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#### Beijing wants to challenge New Delhi now --- border disputes create flash points for conflicts --- absent Indian modernization china would get access to influence south Asia

Haqqani & Pande 21 [HUSAIN HAQQANI, director for South and Central Asia at the Hudson Institute in Washington D.C., APARNA PANDE, is director of the Initiative on the Future of India and South Asia at the Hudson Institute, 7-10-2021, “India has a long way to go in confronting China” The Hill, Accessed 1-6-2021, <https://thehill.com/opinion/international/562397-india-has-a-long-way-to-go-in-confronting-china> ww

India’s decision to move 50,000 additional troops to its border with China bolsters its ability to protect itself against Chinese aggression. It is a belated response to China’s actions last year, when the Chinese army surprised ill-prepared Indian soldiers and occupied several square miles of Indian territory in the Ladakh region to build roads and fortify military encampments. ∂ The hope of some Indian policymakers to resolve the matter diplomatically has not so far been fulfilled. Several rounds of military and diplomatic negotiations since April 2020, when the Chinese incursions started, have yielded little result.∂ Any willingness on India’s part to deal forcefully with China would be welcomed in the U.S., where successive administrations have sought to integrate India into America’s Indo-Pacific strategy. Several years of an India-U.S. entente cordiale has been premised on India standing up to China. ∂ After all, with a population of more than one billion, India is the only country with enough manpower to match that of China. ∂ China sees India as a potential rival and covets parts of Indian territory. China occupied 15,000 miles of Indian territory in the Aksai Chin section of Ladakh after war in 1962. China’s desire for influence in South Asia and the Indian Ocean Region challenges India in its backyard, setting off competition for the same sphere of influence.∂ But China’s phenomenal economic growth, coupled with India’s inability to keep pace, has hampered India’s ability to respond to China strategically. Even now the moving of troops to Ladakh is a tactical maneuver not backed by a clear strategic plan.∂ On four occasions since 2012, China has indulged in salami-slicing along the largely un-demarcated India-China border. India’s response each time has been limited to diplomatic negotiations with limited military pushback. ∂ There is a co-relation between relative economic strength and China’s willingness to flex its muscle. Between 1988, when India and China signed a series of agreements to restore relations, and 2012, the border between India and China remained by and large quiet.∂ During that period, the size of the two countries’ economies was not huge. In 1990, India’s GDP stood at $320 billion and China’s GDP at $413 billion. By 2012, China’s GDP had grown to $8.5 trillion, seven times larger than India’s $1.2 trillion economy.∂ The change in China’s policy after 2012, encouraging its troops to use force against India along the border, coincided with the rise in China’s military and economic power and its impact on the relative balance of power with India. ∂ Like many in the West, India during the 1990s had bought into the view that deeper economic and diplomatic engagement with communist China would help maintain peace between the two Asian giants. But the India-China border dispute could not remain on the back burner as China became more aggressive in the wake of growing economic and military power.∂ India can no longer rely solely on diplomacy to deal with China. It will soon have to build and deploy hard power to deter the Chinese. The recent deployment along the Ladakh border could mark the beginning of that process.∂ With the latest addition, 200,000 of India’s more than a million strong army now face China along the 2,167-mile border. By way of comparison, 600,000 Indian troops are positioned along the 2,065-mile, fully fenced and fully demarcated border with Pakistan. It is inconceivable that any attempt by Pakistan to take territory would go unretaliated by India. ∂ While India’s attempts over the last year have been to convince China, primarily through diplomatic engagements, to return the border to status quo ante, most military and strategic experts argue that China has no interest in resolving the border dispute with India. ∂ India has for far too long acquiesced to Chinese aggression without sufficient retaliatory military action. India may not seek to provoke China into an all-out war, but it needs to find a sweet spot between ignoring and provoking.∂ The United States and its allies, too, would like India to act like a major power in not taking Chinese provocations lightly.∂ Western democracies and Japan have viewed India as an ideal partner and future ally in Asia and the Indo-Pacific. India has consistently been a democracy, shares pluralist values with the United States, and its embrace of free market reforms since 1992 have created an opening for expanded economic ties.∂ India also shares America’s concerns about China’s rising power. In developing a pivot to Asia or an Indo-Pacific policy, successive U.S. administrations have assumed that a shared concern about China makes India a natural American ally. India-U.S. relations were referred to as the “defining partnership of the 21st century” under President Obama. The Trump administration’s 2017 National Security Strategy spoke of India as a “leading global power” and a strong “strategic and defense partner.”∂ The Biden administration’s March 2021 “Interim National Security guidance” has described the “deepening partnership” with India as being critical to America’s “vital national interests.” But the Indo-Pacific policies of both the Trump and Biden administrations have focused on maritime security, ignoring India’s challenge from China on the continental landmass.∂ China views India as an inward-looking democracy that has yet to focus on economic growth or military prowess. Only an expansion in India’s economy and military capability would convince China’s leaders to view it differently.∂ Moreover, the two decades of celebrating convergence of democratic values and voicing of strategic concerns by Washington and Delhi now needs to be followed up with specific steps to counter Chinese hard power with Indian muscle.

