new companies face obstacles that their rivals in the West don’t have to worry about. While Chinese companies may look private on paper, they must still submit to government guidance and control, and accept some level of interference. It may be difficult for them to make a case to potential overseas customers that they are independent. The distinction between companies that are truly private and those that are more or less state actors is still quite fuzzy, especially if the government is a frequent customer. “That could still lead to a lack of trust from other partners,” says Goswami. It doesn’t help that the government itself is often [very cagey about what its national program is even up to](https://archive.md/o/bc9l4/https:/www.bbc.com/news/science-environment-54076895).

And Hines adds that it’s not always clear exactly how separate these companies are from, say, the People’s Liberation Army, given the historical ties between the space and defense sectors. “Some of these things will pose significant hurdles for the commercial space sector as it tries to expand,” he says.

#### Shifts in regime perception threatens CCP’s legitimacy from nationalist hardliners

Weiss 19 Jessica Weiss 1-29-2019 “Authoritarian Audiences, Rhetoric, and Propaganda in International Crises: Evidence from China” <http://www.jessicachenweiss.com/uploads/3/0/6/3/30636001/19-01-24-elite-statements-isq-ca.pdf> (Associate Professor of Government at Cornell University)//Elmer

Public support—or the appearance of it—matters to many autocracies. As Ithiel de Sola Pool writes, modern dictatorships are “highly conscious of public opinion and make major efforts to affect it.”6 Mao Zedong told his comrades: “When you make revolution, you must first manage public opinion.”7 Because autocracies often rely on **nationalist mythmaking**,8 success or failure in defending the national honor in international crises could burnish the leadership’s patriotic credentials or spark opposition. **Shared outrage at the regime’s foreign policy failures could galvanize street protests or elite fissures, creating intraparty upheaval** or inviting military officers to step in to restore order. Fearing a domestic backlash, authoritarian leaders may feel compelled to take a tough international stance. Although authoritarian leaders are rarely held accountable to public opinion through free and fair elections, fears of popular unrest and irregular ouster often weigh heavily on autocrats seeking to maximize their tenure in office. Considering the harsh consequences that authoritarian elites face if pushed out of office, even a small increase in the probability of ouster could alter authoritarian incentives in international crises.9 A history of nationalist uprisings make Chinese citizens and leaders especially aware of the linkage between international disputes and domestic unrest. The weakness of the PRC’s predecessor in defending Chinese sovereignty at the Paris Peace Conference in 1919 galvanized protests and a general strike, forcing the government to sack three officials and reject the Treaty of Versailles, which awarded territories in China to Japan. These precedents have made Chinese officials particularly sensitive to the appearance of hewing to public opinion. As the People’s Daily chief editor wrote: “History and reality have shown us that public opinion and regime safety are inseparable.”10 One Chinese scholar even claimed: “the Chinese government probably knows the public’s opinion better and reacts to it more directly than even the U.S. government.”11

#### Xi will launch diversionary war to domestic backlash – escalates in multiple hotspots

Norris 17, William J. Geostrategic Implications of China’s Twin Economic Challenges. CFR Discussion Paper, 2017. (Associate professor of Chinese foreign and security policy at Texas A&M University’s Bush School of Government and Public Service)//Elmer

