# 1nc TOC r2

## Off

### 1

#### Interpretation: Debaters must not break new affs if the advocacy text is not disclosed at least 15 min before round

#### Violation: insert screenshot

Graphical user interface, text, application, email

Description automatically generated

#### Standards:

#### 1] Clash- Not disclosing incentivizes surprise tactics and poorly refined positions that rely on artificial and vague negative engagement to win debates. Their interpretation means that negatives are forced to rely on generics that don’t link or barely link instead of smart contextual strategies destroying nuanced argumentation.

#### 2] Resource Disparities – Their interpretation means only giant prep squads or schools with generations of prep like Harvard Westlake could engage effectively since small school debaters don’t have prep that links to every possible aff from Rawls to Non-T to Wynter to a hyper specific policy aff.

#### Our model solves innovation by allowing you to break new affs, but we only ask that we disclose the plan text so that we can effectively overcome prep disparities. We literally only get 6 min to prep an entire aff that hwl had months to prepare, and those 6 min aren’t even for prepping they are literally for flowing.

#### Fairness –

#### Ed --

#### Paradigm Issues:

#### Use Competing Interps on New Affs Bad –

#### A. It’s a yes/no question on disclosing a new aff since you can’t disclose half a plantext “States ought to eliminate” means nothing.

#### B. Reasonability changes every round and forces the judge to intervene to determine what is reasonable.

#### No RVIs

#### A.Encourages debaters to read New Affs just to bait the shell and win on the RVI – kills substance

#### Discourages checking real abuse since debaters will think they will lose to the RVI

#### Drop the Debater

#### A.Our interp affects their entire 1AC since we couldn’t prepare for any argument – so drop the argument doesn’t make sense.

### 2

#### Interpretation—the aff may not defend a subset of appropriation.

#### Appropriation is a generic indefinite singular. Cohen 01

Ariel Cohen (Ben-Gurion University of the Negev), “On the Generic Use of Indefinite Singulars,” Journal of Semantics 18:3, 2001 <https://core.ac.uk/download/pdf/188590876.pdf>

\*IS generic = Indefinite Singulars

French, then, expresses the two types of reading differently. In English, on¶ the other hand, generic BPs are ambiguous between inductivist and normative¶ readings. But even in English there is one type of generic that can express only¶ one of these readings, and this is the IS generic. While BPs are ambiguous¶ between the inductivist and the rules and regulations readings, ISs are not. In¶ the supermarket scenario discussed above, only (44.b) is true:¶ (44) a. A banana sells for $.49/lb.¶ b. A banana sells for $1.00/lb.¶ The normative force of the generic IS has been noted before. Burton-Roberts¶ (1977) considers the following minimal pair:¶ (45) a. Gentlemen open doors for ladies.¶ b. A gentleman opens doors for ladies.¶ He notes that (45.b), but not (45.a), expresses what he calls “moral necessity.”7¶ Burton-Roberts observes that if Emile does not as a rule open doors for ladies, his mother could utter [(45.b)] and thereby successfully imply that Emile was not, or was¶ not being, a gentleman. Notice that, if she were to utter. . . [(45.a)] she¶ might achieve the same effect (that of getting Emile to open doors for¶ ladies) but would do so by different means. . . For [(45.a)] merely makes a¶ generalisation about gentlemen (p. 188).¶ Sentence (45.b), then, unlike (45.a), does not have a reading where it makes¶ a generalization about gentlemen; it is, rather, a statement about some social¶ norm. It is true just in case this norm is in effect, i.e. it is a member of a set of¶ socially accepted rules and regulations.¶ An IS that, in the null context, cannot be read generically, may receive a¶ generic reading in a context that makes it clear that a rule or a regulation is¶ referred to. For example, Greenberg (1998) notes that, out of the blue, (46.a)¶ and (46.b) do not have a generic reading:¶ (46) a. A Norwegian student whose name ends with ‘s’ or ‘j’ wears green¶ thick socks.¶ b. A tall, left-handed, brown haired neurologist in Hadassa hospital¶ earns more than $50,000 a year.¶ However, Greenberg points out that in the context of (47.a) and (47.b),¶ respectively, the generic readings of the IS subject are quite natural:¶ (47) a. You know, there are very interesting traditions in Norway, concerning the connection between name, profession, and clothing. For¶ example, a Norwegian student. . .¶ b. The new Hadassa manager has some very funny paying criteria. For¶ example, a left-handed. . .¶ Even IS sentences that were claimed above to lack a generic reading, such¶ as (3.b) and (4.b), may, in the appropriate context, receive such a reading:¶ (48) a. Sire, please don’t send her to the axe. Remember, a king is generous!¶ b. How dare you build me such a room? Don’t you know a room is¶ square?