#### Space privatization is key to modernizing India’s military --- communications, weapons, and innovation --- top military officials agree

The Economic Times 21 [The Economic Times, 11-11-2021, “Indian private industry must step in to provide cutting-edge space technologies to armed forces: Bipin Rawat” The Economic Times, Accessed 1-5-2022, <https://economictimes.indiatimes.com/news/defence/indian-private-industry-must-step-in-to-provide-cutting-edge-space-technologies-to-armed-forces-bipin-rawat/articleshow/86931188.cms> ww

The Indian private industry must step in to provide cutting-edge space technologies and products to boost operational capabilities of the Indian armed forces, Chief of Defence Staff General Bipin Rawat said on Monday.∂ "Space and cyber domains have become critical to our ability to undertake operations across the spectrum, both in peace and conflict," he said.∂ While the Indian Space Research Organisation (ISRO) will continue to provide leadership and guidance, the expanding needs of the nation and the armed forces require that the private industry must step in and step forward, General Rawat said.∂ "The armed forces look forward to the Indian industry to provide products and innovations...and cutting-edge technologies towards war winning capabilities," he said.∂ The CDS was speaking at the launch ceremony of the Indian Space Association, a space sector industry body comprising companies such as Bharti Airtel, Larsen and Toubro, Agnikul, Dhruva Space and Kawa Space.∂ Opening of our space to the private industry in India is indeed a landmark and historic decision which was taken by the prime minister in June last year, he said.∂ The privatisation of the space industry will catapult the space into the future as the central driver of nation building, the CDS said.∂ "The concept that higher exploratory space domain, research and development activities, new technologies, human space flights, continues to be ISRO's mandate while many upstream and downstream space products as well as technological innovations be taken over by the private industry is an idea whose time has finally come," he said.∂ The initiative will surely help in making India a new global space hub in the years ahead, General Rawat said.∂ Like the armed forces the world over, the Indian armed forces are significant users of diverse space products including communication, position navigation and timing, and of course, intelligence, surveillance, and reconnaissance, he said.∂ "And apart from this, space situational awareness, and protection of our space based assets have become important domains," the CDS said.

#### Border conflicts cause miscalc --- goes nuclear

Dalton et al 20 [Toby Dalton, co-director and a senior fellow of the Nuclear Policy Program at the Carnegie Endowment. An expert on nonproliferation and nuclear energy, his work addresses regional security challenges and the evolution of the global nuclear order. Tong Zhao, senior fellow in Carnegie’s Nuclear Policy Program. Rukmani Gupta, New Delhi–based defense analyst whose work focuses on geopolitics, defense strategy, and military capabilities in Asia. 10-29-2020 “After the Border Clash, Will China-India Competition Go Nuclear?” Carnegie Endowment for International Peace, Accessed 1-6-2021, <https://carnegieendowment.org/2020/10/29/after-border-clash-will-china-india-competition-go-nuclear-pub-83072> ww

COULD A FUTURE CHINA-INDIA MILITARY CONFRONTATION INVOLVE NUCLEAR WEAPONS?∂ Zhao and Dalton: As their NFU policies demonstrate, both India and China have traditionally reserved nuclear weapons only for deterring a hostile nuclear attack. So even if their dispute over the border worsens, the risk of a Sino-Indian nuclear conflict is still very low, especially compared with other potential nuclear flashpoints around the world.∂ That said, the risk of nuclear use is growing for several reasons. India has noticed that China is increasingly willing to leverage its growing economic and military power to advance its national interests, especially over disputed territory. The nationalist government of Indian Prime Minister Narendra Modi presumably feels growing pressure from populists to push back, despite the potential short-term economic consequences.∂ Both countries are ruled by avowed strongmen who whip up nationalism as a source of popularity and legitimacy. The “fighting spirit” that Chinese President Xi Jinping has touted exposes senior Chinese officials and rank-and-file border guards alike to domestic criticism if they appear weak by making compromises with their Indian counterparts. Modi is similarly known for cultivating a macho image and has publicly alluded to nuclear weapons during previous military crises with Pakistan.∂ Chinese experts tend to dismiss the risk that a conventional border conflict with India could spark nuclear escalation because the tough, mountainous terrain makes large-scale troop maneuvers impossible. If there was a clash, they expect that the potential casualties and damage would be limited enough to avoid triggering nuclear threats.∂ Yet these risks may be growing. After both sides suffered casualties in the Galwan Valley clash in June 2020, both countries ramped up their military presence close to the border. Both sides now boast better transportation infrastructure and modern weaponry, so a severe, high-intensity conventional war can no longer be ruled out. Both countries also have dual-use (conventional or nuclear) weapon systems that could factor into a border conflict—weapons that could inadvertently fuel a deadly overreaction.∂ Gupta: The Indian military is battle-tested and is experienced in mountain combat. Infrastructure development under way in India’s border regions will improve transport and logistics links, allowing for a year-round military presence in contested areas. Even though the military confrontation at the border will continue, the risk of nuclear escalation likely hasn’t budged much. The India-China relationship encompasses more than just military affairs. Neither side wants conflict to spill beyond isolated military standoffs. Although Modi and Xi have used nationalist rhetoric in bolstering their legitimacy, the countries’ declared NFU positions remain unchanged, and they remain similarly committed to reserving nuclear weapons for deterrence.∂ After all, the border dispute has not escalated to large-scale conflict in over five decades— clearly, both sides are abundantly cautious about using offensive weapons. The purpose of such contained military confrontation is finite, bound by perceptions of limited territorial claims. Large-scale conventional war beyond the border regions remains highly unlikely.∂ The chances that one side may inadvertently target the other’s weapon systems—a possible path to nuclear escalation—remain very low too. Neither country has embraced tactical nuclear weapons. In the interest of limiting conflict and in keeping with their NFUs, it is extremely unlikely that either country would deploy strategic nuclear weapons to border regions, especially since their respective nuclear missiles have sufficient range to be stationed far from the border. None of the Chinese bases believed to host nuclear-capable missiles that can target India are near the Line of Actual Control where the border conflict is simmering. The prospect of accidental nuclear escalation remains quite remote.