Populist pressures might tempt the **party leadership** to encourage **diversionary nationalism**. The logic of this concern is straightforward: the Communist Party might seek to **distract a restless domestic population** with **adventurism abroad**.19 The **Xi** administration wants to **appear tough** in its **defense of foreign encroachments** against China’s interests. This need stems from a long-running narrative about how a weak Qing dynasty was unable to defend China in the face of European imperial expansion, epitomized by the Opium Wars and the subsequent treaties imposed on China in the nineteenth century. The party is **particularly sensitive** to **perceptions of weakness** because much of its **claim to legitimacy**—manifested in **Xi’s Chinese Dream** campaign today—stems from the party’s claims of leading the **restoration of Chinese greatness**. For example, the May Fourth Movement, a popular protest in 1919 that helped catalyze the CPC, called into question the legitimacy of the Republic of China government running the country at that time because the regime was seen as not having effectively defended China’s territorial and sovereignty interests at the Versailles Peace Conference. **Diversionary nationalist frictions** would likely occur if the Chinese leadership portrayed a foreign adversary as having made the first move, thus forcing Xi to stand up for China’s interests. An example is the 2012 attempt by the nationalist governor of Tokyo, Shintaro Ishihara, to buy the Senkaku/Diaoyu Islands from a private owner.20 Although the Japanese central government sought to avert a crisis by stepping in to purchase the islands—having them bought and administered by Ishihara’s Tokyo metropolitan government would have dragged Japan into a confrontation with China—China saw this move as part of a deliberate orchestration by Japan to nationalize the islands. Xi seemingly had no choice but to defend China’s claims against an attempt by Japan to consolidate its position on the dispute.21 This issue touched off a period of heated tensions between China and Japan, lasting more than two years.22 Such dynamics are not limited to Japan. Other possible areas of conflict include, but are not necessarily limited to, **Taiwan**, **India**, and the **South China Sea** (especially with the **Philippines** and **Vietnam**). The Chinese government will use such tactics if it believes that the costs are relatively low. Ideally, China would like to appear tough while avoiding material repercussions or a serious diplomatic breakdown. Standing up against foreign encroachment—without facing much blowback—could provide Xi’s administration with a tempting source of noneconomic legitimacy. However, over the next few years, Xi will probably not be actively looking to get embroiled abroad. Cushioning the fallout from slower growth while managing a structural economic transition will be difficult enough. Courting potential international crises that distract the central leadership would make this task even more daunting. Even if the top leadership did not wish to provoke conflict, a smaller budgetary allotment for security could cause **military interests** in China to **deliberately instigate trouble** to **justify** their **claims over increasingly scarce resources**. For example, an air force interested in ensuring its funding for a midair tanker program might find the existence of far-flung territorial disputes to be useful in making its case. Such a case would be made even stronger by a pattern of recent frictions that highlights the necessity of greater air power projection. Budgetary pressures may be partly behind a recent People’s Liberation Army reorganization and headcount reduction. A slowing economy might cause a further deceleration in China’s military spending, thus increasing such pressures as budgetary belts tighten. Challenges to Xi’s Leadership Xi Jinping’s efforts to address economic challenges could fail, unleashing consequences that extend well beyond China’s economic health. For example, an **economic collapse** could give rise to a Vladimir **Putin–like redemption figure** in China. Xi’s approach of centralizing authority over a diverse, complex, and massive social, political, and economic system is a **recipe for brittleness**. Rather than designing a resilient, decentralized governance structure that can gracefully cope with localized failures at particular nodes in a network, a highly centralized architecture **risks catastrophic**, **system-level failure**. Although centralized authority offers the tantalizing chimera of stronger control from the center, it also puts all the responsibility squarely on Xi’s shoulders. With China’s ascension to great power status, the consequences of internecine domestic political battles are increasingly playing out on the world stage. The international significance of China’s domestic politics is a new paradigm for the Chinese leadership, and one can expect an adjustment period during which the outcome of what had previously been relatively insulated domestic political frictions will likely generate **unintended international repercussions**. Such dynamics will influence Chinese foreign policy and security behavior. Domestic arguments over ideology, bureaucratic power struggles, and strategic direction could all have **ripple effects abroad**. Many of China’s party heavyweights still employ a narrow and exclusively domestic political calculus. Such behavior increases the possibility of international implications that are not fully anticipated, **raising the risks** of **strategic miscalculation** on the world stage. For example, the factional power struggles that animated the Cultural Revolution were largely driven by domestic concerns, yet manifested themselves in Chinese foreign policy for more than a decade. During this period, China was not the world’s second largest economy and, for much of this time, did not even have formal representation at the United Nations. If today’s globally interconnected China became engulfed in similar domestic chaos, the effects would be felt worldwide.23 Weakened Fetters of Economic Interdependence If China successfully transitioned away from its export-driven growth model toward a consumption-driven economic engine over the next four or five years, it could no longer feel as constrained by economic interdependence. To the extent that such constraints are loosened, the U.S.-China relationship will be more prone to conflict and friction.24 While China has never been the archetypal liberal economic power bent on benign integration with the global economy, its export-driven growth model produced a strong strategic preference for stability. Although past behavior is not necessarily indicative of future strategic calculus, China’s “economic circuit breaker” logic seems to have held its most aggressive nationalism below the threshold of war since 1979. A China that is both comparatively strong and less dependent on the global economy would be a novel development in modern geopolitics. As China changes the composition of its international economic linkages, global integration could place fewer constraints on it. Whereas China has been highly reliant on the import of raw materials and semifinished goods for reexport, a consumption-driven China could have a different international trade profile. China could still rely on imported goods, but their centrality to the country’s overall economic growth would be altered. Imports of luxury goods, consumer products, international brands, and services may not exert a significant constraining influence, since loss of access to such items may not be seen as strategically vital. If these flows were interrupted or jeopardized, the result would be more akin to an inconvenience than a strategic setback for China’s rise. That said, China is likely to continue to highly depend on imported oil even if the economic end to which that energy resource is directed shifts away from industrial and export production toward domestic consumption.