#### Their plan violates. Rules readings are always generalized – specific instances are not consistent. Cohen 01

Ariel Cohen (Ben-Gurion University of the Negev), “On the Generic Use of Indefinite Singulars,” Journal of Semantics 18:3, 2001 https://core.ac.uk/download/pdf/188590876.pdf

In general, as, again, already noted by Aristotle, rules and definitions are not relativized to particular individuals; it is rarely the case that a specific individual¶ forms part of the description of a general rule.¶ Even DPs of the form a certain X or a particular X, which usually receive¶ a wide scope interpretation, cannot, in general, receive such an interpretation in the context of a rule or a definition. This holds of definitions in general, not¶ only of definitions with an IS subject. The following examples from the Cobuild¶ dictionary illustrate this point:¶ (74) a. A fanatic is a person who is very enthusiastic about a particular¶ activity, sport, or way of life.¶ b. Something that is record-breaking is better than the previous¶ record for a particular performance or achievement.¶ c. When a computer outputs something it sorts and produces information as the result of a particular program or operation.¶ d. If something sheers in a particular direction, it suddenly changes¶ direction, for example to avoid hitting something.

#### That outweighs—only our evidence speaks to how indefinite singulars are interpreted in the context of normative statements like the resolution—

#### Vote neg:

#### 1] Precision –any deviation justifies the aff arbitrarily jettisoning words in the resolution at their whim which decks negative ground and preparation because the aff is no longer bounded by the resolution.

#### 2] Limits—specifying a type of appropriation offers huge explosion in the topic since space is, quite literally, infinite—but general interps solve since we can read DAs to anything.

#### CA Paradigm issues

### 3

#### Text – हिंदी में करो अफीम

#### The text does not mean only hindi is accepted, rather there should be a diversity in language usage that’s not just english

#### The normalization of normative English leads to an in-group/out-group that drive racial violence

**Rosa et al 17** Rosa, Jonathan, and Nelson Flores. "Unsettling race and language: Toward a raciolinguistic perspective." Language in society 46.5 (2017): 621-647. (Assistant Professor of Anthropology and Linguistics and Associate Professor in the Educational Linguistics Division)//Elmer

Similar to Bucholtz & Hall's (2005) approach to identity and interaction, we are interested in how processes of raciolinguistic enregisterment emblematize particular linguistic features as authentic signs of racialized models of personhood. This is found not only in sociolinguistic accounts of the features that compose categories such as ‘African American English’ (Green 2002) or ‘Chicano English’ (Fought 2003), but also popular stereotypes and modes of linguistic appropriation such as ‘Mock Spanish’ (Hill 2008), ‘Mock Asian’ (Chun 2004), ‘Hollywood Injun English’ (Meek 2006), and ‘linguistic minstrelsy’ (Bucholtz & Lopez 2011). In each of these cases, minute features of language, including grammatical forms, prosodic patterns, and morphological particles, are emblematized as sets of signs that correspond to racial categories. Crucially, as Meek (2006) demonstrates, these forms need not correspond to empirically verifiable linguistic practices in order to undergo racial emblematization. Moreover, as Lo & Reyes (2009) point out, the imagination of groups such as Asian Americans as lacking a distinctive racialized variety of English analogous to African American English or Chicano English, must be interrogated based on the racial logics that organize stereotypes about and societal positions of different racial groups on the one hand, and perceptions of their language practices on the other. Specifically, Lo & Reyes argue that racial ideologies constructing Asian Americans as model minorities who approximate whiteness are linked to language ideologies constructing Asian Americans as lacking a racially distinctive variety of English. In related work, Chun (2016:81) shows how emblematized Mock Asian forms such as ‘ching-chong’ are located across ‘the important boundary between ‘Oriental talk’ and English’, which sustains Asian Americans alternately as model minorities and forever foreigners. Thus, we must carefully reconsider seemingly ‘distinctive’ and ‘nondistinctive’ language varieties alike, by analyzing the logics that position particular racial groups and linguistic forms in relation to one another. That is, no language variety is objectively distinctive or nondistinctive, but rather comes to be enregistered as such in particular historical, political, and economic circumstances.