#### Triggers nuclear winter and extinction --- worse than Indo-pak war

Jain 19 [Akshita Jain, Reporter for The Independent Formally Huff po india and the First post(they are citing Alan Robock, who is the co-author of a study on the impact of a potential India-Pakistan nuclear war), 10-11-2019, “An India-China Nuclear War Would Be More Devastating For Environment Than India-Pak: Expert” Huffington Post, Accessed 2-8-2022, <https://www.huffpost.com/archive/in/entry/india-china-pakistan-nuclear-war-expert-explains_in_5d9ada26e4b03b475f9bee92> ww

A war between the US and Russia could produce 150 Tg (millions of tonnes) of smoke, leading to “a nuclear winter”, said Alan Robock, the co-author of a recent study on the potential impact of the rapidly expanding nuclear arsenals in Pakistan and India, in an interview with HuffPost India.∂ The study, which was published in the journal Science Advances and received widespread coverage in Indian media, had said that over 100 million people were likely to die if a war took place between the two countries in 2025.∂ In the interview, conducted over email, Robock said that a potential war between India and China “could produce more smoke than the India-Pakistan case we studied”.∂ The report had noted that both India and Pakistan may have 400-500 nuclear weapons by 2025 and that nuclear-ignited fires could release 16-36 million tonnes of soot.∂ The smoke, the researchers said, would rise into the upper troposphere, be self-lofted into the stratosphere, and spread globally within weeks.∂ “Surface sunlight will decline by 20 to 35%, cooling the global surface by 2° to 5°C and reducing precipitation by 15 to 30%, with larger regional impacts,” the report said.∂ Robock, who works at Rutgers University in New Brunswick, said in the interview that the researchers first looked at the consequences of a potential nuclear war between India and Pakistan more than 10 years ago.∂ 1. You were quoted in another report as saying that continuing unrest between India and Pakistan, particularly over Kashmir, made it important to understand the consequences of a nuclear war. What exactly prompted you to undertake the study? How long did it take to complete?∂ We first addressed the consequences of a nuclear war between India and Pakistan more than 10 years ago. Please see the papers 12 and 13 here.∂ Now, India and Pakistan have more weapons, and the weapons are larger, and the potential targets are larger, and there are still disputes over Kashmir, so we decided to revisit this problem with an improved climate model (see paper 25 in the link provided above).∂ The actual computer runs only took a couple weeks, but designing the experiments and analysing them and writing the paper took 6 months or so.∂ 2. While the paper says that India and Pakistan are of special concern because of a history of military clashes and other reasons, would a nuclear war between any other two countries be as devastating?∂ It depends on the number of weapons, the size of the weapons, and the targets. A war between the US and Russia could produce 150 Tg (millions of tonnes) of smoke, and would produce a nuclear winter, with temperatures below freezing over land in the summer.∂ India and China could produce more smoke than the India-Pakistan case we studied. We wanted the world to understand the consequences for global climate and food production for various amounts of smoke injected into the upper atmosphere from city and industrial fires.∂ 3. Why did you choose the year 2025 for your study?∂ It is the near future. We want India and Pakistan to understand that their ongoing arms race has no purpose.∂ 4. Considering the tensions between India and Pakistan have escalated since the Pulwama attack in February, what would be the consequences if the nuclear war happens before 2025?∂ It depends on the number of weapons, the size of the weapons, and the targets. There could still be terrible consequences for global climate. We have already analyzed the agricultural response to 5 Tg of smoke. See papers 23, 24, and 26 at the website above.∂ 5. The study notes that India and Pakistan are rapidly increasing their arsenals. Neither countries has signed the Nuclear Nonproliferation Treaty (NPT). Is it not incumbent on United States, Russia, China, France and the United Kingdom (the permanent members of the UN Security Council) to prevent the possibility of a war between India and Pakistan?∂ Of course, that is an opinion. My expertise is in climate change. But I don’t see how those other nations can prevent a nuclear war between India and Pakistan except by setting an example by getting rid of their nuclear weapons. My opinion is that all nine nuclear nations should sign and ratify the 2017 UN Treaty on the Prohibition of Nuclear Weapons.∂ (The Treaty on the Prohibition of Nuclear Weapons was adopted at the United Nations on 7 July 2017 by over 120 countries. The nine countries which possess nuclear weapons did not take part in the negotiations. The treaty prohibits the signatory countries from developing, testing, producing, acquiring, possessing, using or threatening to use nuclear weapons. Read more about the treaty here.∂ India had, in 2017, said that the treaty in no way constitutes or contributes to the development of any customary international law. In July 2019, the MEA had reiterated that India would not be a party to the treaty and shall not be bound by any of the obligations that may arise from it.∂ Pakistan had also said that it was not bound by the treaty because it failed to take into account the interests of all stakeholders—Ed)

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#### Hegemony is on the brink now --- Covid has created momentum for Beijing to cement US heg through increasing regional control in the Middle east

Hamovitz 21 [Lior Hamovitz, Hebrew University of Jerusalem Department of Political Science, Master of Arts, 1-7-2021, “Shifting Hegemony: China’s Challenge to U.S. Hegemony During COVID-19” E-International Relations Accessed on 12-25-2021(yes I was cutting cards on Christmas what of it), https://www.e-ir.info/2021/09/07/shifting-hegemony-chinas-challenge-to-u-s-hegemony-during-covid-19/ ww