#### US–China war goes nuclear – crisis mis-management ensures conventional escalation - extinction

Kulacki 20 [Dr. Gregory Kulacki focuses on cross-cultural communication between the United States and China on nuclear and space arms control and is the China Project Manager for the Global Security Program at the Union of Concerned Scientists, 2020. Would China Use Nuclear Weapons First In A War With The United States?, Thediplomat.com, https://thediplomat.com/2020/04/would-china-use-nuclear-weapons-first-in-a-war-with-the-united-states/] srey

Admiral Charles A. Richard, the head of the U.S. Strategic Command, recently told the Senate Armed Service Committee he “could drive a truck” through the holes in China’s no first use policy. But when Senator John Hawley (R-MO) asked him why he said that, Commander Richard backtracked, described China’s policy as “very opaque” and said his assessment was based on “very little” information. That’s surprising. **China** has been exceptionally **clear** **about** its **intentions** **on** the possible **first** **use** **of** **nuclear** **weapons**. On the day of its first nuclear test on October 16, 1964, China declared it “will never at any time or under any circumstances be the first to use nuclear weapons.” That **unambiguous** **statement** **has** **been** a **cornerstone** **of** **Chinese** **nuclear** **weapons** policy for 56 years and has been repeated frequently in authoritative Chinese publications for domestic and international audiences, including a highly classified training manual for the operators of China’s nuclear forces. Richard should know about those publications, particularly the training manual. A U.S. Department of Defense translation has been circulating within the U.S. nuclear weapons policy community for more than a decade. The commander’s comments to the committee indicate a familiarity with the most controversial section of the manual, which, in the eyes of some U.S. analysts, indicates there may be some circumstances where **China** **would** **use** **nuclear** **weapons** **first** **in** a **war** **with** **the** **U**nited **S**tates. This U.S. misperception is understandable, especially given the difficulties the Defense Department encountered translating the text into English. The language, carefully considered in the context of the entire book, articulates a strong reaffirmation of China’s no first use policy. But it also reveals **Chinese** military planners are **struggling** **with** **crisis** **management** **and** **considering** **steps** **that** could **create** **ambiguity** **with** **disastrous** **consequences**. Towards the end of the 405-page text on the operations of China’s strategic rocket forces, in a chapter entitled, “Second Artillery Deterrence Operations,” the authors explain what China’s nuclear forces train to do if **“**a strong military power possessing nuclear‐armed missiles and an absolute advantage in high‐tech conventional weapons is carrying out intense and continuous attacks against our major strategic targets and we have no good military strategy to resist the enemy.**”** The military power they’re talking about is the United States. The authors indicate China’s nuclear missile forces train to take specific steps, including increasing readiness and conducting launch exercises, to “dissuade the continuation of the strong enemy’s conventional attacks.” The manual refers to these steps as an “adjustment” to China’s nuclear policy and a “lowering” of China’s threshold for brandishing its nuclear forces. Chinese leaders would only take these steps in extreme circumstances. The text highlights several triggers such as U.S. conventional bombing of China’s nuclear and hydroelectric power plants, heavy conventional bombing of large cities like Beijing and Shanghai, or other acts of **~~conventional~~****~~warfare~~****~~that~~** ~~“~~**~~seriously~~****~~threatened~~**~~” the “safety and~~ **~~survival~~**~~” of the nation. U.S. Misunderstanding Richard seems to believe this planned adjustment in China’s nuclear posture means China is~~ **~~preparing~~****~~to~~****~~use~~****~~nuclear~~****~~weapons~~** ~~first under these circumstances. He told Hawley that there are a “number of situations where they may conclude that first use has occurred that do not meet our definition of first use.” The head of the U.S. Strategic Command appears to assume, as do other U.S. analysts, that the~~ **~~Chinese~~** ~~would~~ **~~interpret~~****~~these~~** ~~types of U.S. conventional~~ **~~attacks~~****~~as~~****~~equivalent~~****~~to~~** ~~a~~ **~~U.S. first use~~****~~of~~****~~nuclear~~****~~weapons~~** ~~against China. But that’s not what the text says. “Lowering the threshold” refers to China putting its nuclear weapons on alert — it does not indicate Chinese leaders might lower their threshold for deciding to use nuclear weapons in a crisis. Nor does the text indicate Chinese nuclear forces are training to launch nuclear weapons first in a war with the United States. China, unlike the United States, keeps its nuclear forces off-alert. Its warheads are not mated to its missiles. China’s nuclear-armed submarines are not continuously at sea on armed patrols. The manual describes how China’s nuclear warheads and the missiles that deliver them are controlled by two separate chains of command. Chinese missileers train to bring them together and launch them after China has been attacked with nuclear weapons. All of these behaviors are consistent with a no first use policy. The “adjustment” Chinese nuclear forces are preparing