#### The performance of the 1NC is a form of Code Switching that disrupts English-centered discourses

**Duan**, Carlina. " The Space Between: An analysis of code-switching within Asian American poetry as strategic poetic device"(English Honors) AND" Here I Go, Torching"(Creative Writing Honors). Diss. 2015. (BA in Honors English from the University of Michigan)//Elmer

In an interview with Women’s Review of Books literary magazine, Hong further discussed the strategic role of translation as a form of linguistic activism within her poetic work. When asked why she does not include translations from Korean to English within her own poetry, Hong said: “I wanted to open up these schisms, to emphasize that memory, the filtering of human experience into poetry, is often fractured and not transparent, especially experiences which have always been bisected and undercut by two languages.” She added, “I think I want to debunk the idea of easy translation—whether it be the idea of literal translation or, as I said before, the translating of one’s experience into poetry” (Hong 2002a, 15). Hong’s intentional decision to leave out English translations in her poetry creates a power dynamic between speaker and reader of the poem. Not only are “easy” translations dismantled and withheld from the reader, but, according to Hong, codeswitching — without translation — also more accurately reflects her personal experiences of cultural and linguistic movement. Hong points out that human experiences and the world of memory, especially for bilingual speakers, are “not transparent” — not captured neatly by one language, but rather, “bisected” by the complexities of belonging to two (or more) languages, implying a movement between multiple spaces. Scholars describe poetic code-switching in this way as a navigation of power. Literary scholar Benzi Zhang argues that code-switching makes apparent different levels of cultural knowledge for speaker and reader: “[T]he insertion of […] foreign words effectively renders Asian sensibilities into English and signifies different positions of cultural agency” (Zhang 131). Building upon this idea of cultural agency, I argue that Hong uses Korean to consciously expose themes of exoticism and racial stereotyping that readers themselves may be (consciously or unconsciously) participating in. As a result, Hong creates agency for her speaker through critiquing culturally appropriative behavior, in addition to an agency in knowledge; Hong’s speaker can access cultural understanding that her readers do not have. Yet, Hong does more than negotiate questions of audience access; she uses code-switching to reflect her speaker’s lived experiences of Korean-American identity, grappling with multiple languages and cultural codes. In “An Introduction to Chinese-American and Japanese American Literatures,” Jeffrey Chan et al. writes, “The minority experience does not yield itself to accurate or complete expression on the white man’s language” (qtd. Zhang 137). As Chang et al. suggest, code-switching embeds itself as a natural part of the “minority experience,” and is documented as such in Hong’s poems. Thus, the poems not only act as social critique of exoticization, but further inhabit the embodied experiences of Korean-American female identities living in the U.S. — which, as Hong reveals, are complicated experiences of rage, agency, celebration, and shifting power dynamics. Critics who have reviewed Hong’s work, such as Jan Clausen, have raised questions about the effect of Hong’s play with translation. Clausen, in a review titled “The poetics of estrangement,” published through the Women’s Review of Books, writes of Hong’s collection Translating Mo’um: “Hong deftly dismantles the romance of language as homeland, with results especially unnerving for the non-Korean-speaking reader” (Clausen 15). According to Clausen, Hong’s work with code-switching subverts traditional notions of the ‘native tongue’ as representative of “homeland,” dismantling what a reader may expect of a Korean American author: that she use Korean language to specifically discuss her ethnic culture as a hyphenated American. In other words, Hong’s code-switches function as intentional poetic protest against the reader’s expectations of the relationship between multilingual text and ethnic identity. As Clausen points out, such readings may anticipate that mother tongue is only introduced to speak about cultural difference or history, rather than used additionally as formal poetic device. In this chapter, I reveal Hong’s awareness of Korean language and code-switching as tools in identity-construction. Rather than allow others to shape her identity for her, she remains dominant in shaping her identity — and her agency — for herself.