Conclusion This article has taken on the task of highlighting the ways in which China has been able to challenge the US’s hegemony in the international system during the coronavirus pandemic. It further sought to underscore the growing importance the MENA region may have as the two countries find themselves battling to regain or strengthen their legitimacy around the world. The scholarship presented in this paper was used to convey the existing literature gap which has yet to address how China’s model of governance and leadership approach are progressively aiding it in undermining the predominance of the US in the current world order, and especially in the Middle East. Yan Xuetong’s work has been key to the theoretical framework and purpose of this paper, as its theory of moral realism focuses on the importance of leadership in allowing a state to rise within the international system and even eclipse another dominant power. Furthermore, his work was utilized to convey the unique and meaningful insight the CS can provide in understanding global power dynamics. Adopting Yan’s framework, based in the core importance of morality, authority, capability, enables us to consider a perspective that could explain unfolding hegemonic shifts. The trajectory Yan hoped China will embark on in writing in book certainly seems to be in motion, albeit discrepantly. Through the pillars of leadership and legitimacy, which were set out as the foundations of hegemony, this paper argued that China has demonstrated during the COVID-19 pandemic the very morality, capability and authority Yan deems are crucial for an aspiring rising state. It was argued that by collaborating with fellow states and international organizations, showcasing crisis-containment capabilities and competent leadership, as well as having policies consistent with promises and fostering trust, Beijing has deeply challenged the perception of Washington’s leadership worldwide. The American government’s failures in addressing the multifaceted demands of the coronavirus crisis have only served to exacerbate its diminishing image as a competent hegemon for the world order. Considering the leadership vacuum the US seems to have opened at the time of the COVID-19 globally, this paper attempted to analyze how the growing legitimacy China and its model of governance are gaining in the Middle East could translate into geopolitical contestation in the region. It was demonstrated that close attention needs to be paid to the MENA, as an area volatile in its own right and predisposed to anti-Western sentiments, where China is getting further entangled as part of its global ambitions. In a post-coronavirus era, with a declining US dominance in the international arena and a rising China, newly galvanized by the leadership and legitimacy credentials it has gained, the Middle East may become fertile grounds for great-power rivalry and a possible hegemonic shift.

#### Privatization of space has been in the interest of maintaining US heg --- Privatization of outer space maintains US leadership in the globe and solar system

Henry 18 [Edward C. Henry, California State University, Sacramento M.A., University of Massachusetts Boston, 8-31-2018, “The United States of Sol: Privatization as a Tool of American Hegemony in the Solar System” University of Massachusetts Boston(Scholar Works), Accessed 12-25-2021, <https://scholarworks.umb.edu/cgi/viewcontent.cgi?article=1511&context=masters_theses> ww

American outer space exploration has been progressively privatized since the end of the Cold War. The choice of privatization was a strategic geopolitical decision in the interest of maintaining American hegemonic leadership on Earth and in the solar system. American Congressional legislation and presidential speeches in the nearly three decades since the collapse of the Soviet Union and the “victory” of the American neoliberal form of capitalism, show support for the expansion of free-market principles into lower-Earth orbit and beyond. However, this is not a new trend. From the beginning of the American entry into the space race, the goal has been to achieve and maintain the dominant position in outer space. With that in mind, the question is, why did the United States choose to privatize its space exploration efforts to assert American hegemonic leadership?∂ The move towards American privatization of outer space aligns with the American quest for hegemonic leadership. This thesis draws on the historical development of the past 60 years and relies on presidential speeches and congressional legislation to reveal how the American government has justified and explained changing trends in US space policy. The thesis assesses the ability of two key international relations paradigms (realism and Marxism) to help explain the different factors behind this privatization trend and its implications for US power.∂ Prior to the 1991 privatization shift, American leadership, reflected in presidential speeches and Congressional legislation, utilized the language of common heritage to promote American space efforts. Presidents Eisenhower and Kennedy established a framework for scientific advancement in space for the betterment of humanity, but always through American leadership. The first space treaty was signed under President Johnson, who heralded the international treaty as the next step in mitigating global conflict and, at a minimum, preventing the spread of human conflict into orbit and the wider solar system.∂ Americans entered the space race in second place, trailing the Soviet Union in several space “firsts.”2 Early Soviet achievements included: the first satellite successfully launched into orbit (Sputnik 1, October 1957), the first human launched successfully into orbit (Yuri Gagarin, April 1961), and the first woman to orbit Earth (Valentina Tereshkova, June 1963). The Americans followed Sputnik a year later with the 1958 launch of the Explorer 1 satellite. Alan Shepard, the first American in outer space, followed Gagarin not a month later. The first American women in space, however, would not occur until Sally Ride successfully launched into orbit in 1983. Though the United States started behind, it ultimately won the space race with the successful 1969 Apollo Moon Landing - a crowning achievement for the National Aeronautics and Space Administration (NASA). The Moon served as the ultimate goal of the space race, carrying a significant symbolic weight: “for the United States, coming in first in the moon race would tend to confirm the general disposition to believe that once the United States makes up its mind to do something it follows through.”3 By the end of the Cold War, the United States was the clear leader in space technology and low-Earth orbit. If NASA was so successful in achieving American national security goals and enshrining US orbital leadership, why did the federal government push privatization so strongly?∂ Realist scholars of International Relations theory would argue American unilateral action to privatize outer space exploration is a natural act of the hegemon, freed from the constraints of balance of power politics under a bipolar world. Marxists would argue that privatization was deliberate act during the rise of the neoliberal practice of capitalism. By critiquing the rise of neoliberal capital to hegemonic status, Marxism highlights key pieces that are missed by the realist explanations of the privatization of outer space: the role of private property, the influence of commercial interests in American government, and the constructed definition of “freedom” and deregulation.∂ This chapter will establish the international legal context necessary to understand Space policy more generally and the regulations set out in international treaties to define and guide state led outer space exploration. It provides an important context for understanding US space policy as well as the following two chapters. What follows is a discussion of the five international outer space treaties that sought to apply what came to be known as the common heritage principles that were developed during the height of the Cold War. The common heritage principles were drafted with the idea of closing the inequalities among the various states and containing conflict (particularly in light of the global nuclear threat).