to make if the United States is bombing China with impunity is to place China’s nuclear forces in a state of readiness similar to the state the nuclear forces of the United States are in all the time. This step is intended not only to end the bombing, but also to convince U.S. decision-makers they cannot expect to destroy China’s nuclear retaliatory capability if the crisis escalates. Chinese Miscalculation Unfortunately, alerting Chinese nuclear forces at such a moment could have terrifying consequences. Given the relatively small size of China’s nuclear force, a U.S. president might be tempted to try to limit the possible damage from a Chinese nuclear attack by destroying as many of China’s nuclear weapons as possible before they’re launched, especially if the head of the U.S. Strategic Command told the president China was preparing to strike first. One study concluded that if the United States used nuclear weapons to attempt to knock out a small fraction of the Chinese ICBMs that could reach the United States it may kill tens of millions of Chinese civilians. The authors of the text assume alerting China’s nuclear forces would “create a great shock in the enemy’s psyche.” That’s a fair assumption. But they also assume this shock could “dissuade the continuation of the strong enemy’s conventional attacks against our major strategic targets.” That’s highly questionable. There is a~~ **~~substantial~~****~~risk~~****~~the~~****~~U~~**~~nited~~ **~~S~~**~~tates~~ **~~would~~****~~respond~~****~~to~~** ~~this implicit~~ **~~Chinese~~****~~threat~~****~~to~~****~~use~~****~~nuclear~~****~~weapons~~****~~by~~****~~escalating~~**~~, rather than halting, its~~ **~~conventional~~****~~attacks~~**~~. If China’s nuclear forces were targeted, it would put even greater strain on the operators of China’s nuclear forces. A~~ **~~slippery~~****~~slope~~****~~to~~****~~nuclear~~****~~war~~** ~~Chinese military planners are aware that attempting to coerce the United States into halting conventional bombardment by alerting their nuclear forces could fail. They also know it might trigger a nuclear war. But if it does, they are equally clear China won’t be the one to start it. Nuclear attack is often preceded by nuclear coercion. Because of this, in the midst of the process of a high, strong degree of nuclear coercion we should prepare well for a nuclear retaliatory attack. The more complete the preparation, the higher the credibility of nuclear coercion, the easier it is to accomplish the objective of nuclear coercion, and the lower the possibility that the nuclear missile forces will be used in actual fighting. They assume if China demonstrates it is well prepared to retaliate the United States would not risk a damage limitation strike using nuclear weapons. And even if the United States were to attack China’s nuclear forces with conventional weapons, China still would not strike first. In the opening section of the next chapter on “nuclear retaliatory attack operations” the manual instructs, as it does on numerous occasions throughout the entire text: According to our country’s principle, its stand of no first use of nuclear weapons, the Second Artillery will carry out a nuclear missile attack against the enemy’s important strategic targets, according to the combat orders of the Supreme Command, only after the enemy has carried out a nuclear attack against our country. Richard is wrong. There are no holes in China’s no first use policy. But the worse-case planning articulated in this highly classified military text is a significant and deeply troubling departure from China’s traditional thinking about the role of nuclear weapons. Mao Zedong famously called nuclear weapons “a paper tiger.” Many assumed he was being cavalier about the consequences of nuclear war. But what he meant is that they would not be used to fight and win wars. U.S. nuclear threats during the Korean War and the Taiwan Strait Crisis in the 1950s – threats not followed by an actual nuclear attack – validated Mao’s intuition that nuclear weapons were primarily psychological weapons. Chinese leaders decided to acquire nuclear weapons to free their minds from what Mao’s generation called “~~**~~nuclear~~****~~blackmail~~**~~.” A former director of China’s nuclear weapons laboratories told me China developed them so its leaders could “sit up with a straight spine.” Countering nuclear blackmail – along with compelling other nuclear weapons states to negotiate their elimination – were the only two purposes Chinese nuclear weapons were meant to serve. Contemporary Chinese military planners appear to have added a new purpose: compelling the United States to halt a conventional attack. Even though it only applies in extreme circumstances, it~~ **~~increases~~** ~~the~~ **~~risk~~****~~that~~** ~~a~~ **~~war~~** ~~between the United States and China~~ **~~will~~****~~end~~****~~in~~** ~~a nuclear exchange with unpredictable and~~ **~~catastrophic~~****~~consequences~~**~~. Adding this new purpose could also be the first step on a slippery slope to an incremental broadening the role of nuclear weapons in Chinese national security policy. Americans would be a lot safer if we could avoid that. The United States government should applaud China’s no first use policy instead of repeatedly calling it into question. And it would be wise to adopt the same policy for the United States. If both countries declared they would never use nuclear weapons first it may not guarantee they can avoid a nuclear exchange during a military crisis, but it would make one far less likely.~~