### 4

#### 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.

### 5

#### The United States federal government should:

* transparently develop, deploy, and demonstrate a debris removal system, with external non-military verification, through government contracts to the private sector funded by charging fees and service fees that removes US debris and compensates other nations for removing their debris;
* institute debris remediation guidelines that clarify US intentions as peaceful, declare the US will not intentionally damage any satellites, publicize all planned debris removal operations in advance, and provide transparency by broadcasting all non-critical SSA data pertaining to active debris removal operations;
* and, employ a satellite resilience strategy that disaggregates satellite infrastructure, builds in redundancies, and develops backup systems.

#### Unilateral ADR solves the case.

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VI. U.S. Leadership by Example Need to Initiate Unilateral Action International cooperation in space has rarely resulted in cost-effective or expedient solutions, especially in politically-charged areas of uncertain technological feasibility. The International Space Station, because of both political and technical setbacks, has taken over two decades to deploy and cost many billions of dollars—far more time and money than was originally intended. Space debris mitigation has also encountered aversion in international forums. The topic was brought up in COPUOS as early as 1980, yet a policy failed to develop despite a steady flow of documents on the increasing danger of space debris (Perek 1991). In fact, COPUOS did not adopt debris mitigation guidelines until 2007 and, even then, they were legally non-binding.

Space debris removal systems could take decades to develop and deploy through international partnerships due to the many interdisciplinary challenges they face. Given the need to start actively removing space debris sooner rather than later to ensure the continued benefits of satellite services, international cooperation may not be the most appropriate mechanism for instigating the first space debris removal system. Instead, one country should take a leadership role by establishing a national space debris removal program. This would accelerate technology development and demonstration, which would, in turn, build-up trust and hasten international participation in space debris removal.

Possibilities of Leadership As previously discussed, a recent NASA study found that annually removing as little as five massive pieces of debris in critical orbits could significantly stabilize the long-term space debris environment (Liou and Johnson 2007). This suggests that it is feasible for one nation to unilaterally develop and deploy an effective debris removal system. As the United States is responsible for creating much of the debris in Earth’s orbit, it is a candidate for taking a leadership role in removing it, along with other heavy polluters of the space environment such as China and Russia.

There are several reasons why the United States should take this leadership role, rather than China or Russia. First and foremost, the United States would be hardest hit by the loss of satellites services. It owns about half of the roughly 800 operating satellites in orbit and its military is significantly more dependent upon them than any other entity (Moore 2008). For example, GPS precision-guided munitions are a key component of the “new American way of war” (Dolman 2006, 163-165), which allows the United States to remain a globally dominant military power while also waging war in accordance with its political and ethical values by enabling faster, less costly war fighting with minimal collateral damage (Sheldon 2005). The U.S. Department of Defense recognized the need to protect U.S. satellite systems over ten years ago when it stated in its 1999 Space Policy that, “the ability to access and utilize space is a vital national interest because many of the activities conducted in the medium are critical to U.S. national security and economic well-being” (U.S. Department of Defense 1999, 6). Clearly, the United States has a vested interest in keeping the near-Earth space environment free from threats like space debris and thus assuring U.S. access to space.

Moreover, current U.S. National Space Policy asserts that the United States will take a “leadership role” in space debris minimization. This could include the development, deployment, and demonstration of an effective space debris removal system to remove U.S. debris as well as that of other nations, upon their request. There could also be international political and economic advantages associated with being the first country to develop this revolutionary technology. However, there is always the danger of other nations simply benefiting from U.S. investment of its resources in this area. Thus, mechanisms should also be created to avoid a classic “free rider” situation. For example, techniques could be employed to ensure other countries either join in the effort later on or pay appropriate fees to the United States for removal services.

Recommendations for Leadership in Space Debris Removal Going forward, the U.S. government should engage the commercial sector in space debris removal. Government contracts with several commercial firms would create a competitive environment, encouraging innovation and cost minimization. Having several companies working on the problem at the same time would also accelerate remediation as several critical orbits could be addressed at once. Furthermore, early investments in a domestic space debris removal industry would give the United States a head start in what may become a critical industry over the coming decades.