#### Top military officials agree

Macias and Sheetz 2-3 [Amanda Macias, Amanda Macias covers global trade and foreign policy for CNBC, studied Broadcast Journalism and Finance at the University of Missouri. She is a Knight-Bagehot Fellow in Economics and Business Journalism at Columbia University in New York, Michael Sheetz, space reporter graduated as a Founder’s Scholar from The King’s College with a bachelor of the arts in Politics, Philosophy and Economics, double-minoring in Journalism and Theology, 2-3-2021, “Space Force general says success of private companies like SpaceX helps U.S. secure the space domain”, CNBC, accessed 12-14-2021, <https://www.cnbc.com/2021/02/03/space-force-general-america-owns-space-with-help-from-elon-musks-spacex.html> ww

WASHINGTON – The nation’s top general leading the U.S. military mission in space said Wednesday that he is excited about Wall Street and billionaire investment in the space industry, which has sparked renewed interest in the field among Americans and strong recruitment at the Pentagon’s youngest branch.¶ “There is a ton of excitement across America on space in all sectors,” said Gen. John Raymond, the U.S. Space Force’s chief of operations, when asked by CNBC about the strides made by private space companies like Elon Musk’s SpaceX.¶ “I’ve talked about people knocking on our door wanting to come into the Space Force in numbers greater than what we have slots to fill. I’ve talked in the past about how universities are seeing more students apply for space STEM degrees, which I think is going to be great for our nation,” Raymond added.¶ “I’m excited about all of it, both what we’re doing here on national security and what’s going on in the commercial industry that we can leverage the advantage,” the four-star general said without specifically naming any companies.¶ “The U.S. has always, has long understood that we are stronger with a secure and stable space domain and all of those sectors play into that,” Raymond said.¶ The U.S. Space Force, the Pentagon’s youngest branch, has increasingly looked to partner with the private sector as companies and investors pour into the space industry. The Pentagon is closely watching the progress of rocket builders like Rocket Lab, Astra and Virgin Orbit in addition to SpaceX.¶ Raymond’s comments came on the heels of SpaceX announcing this week that it will fly its first all-civilian crew into orbit later this year, a mission known as Inspiration 4. ¶ The landmark flight, led by billionaire Jared Isaacman, is aimed at using high-profile space tourism to raise support for St. Jude Children’s Research Hospital. Three yet-to-be-announced passengers will accompany Isaacman on the multiday journey around the Earth, with two of the seats to be decided in public online competitions this month.¶ Raymond also called out NASA’s Crew-1 mission, which was the first operational launch of SpaceX’s Crew Dragon spacecraft.¶ “If you look at what’s going on in the civil sector with the launch of U.S. astronauts, and in this last launch a Japanese astronaut from U.S. soil on a commercial launch vehicle, there’s a ton of excitement there,” he said.¶ Raymond did not provide a reaction to SpaceX’s Starship rocket test flight on Tuesday, which resulted in an explosion as it attempted to land.¶ Starship prototype SN9 launched successfully to about 33,000 feet but, like the previous prototype flight in December, the rocket smashed into the ground while attempting to land.¶ Private investment in space companies last year set a fresh annual record, despite industry fears that the Covid-19 pandemic would end the past decade’s momentum, according to a report by Space Capital last month. Builders of rockets and satellites brought in $8.9 billion in 2020, with venture capital and angel investors continuing to pour funds into space businesses.

#### Primacy prevents great-power conflict — multipolar revisionism fragments the global order and causes nuclear war.

Brands & Edel, 19 — Hal Brands; PhD, Henry A. Kissinger Distinguished Professor of Global Affairs at the Johns Hopkins School of Advanced International Studies. Charles Edel; PhD, Senior Fellow and Visiting Scholar at the United States Studies Centre at the University of Sydney. (“The Lessons of Tragedy: Statecraft and World Order;” Ch. 6: Darkening Horizon; Published by *Yale University Press*; //GrRv)

Each of these geopolitical challenges is different, and each reflects the distinctive interests, ambitions, and history of the country undertaking it. Yet there is growing cooperation between the countries that are challenging the regional pillars of the U.S.-led order. Russia and China have collaborated on issues such as energy, sales and development of military technology, opposition to additional U.S. military deployments on the Korean peninsula, and naval exercises from the South China Sea to the Baltic. In Syria, Iran provided the shock troops that helped keep Russia’s ally, Bashar al-Assad, in power, as Moscow provided the air power and the diplomatic cover. “Our cooperation can isolate America,” supreme leader Ali Khamenei told Putin in 2017. More broadly, what links these challenges together is their opposition to the constellation of power, norms, and relationships that the U.S.-led order entails, and in their propensity to use violence, coercion, and intimidation as means of making that opposition effective. Taken collectively, these challenges constitute a geopolitical sea change from the post-Cold War era.