# CASE

## Adv 1

#### Zero i/l between “heightening escalations” and nuclear war – uncarded, untrue

#### CSIS 18 indicates numerous alt causes to the aff – aff can’t solve a hundred years of bad blood, they couldn’t point to a line in the card that implicates how their link overcomes the impact uq

#### No space war – limited accessibility, norms, and interdependence

Pavur and Martinovic 19 [James Pavur, DPhil Researcher Cybersecurity Centre for Doctoral Training Oxford University, Ivan Martinovic, Professor of Computer Science Department of Computer Science Oxford University, “The Cyber-ASAT: On the Impact of Cyber Weapons in Outer Space,” 2019 11th International Conference on Cyber Conflict: Silent Battle, <https://ccdcoe.org/uploads/2019/06/Art_12_The-Cyber-ASAT.pdf>]

STABILITY IN SPACE Given the uncomfortable combination of high dependency and low survivability, one might expect to observe frequent attacks against critical military assets in orbit. However, **despite decades of recurring prophesies of impending space war, no such conflict has broken out** [14]–[18]. It is true that a handful of space security crises have occurred; most notably, the 2007 Chinese anti-satellite weapon (ASAT) test and the 2008 US ASAT demonstration in response [19]. Moreover, a recent Centre for Strategic and International Studies report suggests increasing interest in attacking US space assets, particularly among the Chinese, Russian, North Korean and Iranian militaries [20]. Overall, however, the space domain has remained puzzlingly peaceful. In this section, we outline three major contributors to this enduring stability: limited accessibility, attributable norms, and environmental interdependence. A. Limited Accessibility Space is difficult. Over 60 years have passed since the first Sputnik launch and only nine countries (ten including the EU) have orbital launch capabilities. Moreover, a launch programme alone does not guarantee the resources and precision required to operate a meaningful ASAT capability. Given this, one possible reason why space wars have not broken out is simply because only the US has ever had the ability to fight one [21, p. 402], [22, pp. 419–420]. Although launch technology may become cheaper and easier, it is unclear to what extent these advances will be distributed among presently non-spacefaring nations. Limited access to orbit necessarily reduces the scenarios which could plausibly escalate to ASAT usage. Only major conflicts between the handful of states with ‘space club’ membership could be considered possible flashpoints. Even then, the fragility of an attacker’s own space assets creates de-escalatory pressures due to the deterrent effect of retaliation. Since the earliest days of the space race, dominant powers have recognized this dynamic and demonstrated an inclination towards de-escalatory space strategies [23]. B. Attributable Norms There also exists a long-standing normative framework favouring the peaceful use of space. The effectiveness of this regime, centred around the Outer Space Treaty (OST), is highly contentious and many have pointed out its serious legal and political shortcomings [24]–[26]. **Nevertheless, this status quo framework has somehow supported over six decades of relative peace in orbit.** Over these six decades, norms have become deeply ingrained into the way states describe and perceive space weaponization. This de facto codification was dramatically demonstrated in 2005 when the US found itself on the short end of a 160-1 UN vote after opposing a non-binding resolution on space weaponization. **Although states have occasionally pushed the boundaries of these norms, this has typically occurred through incremental legal re-interpretation rather than outright opposition** [27]. Even the most notable incidents, such as the 2007-2008 US and Chinese ASAT demonstrations, were couched in rhetoric from both the norm violators and defenders, depicting space as a peaceful global commons [27, p. 56]. Altogether, this suggests that **states perceive real costs to breaking this normative tradition and may even moderate their behaviours accordingly.** One further factor supporting this norms regime is the high degree of attributability surrounding ASAT weapons. For **kinetic ASAT technology, plausible deniability and stealth are essentially impossible**. The literally explosive act of launching a rocket cannot evade detection and, if used offensively, retaliation. **This imposes high diplomatic costs on ASAT usage and testing**, particularly during peacetime. C. Environmental Interdependence A third stabilizing force relates to the orbital debris consequences of ASATs. China’s 2007 ASAT demonstration was the largest debris-generating event in history, as the targeted satellite dissipated into thousands of dangerous debris particles [28, p. 4]. Since debris particles are indiscriminate and unpredictable, they often threaten the attacker’s own space assets [22, p. 420]. This is compounded by Kessler syndrome, a phenomenon whereby orbital debris ‘~~breeds’ as large pieces of debris collide and disintegrate. As space debris remains in orbit for hundreds of years, the cascade effect of an ASAT attack can constrain the attacker’s long-term use of space [29, pp. 295– 296]. Any state with kinetic ASAT capabilities will likely also operate satellites of its own, and they are necessarily exposed to this collateral damage threat.~~ **~~Space debris thus acts as a strong strategic deterrent to ASAT usage.~~**

#### ~~Private actors solve space war and specifically ASAT restraint.~~

~~Cobb 21 [Wendy N. Whitman Cobb, Associate Professor of Strategy and Security Studies at the School of Advanced Air and Space Studies, “Privatizing Peace: How Commerce Can Reduce Conflict in Space,” 2021, Routledge, pp. 68-69, EA]~~