The aforementioned 2009 International Conference on Orbital Debris Removal, co-hosted by DARPA and NASA, suggests that these two agencies could lead U.S. government efforts in space debris removal. However, it is important to recognize that DARPA and NASA are driven by very different motives: one is a civilian space agency, while the other is a defense research agency. Failure to appreciate these differences when establishing mission requirements could lead to a situation like that of the National Polar Environmental Satellite System (NPOESS), where the attempt to combine civil and military requirements into a single satellite resulted in doubling project costs, a launch delay of five years, and ultimately splitting the project into two separate programs (Clark 2010). Furthermore, any system developed through a joint NASA-DARPA partnership would need to be transferred to an operational agency, as both NASA and DARPA are research and development entities. The U.S. Air Force, as it is the primary agency responsible for national security space operations, is a possible option.

Funding the development of a national space debris removal system carries risks because, due to the nascent state of the field, detailed cost-benefit estimates have not yet been carried out. The Space Frontier Foundation, however, proposes that the government should establish special funds at the expense of parties who generate debris (Dunstan and Werb 2009). Suggested mechanisms for raising the funds include charging fees for U.S. launches based on the debris potential of the mission, with the size of the fee determined by relevant factors such as the mass of the anticipated debris resulting from the mission and the congestion of the orbit into which the space object is being launched. Satellite manufacturers, operators, and service providers could all share responsibility for payment into such funds. Once debris removal systems are in operation, additional funds could also come from service fees. For example, entities that created debris could pay a specified amount to removal providers in return for the service rendered.

Any national space debris removal program must also be kept transparent with ongoing international dialogue in forums such as COPUOS so that other nations can build-up trust in the effectiveness and efficiency of the program. A proven debris removal program will result in more productive discussions in these international forums.

If the United States and other powerful governments do not take steps now to avert the potentially devastating effects of space debris, the issue risks becoming stalemated in a manner similar to climate change. Given the past hesitation of international forums in addressing the space debris issue, unilateral action is the most appropriate means of instigating space debris removal within the needed timeframe. The United States is well poised for a leadership role in space debris removal.

Going forward, the U.S. government should work closely with the commercial sector in this endeavor, focusing on removing pieces of U.S. debris with the greatest potential to contribute to future collisions. It should also keep its space debris removal system as open and transparent as possible to allow for future international cooperation in this field.

Although leadership in space debris removal will entail certain risks, investing early in preserving the near-Earth space environment is necessary to protect the satellite technology that is so vital to the U.S. military and day-to-day operations of the global economy. By instituting global space debris removal measures, a critical opportunity exists to mitigate and minimize the potential damage of space debris and ensure the sustainable development of the near-Earth space environment.