The revival of great-power competition entails higher international tensions than the world has known for decades, and the revival of arms races, security dilemmas, and other artifacts of a more dangerous past. It entails sharper conflicts over the international rules of the road on issues ranging from freedom of navigation to the illegitimacy of altering borders by force, and intensifying competitions over states that reside at the intersection of rival powers’ areas of interest. It requires confronting the prospect that rival powers could overturn the favorable regional balances that have underpinned the U.S.-led order for decades, and that they might construct rival spheres of influence from which America and the liberal ideas it has long promoted would be excluded. Finally, it necessitates recognizing that great-power rivalry could lead to great-power war, a prospect that seemed to have followed the Soviet empire onto the ash heap of history.

Both Beijing and Moscow are, after all, optimizing their forces and exercising aggressively in preparation for potential conflicts with the United States and its allies; Russian doctrine explicitly emphasizes the limited use of nuclear weapons to achieve escalation dominance in a war with Washington. In Syria, U.S. and Russian forces even came into deadly contact in early 2018. American airpower decimated a contingent of government-sponsored Russian mercenaries that was attacking a base at which U.S. troops were present, an incident demonstrating the increasing boldness of Russian operations and the corresponding potential for escalation. The world has not yet returned to the epic clashes for global dominance that characterized the twentieth century, but it has returned to the historical norm of great-power struggle, with all the associated dangers.

Those dangers may be even greater than most observers appreciate, because if today’s great-power competitions are still most intense at the regional level, who is to say where these competitions will end? By all appearances, Russia does not simply want to be a “regional power” (as Obama cuttingly described it) that dominates South Ossetia and Crimea.37 It aspires to the deep European and extra-regional impact that previous incarnations of the Russian state enjoyed. Why else would Putin boast about how far his troops can drive into Eastern Europe? Why else would Moscow be deploying military power into the Middle East? Why else would it be continuing to cultivate intelligence and military relationships in regions as remote as Latin America?

Likewise, China is today focused primarily on securing its own geopolitical neighborhood, but its ambitions for tomorrow are clearly much bolder. Beijing probably does not envision itself fully overthrowing the international order, simply because it has profited far too much from the U.S.-anchored global economy. Yet China has nonetheless positioned itself for a global challenge to U.S. influence. Chinese military forces are deploying ever farther from China’s immediate periphery; Beijing has projected power into the Arctic and established bases and logistical points in the Indian Ocean and Horn of Africa. Popular Chinese movies depict Beijing replacing Washington as the dominant actor in sub-Saharan Africa—a fictional representation of a real-life effort long under way. The Belt and Road Initiative bespeaks an aspiration to link China to countries throughout Central Asia, the Middle East, and Europe; BRI, AIIB, and RCEP look like the beginning of an alternative institutional architecture to rival Washington’s. In 2017, Xi Jinping told the Nineteenth National Congress of the Chinese Communist Party that Beijing could now “take center stage in the world” and act as an alternative to U.S. leadership.38

These ambitions may or may not be realistic. But they demonstrate just how significantly the world’s leading authoritarian powers desire to shift the global environment over time. The revisionism we are seeing today may therefore be only the beginning. As China’s power continues to grow, or if it is successful in dominating the Western Pacific, it will surely move on to grander endeavors. If Russia reconsolidates control over the former Soviet space, it may seek to bring parts of the former Warsaw Pact to heel. Historically, this has been a recurring pattern of great-power behavior—interests expand with power, the appetite grows with the eating, risk-taking increases as early gambles are seen to pay off.39 This pattern is precisely why the revival of great-power competition is so concerning—because geopolitical revisionism by unsatisfied major powers has so often presaged intensifying international conflict, confrontation, and even war. The great-power behavior occurring today represents the warning light flashing on the dashboard. It tells us there may be still-greater traumas to come.

The threats today are compelling and urgent, and there may someday come a time when the balance of power has shifted so markedly that the postwar international system cannot be sustained. Yet that moment of failure has not yet arrived, and so the goal of U.S. strategy should be not to hasten it by giving up prematurely, but to push it off as far into the future as possible. Rather than simply acquiescing in the decline of a world it spent generations building, America should aggressively bolster its defenses, with an eye to preserving and perhaps even selectively advancing its remarkable achievements.

# Case

## OST Bad

### 1NC – Circumvention – OST is Vague

#### Outer Space Laws are unclear – private corporations are still capable of escaping due to loopholes in the plan.

**Green and Stark 17** [Christopher and Eda, “Outer Space Treaty and Beyond: Do Existing Space Laws Put an Astronomical Barrier to Private IP Rights in Space?”, JDSUPRA. 8 September 2020 https://www.jdsupra.com/legalnews/outer-space-treaty-beyond-do-existing-44028/] //DebateDrills LC

Our **limited body of space law provides little guidance**. The first international treaty, the “Outer Space Treaty,” was signed by the U.S., Russia, and the U.K. in 1967, quickly followed by the Rescue Agreement. Over the next two decades, three other treaties—the Liability Convention, the Registration Convention, and the Moon Agreement—were also signed by these nations, with most countries following in their footsteps.[3] But after that rapid succession of international treaties, there have since been few others. These five documents form the basis of the international space law we have today, but **none address** the issue of [intellectual property rights in space](https://www.fr.com/fish-litigation/ip-rights-outer-space/). Rather, upon inspection, it appears that **the stated purpose of these treaties may be antithetical to intellectual property protection.**