~~Finally, given the involvement of an ever-larger number of private actors in space, states also need to consider the lost opportunity costs if private actors choose to forego research, development, and deployment of new technologies because the danger in space is too high. As space becomes more commercialized, these private actors can exert pressure on states to behave peacefully in order to promote further economic development. Gartzke and Quan Li argue that this can happen through the movement of capital from conflict-prone states or areas to non-conflictual states.50 This is not necessarily applicable to space because there is no area in space which is formally protected, but commercial space actors may choose not to engage in new economic investment which can in turn affect a state’s economic performance. To date, the size of the space sector is comparatively small, so, arguably, the potential economic loss would not be that great. Where the harm comes from is state reliance on private actors for military and national security space services. As states contract out space services to a greater extent, private actors exert an even greater influence over the state by having a capability they do not.~~

~~Why might private companies want a more conflict-free space? If there is weaponized conflict in space, they could potentially benefit through new launches to send up replacement satellites; this is similar to an argument that war can actually be beneficial to an economy because companies are needed to create materiel and weapons.51 But, in a debris filled environment, sending replacements is more difficult and dangerous. Some private companies want to engage in human spaceflight; a conflictual or more dangerous orbital environment would likely prevent those activities or increase their costs to such an extent that it becomes economically infeasible. James Clay Moltz argues specifically that “the growing presence of space tourists in low-Earth orbit would greatly increase the incentives for restraint in any future [ASAT] test programs.”52 Those foregone development costs and commercial activities can have a similar cost to states simply by discouraging private actors from participating in the market.~~

#### ~~Space miscalc doesn’t go nuclear---response will be proportional~~

~~Zack Cooper 18, senior fellow for Asian security at the Center for Strategic and International Studies (CSIS). Thomas G. Roberts is a research assistant and program coordinator for the Aerospace Security Project at CSIS, 1/2/18, "Deterrence in the Last Sanctuary," War on the Rocks,~~ [~~https://warontherocks.com/2018/01/deterrence-last-sanctuary/~~](https://warontherocks.com/2018/01/deterrence-last-sanctuary/)

~~Until recently, resilience in space was largely an afterthought. It was assumed that a conflict in space would likely lead to or precede a major nuclear exchange. Therefore, the focus was on cost-effective architectures that maximized satellite capabilities, often at the cost of resilience. Recently, however, some have hoped that new architectures could enhance resilience and prevent critical military operations from being significantly impeded in an attack. Although resilience can be expensive, American investments in smaller satellites and more distributed space architectures could minimize adversary incentives to carry out first strikes in space.~~

~~In the late 20th century, minor escalations against space systems were treated as major events, since they typically threatened the superpowers’ nuclear architectures. Today, the proliferation of counter-space capabilities and the wide array of possible types of attacks means that most attacks against U.S. space systems are unlikely to warrant a nuclear response. It is critical that policymakers understand the likely break points in any conflict involving space systems. Strategists should explore whether the characteristics of different types of attacks against space systems create different thresholds, paying particular attention to attribution, reversibility, the defender’s awareness of an attack, the attacker’s ability to assess an attack’s effectiveness, and the risks of collateral damage (e.g., orbital debris). Competitors may attempt to use non-kinetic weapons and reversible actions to stay below the threshold that would trigger a strong U.S. response. The 2017 National Security Strategy warns.~~

## Adv 2

#### No Solvency - Private space will expand with space tourism – hold the line, none of their ev says this is appropriation

Rebecca Heilweil, 7-25-2021, "How bad is space tourism for the environment? And other space travel questions, answered.," Vox, [https://www.vox.com/recode/22589197/space-travel-tourism-bezos-branson-rockets-blue-origin-virgin-galactic-spacex //](https://www.vox.com/recode/22589197/space-travel-tourism-bezos-branson-rockets-blue-origin-virgin-galactic-spacex%20//)Curly RBA

For many, the rise of commercial space tourism is a vulgar display of wealth and power. Amid several global crises, including climate change and a pandemic, billionaires are spending their cash on launching themselves into space for fun. When Amazon founder Jeff Bezos told reporters after his first space tourism trip on Tuesday that Amazon customers and employees had “paid” for his flight, that only intensified that criticism. But critics won’t deter Bezos and the other superrich. Space tourism is now a reality for the people who can afford it — and it will have repercussions for everyone on Earth. In fact, all signs indicate that the market for these trips is already big enough that they’ll keep happening. Jeff Bezos’s spaceflight company Blue Origin already has two more trips scheduled later this year, while Virgin Galactic, the space firm founded by billionaire Richard Branson, has at least 600 people who have already paid around $250,000 each for future tickets on its spaceplane. Now, as the commercial space tourism market (literally) gets off the ground, there are big questions facing future space travelers — and everyone else on the planet. Here are answers to the six biggest ones.