#### US declarations are credible and disaggregation solves escalation.

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Step 1. Elaborate on the administration’s National Space Policy and publicly articulate its approach and goals, both to provide clear high-level guidance for U.S. policy makers— military and nonmilitary alike—and to clarify U.S. intentions for the international community. The approach and goals should: • Emphasize international cooperation rather than unilateral action. • Reaffirm that all countries have the same rights to the peaceful use of space. • Take a more balanced view of commercial, civil, and military uses of space. • Support and reinforce long-held norms against stationing weapons in space and against ~~disabling~~ [damaging] or destroying satellites. Such principles, clearly expressed, are necessary to guide those charged with developing and implementing space policy. Moreover, their public expression can help reduce suspicion of U.S. actions and intentions and set a context that is more conducive to international discussion and cooperation. The Obama NSP does provide some of this high-level direction, albeit at a general level. Greater detail would foster greater progress on space security issues. For example, the policy emphasizes international cooperation but it does not specify what the United States wants to achieve by cooperation or which strategic concept would provide the best guidance.20 The policy also states that the United States will seek to “assure the use of space for all responsible parties” without defining “responsible.” Additionally, the policy charges the defense and intelligence departments to develop the plans and capacity to pursue two related goals—ensure the survivability of space capabilities and deter, defend against, or defeat attempts to interfere with U.S. space capabilities—but the administration has not publicly articulated specific guidance about how these goals are to be achieved and what limits it is willing to consider on related activities. Nor has the administration discussed what steps it will take to ensure that such plans do not decrease security overall—by, for example, appearing to pose an offensive threat to other countries and eliciting a threatening response. Similarly, while the NSP offers support for voluntary TCBMs, it states that the United States will only consider proposals for arms control that are “equitable, effectively verifiable, and enhance the national security of the United States and its allies.” Although this is a welcome change in position, as far as it goes, the administration should also articulate specific approaches and measures it believes would be in its interest. Step 2. Declare that the United States will not intentionally damage or ~~disable~~ any satellites operating in accordance with the Outer Space Treaty, and pledge that the United States will not be the first to station dedicated weapons in space. Strongly urge the other space powers to make parallel pronouncements. Negotiating limits on ASAT and space weapons is certain to be a long and complicated process. But space-faring countries’ declarations that reinforce existing norms of this kind can improve the environment for such negotiations by demonstrating good faith and by reducing the mistrust that arises from concerns about weapons development. The OST requires, among other things: that space activities be undertaken in accordance with international law, including the Charter of the United Nations, as well as with “due regard to the corresponding interests of all other States Parties to the Treaty”; and that if a planned activity could cause “potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space,” the state planning that activity should consult with other states first. The United States would face little risk in making such a declaration, as some other nation’s decision to be the first to deploy an ASAT or space-based weapon would not confer a significant or lasting military advantage; those following the initiator could do the same soon and well enough. Moreover, the United States has the strongest ability to compensate for, and respond to, other countries’ development of space-related weapons. In any case, its advanced monitoring capabilities would allow the United States to keep track of the activities of other countries, essentially eliminating the risk that they could secretly develop and test capabilities that would pose a significant threat. For example, U.S. early warning satellites could detect launches of any missiles able to carry a ground-launched ASAT weapon; and the tracking of suspicious objects in orbit could be made a priority mission for the SSN, thereby limiting the number and capability of any undetected satellites. Moratorium on Destructive ASAT Weapons Testing and Use The United States should unilaterally declare that it will not intentionally damage or destroy a satellite, whether through dedicated ASAT technology or dual-use technology. This declaration would reinforce an important longstanding norm: no country has ever intentionally caused irreversible damage to another country’s satellite. It would also be consistent with the U.S. Department of Defense’s (DOD’s) preference for temporary and reversible means of satellite interference. Moreover, the declarations should go beyond this norm by ruling out tests of destructive ASAT weapons directed against a country’s own satellites. Because it would limit the operational development of such weapons, such a declaration would help assure other countries that the United States is serious about seeking mutually agreed constraints on dangerous technologies. It would also set a standard that other countries should meet to become more credible partners in space security negotiations. This moratorium would ban the use of ASAT weapons that destroy or permanently ~~disable~~ satellites but would not be a comprehensive ban on all ASAT weapons. A second category includes those whose effects are temporary and nondestructive; the United States has already deployed some of these types of weapons, such as satellite signal jammers, for which the technology is widely available. There is less agreement on the implications of these latter weapons, on what kinds of limits regarding them would be useful, and on whether they are appropriate responses to the threat posed by the military utility of satellites. Pledge Not to Be the First to Station Weapons in Space Stationing destructive weapons in space is without precedent. Despite research and development efforts over the years, no dedicated space weapons are known to have been deployed.21 This has been the case for various reasons, the main ones being that they are costly, technically challenging to develop, and unpopular with policy makers and the public. Space basing is a poor choice for many kinds of weapons. For example, ground-attack weapons based in space would