The “Outer Space Treaty” espouses communal themes in characterizing space as the “province of all mankind,” the “common heritage of mankind” and to the “benefit of all countries.”[4] Unsurprisingly, Article II of the Outer Space Treaty prohibits any appropriation of areas in space, keeping in line with its principle of communal property.[5] On the other hand, **patents are fundamentally territorial and grant monopoly rights for a period of time. Applied to space, it is unclear just what is open for patent protections.**

For example, **can private companies patent orbital patterns of satellites**? Currently, companies may patent the technology or design of satellites that stay in a particular orbit, even if not the orbital pattern itself.[6] The practical implications of this are significant, especially with the advent of satellite constellations. If particular satellite technologies, and, indirectly, their orbital patterns, are patentable, then a significant portion of space may be occupied by one satellite constellation, i.e. one company alone.[7] Does this private apportionment of space run counter to our notions of sharing space? Some argue that **the Outer Space Treaty only bans sovereign appropriation and does not limit private entities from exerting claims**. Others counter that private property rights flow from sovereign property claims, so the former is meaningless without the latter.[8] So the question remains, **can the stated goals of sharing outer space be reconciled with the proprietary nature of patents**?

**Our current corpus of space treaties comes from a period of history when space exploration was undertaken primarily by governments** rather than private actors. The cooperative goals were likely a reaction to the time, as the world was coming out of a charged space race. **The silence of these space treaties on intellectual property rights presents an opportunity for modern-day agreements to provide patent protections for private companies**. Without robust international agreement on patents for space, we may even see less international cooperation as companies refuse to divulge their discoveries.[9] Now, as more and more private companies enter space exploration and carry the torch of innovation, **it is more important than ever to strike a balance between sharing our “common heritage” and providing patent protections that incentivize invention.**[10]

### 1NC – No Space War – Barriers

**No ‘space war’ – Insurmountable barriers and everyone has an interest in keeping space peaceful**

**Dobos 19** [(Bohumil Doboš, scholar at the Institute of Political Studies, Faculty of Social Sciences, Charles University in Prague, Czech Republic, and a coordinator of the Geopolitical Studies Research Centre) “Geopolitics of the Outer Space, Chapter 3: Outer Space as a Military-Diplomatic Field,” Pgs. 48-49] TDI

Despite the theorized potential for the achievement of the terrestrial dominance throughout the utilization of the ultimate high ground and the ease of destruction of space-based assets by the potential space weaponry, the utilization of space weapons is with current technology and no effective means to protect them far from fulfilling this potential (Steinberg 2012, p. 255). In current global international political and technological setting, the utility of space weapons is very limited, even if we accept that the ultimate high ground presents the potential to get a decisive tangible military advantage (which is unclear). This stands among the reasons for the lack of their utilization so far. Last but not the least, it must be pointed out that the states also develop passive defense systems designed to protect the satellites on orbit or critical capabilities they provide. These further decrease the utility of space weapons. These systems include larger maneuvering capacities, launching of decoys, preparation of spare satellites that are ready for launch in case of ASAT attack on its twin on orbit, or attempts to decrease the visibility of satellites using paint or materials less visible from radars (Moltz 2014, p. 31). Finally, we must look at the main obstacles of connection of the outer space and warfare. The first set of barriers is comprised of physical obstructions. As has been presented in the previous chapter, the outer space is very challenging domain to operate in. Environmental factors still present the largest threat to any space military capabilities if compared to any man-made threats (Rendleman 2013, p. 79). A following issue that hinders military operations in the outer space is the predictability of orbital movement. If the reconnaissance satellite's orbit is known, the terrestrial actor might attempt to hide some critical capabilities-an option that is countered by new surveillance techniques (spectrometers, etc.) (Norris 2010, p. 196)-but the hide-and-seek game is on. This same principle is, however, in place for any other space asset-any nation with basic tracking capabilities may quickly detect whether the military asset or weapon is located above its territory or on the other side of the planet and thus mitigate the possible strategic impact of space weapons not aiming at mass destruction. Another possibility is to attempt to destroy the weapon in orbit. Given the level of development for the ASAT technology, it seems that they will prevail over any possible weapon system for the time to come. Next issue, directly connected to the first one, is the utilization of weak physical protection of space objects that need to be as light as possible to reach the orbit and to be able to withstand harsh conditions of the domain. This means that their protection against ASAT weapons is very limited, and, whereas some avoidance techniques are being discussed, they are of limited use in case of ASAT attack. We can thus add to the issue of predictability also the issue of easy destructibility of space weapons and other military hardware (Dolman 2005, p. 40; Anantatmula 2013, p. 137; Steinberg 2012, p. 255). Even if the high ground was effectively achieved and other nations could not attack the space assets directly, there is still a need for communication with those assets from Earth. There are also ground facilities that support and control such weapons located on the surface. Electromagnetic communication with satellites might be jammed or hacked and the ground facilities infiltrated or destroyed thus rendering the possible space weapons useless (Klein 2006, p. 105; Rendleman 2013, p. 81). This issue might be overcome by the establishment of a base controlling these assets outside the Earth-on Moon or lunar orbit, at lunar L-points, etc.-but this perspective remains, for now, unrealistic. Furthermore, no contemporary actor will risk full space weaponization in the face of possible competition and the possibility of rendering the outer space useless. No actor is dominant enough to prevent others to challenge any possible attempts to dominate the domain by military means. To quote 2016 Stratfor analysis, "(a) war in space would be devastating to all, and preventing it, rather than finding ways to fight it, will likely remain the goal" (Larnrani 20 16). This stands true unless some space actor finds a utility in disrupting the arena for others.