#### Warming is irreversible – even if humans stop emissions.

Mark Kaufman 21, Mark is a science reporter at Mashable, “What Earth was like last time CO2 levels were this high,” Mashable, 4-20-2021, https://mashable.com/article/carbon-dioxide-earth-co2/ //EM

It’s a time called the Pliocene or mid-Pliocene, some 3 million years ago, when sea levels were around 30 feet higher (but possibly much more) and giant camels dwelled in a forested high Arctic. The Pliocene was a significantly warmer world, likely at some 5 degrees Fahrenheit (around 3 degrees Celsius) warmer than pre-Industrial temperatures of the late 1800s. Much of the Arctic, which today is largely clad in ice, had melted. Heat-trapping carbon dioxide levels, a major temperature lever, hovered around 400 parts per million, or ppm. Today, these levels are similar but relentlessly rising, at some 418 ppm.

Humanity is currently on track to warm Earth to Pliocene-like temperatures by century’s end – unless nations ambitiously slash carbon emissions in the coming decades. Sea levels, of course, won’t instantly rise by tens of feet: Miles-thick ice sheets take many centuries to thousands of years to melt. But, critically, humanity is already setting the stage for a relatively quick return to Pliocene climes, or climes at least significantly warmer than now. It’s happening fast. When CO2 naturally increases in the atmosphere, pockets of ancient air preserved in ice show this CO2 rise happens gradually, over thousands of years. But today, carbon dioxide levels are skyrocketing as humans burn long-buried fossil fuels.

"CO2 in the atmosphere has gone up 100 ppm in my lifetime," said Kathleen Benison, a geologist at West Virginia University who researches past climates. “That’s incredibly fast geologically."

"You don’t have to be a scientist to realize something totally weird is going on, and that weird thing is humans," noted Dan Lunt, a climate scientist at the University of Bristol who has researched the Pliocene.

A NASA graphic, from 2013, showing Earth's atmospheric CO2 levels had already reached levels similar to the Pliocene.

The problematic Pliocene

Sure, it takes a long time for sea levels to catch up with Earth’s warming. But in a plethora of other ways, the planet is already reacting to about 2 F (1.1 C) of warming since the late 1800s: Wildfires are surging in the U.S., major Antarctic ice sheets have destabilized, heat waves are smashing records, storms are intensifying, and beyond.

More warming will further exacerbate these consequences of increased heat. It will get worse. But will it get Pliocene bad? That’s up to the most fickle, unpredictable factor of the climate equation: humans.

"CO2 levels are going to increase," said Lunt. "We could hit the Pliocene in terms of temperature. But it depends on how rapidly we emit [greenhouse gases]."

Some of the human-driven changes happening on Earth today won’t be reversed for centuries or thousands of years. In large part, that’s because civilization continues to deposit prodigious loads of carbon into the atmosphere each year, and all these heat-trapping gases won’t magically vanish from the air, even if we instantly stop adding carbon to the atmosphere. Rather, they’ll have impacts upon the planet – like gradually rising seas and acidifying oceans – for at least centuries. Already, sea levels have risen by some eight to nine inches since the late 1800s, and a conservative estimate, from the UN's Intergovernmental Panel on Climate Change, is sea levels will rise by another one to two feet by the century's end. But, this could very well be more like two or three feet, or even more depending on what Antarctica’s colossal, melting Thwaites Glacier (it’s the size of Britain) purges into the sea this century.

"Sea level rise and ocean acidification are permanent on a human time scale," said Julie Brigham-Grette, a geologist at the University of Massachusetts Amherst who researches how the Arctic has changed since the Pliocene.

#### ~~No warming impact --- adaptation and intervening actors.~~

~~Sebastian FARQUHAR ET AL. 17, Project Manager at FHI responsible for external relations, M.A in Physics and Philosophy from the University of Oxford; John Halstead, Global Priorities Project; Owen Cotton-Barratt, Research Associate in the FHI at the University of Oxford, Lecturer in Mathematics at St. Hugh’s College, Oxford; Stefan Schubert, PhD in philosophy, Researcher at the Centre for Effective Altruism; Haydn Belfield, Academic Project Manager, Centre for the Study of Existential Risk, University of Cambridge; Andrew Snyder-Beattie, Director of Research at FHI [“Existential Risk: Diplomacy and Governance,”~~ *~~Future of Humanity Institute~~*~~, University of Oxford, Global Priorities Project 2017, https://www.fhi.ox.ac.uk/wp-content/uploads/Existential-Risks-2017-01-23.pdf]~~

~~The most likely levels of global warming are very unlikely to cause human extinction.15 The existential risks of climate change instead stem from tail risk climate change – the low probability of extreme levels of warming – and interaction with other sources of risk. It is impossible to say with confidence at what point global warming would become severe enough to pose an existential threat. Research has suggested that warming of 11-12°C would render most of the planet uninhabitable,16 and would completely devastate agriculture.17 This would pose an extreme threat to human civilisation as we know it.18 Warming of around 7°C or more could potentially produce conflict and instability on such a scale that the indirect effects could be an existential risk, although it is extremely uncertain how likely such scenarios are.19 Moreover, the timescales over which such changes might happen could mean that humanity is able to adapt enough to avoid extinction in even very extreme scenarios.¶ The probability of these levels of warming depends on eventual greenhouse gas concentrations. According to some experts, unless strong action is taken soon by major emitters, it is likely that we will pursue a medium-high emissions pathway.20 If we do, the chance of extreme warming is highly uncertain but appears non-negligible. Current concentrations of greenhouse gases are higher than they have been for hundreds of thousands of years,21 which means that there are significant unknown unknowns about how the climate system will respond. Particularly concerning is the risk of positive feedback loops, such as the release of vast amounts of methane from melting of the arctic permafrost, which would cause rapid and disastrous warming.22 The economists Gernot Wagner and Martin Weitzman have used IPCC figures (which do not include modelling of feedback loops such as those from melting permafrost) to estimate that if we continue to pursue a medium-high emissions pathway, the probability of eventual warming of 6°C is around 10%,23 and of 10°C is around 3%.24 These estimates are of course highly uncertain.¶ It is likely that the world will take action against climate change once it begins to impose large costs on human society, long before there is warming of 10°C. Unfortunately, there is significant inertia in the climate system: there is a 25 to 50 year lag between CO2 emissions and eventual warming,25 and it is expected that 40% of the peak concentration of CO2 will remain in the atmosphere 1,000 years after the peak is reached.26 Consequently, it is impossible to reduce temperatures quickly by reducing CO2 emissions. If the world does start to face costly warming, the international community will therefore face strong incentives to find other ways to reduce global temperatures.~~

#### ~~Public sector mining thumps.~~

~~NASA 19 [“NASA Invests in Tech Concepts Aimed at Exploring Lunar Craters, Mining Asteroids,” NASA, June 11, 2019,~~ [~~https://www.nasa.gov/press-release/nasa-invests-in-tech-concepts-aimed-at-exploring-lunar-craters-mining-asteroids~~](https://www.nasa.gov/press-release/nasa-invests-in-tech-concepts-aimed-at-exploring-lunar-craters-mining-asteroids)~~] TDI~~

~~NASA Invests in Tech Concepts Aimed at Exploring Lunar Craters, Mining Asteroids~~

~~Robotically surveying lunar craters in record time and mining resources in space could help NASA establish a sustained human presence at the Moon – part of the agency’s broader~~[~~Moon to Mars exploration~~](https://www.nasa.gov/specials/moon2mars/)~~approach. Two mission concepts to explore these capabilities have been selected as the first-ever Phase III studies within the~~[~~NASA Innovative Advanced Concepts~~](https://www.nasa.gov/niac)~~(NIAC) program.~~

~~“We are pursuing new technologies across our development portfolio that could help make deep space exploration more Earth-independent by utilizing resources on the Moon and beyond,” said Jim Reuter, associate administrator of NASA’s Space Technology Mission Directorate. “These NIAC Phase III selections are a component of that forward-looking research and we hope new insights will help us achieve more firsts in space.”~~

~~The Phase III proposals outline an aerospace architecture, including a mission concept, that is innovative and could change what’s possible in space. Each selection will receive as much as $2 million. Over the course of two years, researchers will refine the concept design and explore aspects of implementing the new technology. The inaugural Phase III selections are:~~

~~Robotic Technologies Enabling the Exploration of Lunar Pits~~

~~William Whittaker, Carnegie Mellon University, Pittsburgh~~

~~This mission concept, called Skylight, proposes technologies to rapidly survey and model lunar craters. This mission would use high-resolution images to create 3D model of craters. The data would be used to determine whether a crater can be explored by human or robotic missions. The information could also be used to characterize ice on the Moon, a crucial capability for the sustained surface operations of NASA’s Artemis program. On Earth, the technology could be used to autonomously monitor mines and quarries.~~

[~~Mini Bee Prototype to Demonstrate the Apis Mission Architecture and Optical Mining Technology~~](https://www.nasa.gov/directorates/spacetech/niac/2019_Phase_I_Phase_II/Mini_Bee_Prototype)

~~Joel Sercel, TransAstra Corporation, Lake View Terrace, California~~

~~This flight demonstration mission concept proposes a method of asteroid resource harvesting called optical mining. Optical mining is an approach for excavating an asteroid and extracting water and other volatiles into an inflatable bag. Called Mini Bee, the mission concept aims to prove optical mining, in conjunction with other innovative spacecraft systems, can be used to obtain propellant in space. The proposed architecture includes resource prospecting, extraction and delivery.~~