## Debris

### 1AR --- AT --- Kessler

#### Kessler is so unlikely, we don’t even need to remove debris

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

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

#### It takes centuries and adaptation solves

Muelhaupt 19 (Ted, Associate Principal Director of the Systems Analysis and Simulation Subdivision (SASS) and Manager of the Center for Orbital and Reentry Debris Studies at The Aerospace Corporation, M.S., B.S. Aerospace and Aeronautical Engineering & Mechanics, University of Minnesota - Twin Cities, Senior Member of the American Institute of Aeronautics and Astronautics, “How Quickly Would It Take For the Kessler Syndrome To Destroy All The Satellites In LEO? And Could You See This Happening From Earth?”, Quora, 2/28/2019, https://www.quora.com/How-quickly-would-it-take-for-the-Kessler-Syndrome-to-destroy-all-the-satellites-in-LEO-And-could-you-see-this-happening-from-Earth)

The dynamics of the Kessler Syndrome are real, and most people studying it agree on the concept: if there is sufficient density of objects and mass, a chain reaction of debris breaking up objects and creating more debris can occur. But the timescale of this process takes decades and centuries. There are many assumptions that go into these models. Though there is still argument about this, many people in the field think that the process is already underway in low earth orbit. But others, including myself, think we can stop it if we take action. This is a slow motion disaster that we can prevent.

#### There is no impact.

Von Fange **’**17 [Daniel Von Fange is a full stack developer that builds web platforms, with a particular interest in space applications. Kessler Syndrome is Over Hyped. May 21, 2017. braino.org/essays/kessler\_syndrome\_is\_over\_hyped/]

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

#### It's slow and in 140 years.

Drmola & Hubík **’**18 Mgr. Jakub Drmola, PhD, Political Sceince Professor at Masaryk University. Tomáš Hubík, Computer Science PhD Candidate at Charles University in Prague, Systems Dynamics UiB at the University of Bergen. [Kessler Syndrome: System Dynamics Model, Space Policy, 44–45, 29–39, ScienceDirect]//BPS

It must be stressed that the model was not designed with such long outlooks in mind, and many of the assumptions will certainly not hold over the next 200 years (such as static launch rate growth, size, and structure of the satellites, their lifetime, evasion rates, lack of mitigation, and many others). But in the overwhelmingly unlikely case that these assumptions stay true, the simulated outcome seems to suggest a collapse of sorts around the year 2163. However, it does not look like a suddenly triggered chain reaction leading to widespread fragmentation of the entire LEO but rather like a gradually reached point at which LEO is so full of debris, and the rate of active satellite fragmentation is so high (almost one every day) that the launches cannot keep up anymore. This is consistent with the findings reported by LaFleur and Finkelman, who found the debris system to be unconditionally stable [18], [19], [27].

#### Long time frame.

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

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

#### No impact to debris---the risk to spacecraft is miniscule compared to normal mission hazards

Lawrence M. Wein 9, Professor & Senior Fellow at Stanford’s Center for International Security and Cooperation, “Space debris: Assessing risk and responsibility,” *Advances in Space Research*, Volume 43, 2009, pp. 1372-1390

[Translated scientific notation to % probability in brackets]

More importantly, while our numerical results mimic earlier results (Liou and Johnson, 2005; Walker and Martin, 2004) that stressed the importance of postmission deorbiting, we do not necessarily agree with the claim that the only way to prevent future problems is to remove existing large intacts from space (Liou and Johnson, 2006, 2008). The divergence between our views and those in Liou and Johnson (2006, 2008) is perhaps due to the different performance metrics used. The root causes for alarm in Liou and Johnson (2006, 2008) appear to be the growth rate of fragments and the small increase in the rate of catastrophic collisions over the next 200 years (Liou and Johnson, 2008, Fig. 2). However, the great majority of catastrophic collisions in the SOI do not involve operational spacecraft, and are hazardous only in the sense that the fragments generated from such a collision could subsequently damage or destroy operational spacecraft. Therefore, we introduced the notion of the lifetime risk of an operational spacecraft as the primary performance metric. Our model predicts that the lifetime risk is <5x10^-4 [less than .0005%] over the next two centuries, and always stays <10^-3 [less than .001%] than if there is very high (>98%) spacecraft deorbiting compliance. These risks appear to be low relative to the immense cost and considerable technological uncertainty involved in removing large objects from space, are dwarfed by the ~20% historical mission-impacting (but not necessarily mission-ending) failure rate of spacecraft (Frost and Sullivan, 2004), and could be overestimated if improved traffic management techniques lower future collision risks (Johnson, 2004). Hence, the need to bring large objects down from space does not appear to be as clear cut as suggested in Liou and Johnson (2006, 2008). Nonetheless, our model does not incorporate the possibility of intentional catastrophic collisions (ASAT tests, space wars) that could conceivably occur in the future. In addition, Fig. 5 considers only catastrophic collisions, whereas noncatastrophic intact-fragment collisions could easily disable an operational spacecraft. If the operational lifetime risk is modified to include noncatastrophic collisions with fragments >= 10cm, then the sustainable risk rises by ~50%: it increases from 2.19x10^-2 [.0219%] to 3.09x10^-2 in the base case, and increases from 4.91x10^-4 [.000491%] to 7.94x10^-4 in the full compliance case. Moreover, if fragments >= 1 cm (rather than >= 10 cm) are harmful to spacecraft (Johnson, 2004), then we (as well as other researchers) could be underestimating the risk.

## Space war

### 1NC – Private Actors Solves Space War

#### 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.