be 50 to 100 times more costly than ground-based alternatives with comparable delivery times, as discussed in the Appendix. Similarly, a system for defending against only one or two ballistic missiles launched from the main geographic regions of concern would be enormously expensive because hundreds of interceptors in space would be required. Even then, the system would fail to provide a reliable defense. (Space-based missile defenses are discussed in more detail in Step 3.) While there may be other missions that military leaders believe would be better suited to space-based weapons, the marginal military capability that the United States might gain from these missions must be weighed against the substantial costs. Pursuing such weapons would legitimize those uses of space and encourage other countries to develop similar capabilities, which could subsequently be used against the United States. Even if never used, these capabilities could increase tensions and hinder the coordination and cooperation needed for the international community to solve pressing problems in space. The United States would gain much by publicly stating its intent not to deploy space-based weapons. Making such a statement would not lock the United States into a position of inferiority, as it would imply the reconsideration of U.S. plans if another country started to place weapons in space. Moreover, the United States has the capability to catch up quickly. In short, it is not in the U.S. interest either to lead in the weaponization of space or to be encouraging others to do so by a lack of clarity about its position. In the absence of an official statement of intent by the administration, other countries trying to figure out U.S. intentions are likely to turn to other evidence (such as military writings or politicians’ declarations), which not only may be unrepresentative of official policy but also may appear needlessly aggressive. For example, the discussion of space weapons in documents such as the Air Force’s Vision for 2020, the interest in them among some policy makers and military leaders, and the continued funding of research and development of relevant technologies22 could raise concerns in other countries about U.S. intentions. Verification Given the U.S. ability to observe satellites and detect launches of missiles as well as of space-launch vehicles, it could have a high degree of confidence about how well other countries were abiding by their declarations not to deploy dedicated space-based weapons. The United States can determine the launch trajectory of a missile, the orbit of a satellite, the types of orbital maneuvers a satellite undergoes, and the physical attributes and appearance of a spacecraft—all of which are closely related to its mission. For example, U.S. sensors observed the demonstration of Chinese ASAT capability in 2007, the previous nondestructive tests of this technology, and China’s January 2010 missile defense test. The declarations need not be made overly complicated by including a detailed definition of a spacebased weapon. It should be sufficient to describe it as a spacecraft purposely designed to damage or destroy another object that is in orbit, is transiting space, or is on or near Earth’s surface.23 Combined with a moratorium on testing and using destructive ASAT weapons, these straightforward declarations would go a long way toward reducing threats from space both to space- and ground-based assets. Step 3. Declare that the United States will not develop or deploy space-based ballistic missile defense interceptors. Pledge not to use any element of the U.S. land-, sea-, or air-based missile defense systems to attack or destroy a satellite. And review plans to sell systems with this capability to other countries in order to ensure that any missile interceptors sold by the United States will not be used as anti-satellite weapons. Pledging to close off or limit these activities would reinforce the U.S. moratorium on using destructive ASAT weapons and the pledge not to be the first to deploy space weapons. It could also help avoid reactions by other countries concerned that the United States may pursue these options. While little unclassified effort is currently being made to pursue space-based missile defenses, this absence does not accrue the benefits that a clear declaration would. Space-Based Interceptors A U.S. decision to develop and test space-based interceptors (SBIs) would be problematic for space security. A space-based ballistic missile defense system, even if eventually built, could not reliably provide such a defense. However, developing the technology for it could spur other countries’ pursuit of similar capabilities or of systems intended to counter the SBI. This would pose a risk to U.S. satellites as well as legitimize the development and deployment of space weapons. Because a space-based missile defense system requires very large numbers of orbiting interceptors to defend against even a single ballistic missile, and because such a system has intrinsic vulnerabilities that undermine its effectiveness, the United States is not likely to attempt to build such a system in the foreseeable future (see the Appendix for a discussion of these issues). However, political pressures may create an incentive for a compromise that would support development and deployment of a handful of interceptors in a “space test bed.” The Missile Defense Agency (MDA) has proposed such a program24 in recent years, and space-based interception continues to be discussed as part of a “layered” missile defense. While Congress has consistently declined to fund the Space Test Bed program and the Obama administration has not requested money for it, no official positions have been articulated that constrain space-based interceptors (SBIs) as an option. Even fielding a few SBIs under the guise of research and development in a program such as the Space Test Bed would be problematic for at least three reasons. First, putting an interceptor in space would cross a significant threshold. It would for the first time place a dedicated weapon in orbit, effectively preempting broader congressional decision making about the wisdom of deploying space-based weapons. Second, while SBIs may nominally be defensive, they are also suited to offense; by their nature they would have or could be modified to have the ability to intercept satellites. The large amount of thrust an interceptor needs to perform boost-phase missile defense from space means that the interceptors could reach and attack satellites in geosynchronous orbit in addition to those in lower orbit. Understanding that a full space-based missile defense is unlikely to be built in the foreseeable future and that it would be vulnerable to attack if it were built, an adversary might reasonably assume that the real purpose of developing SBIs was to attack satellites. And third, if a working space-based missile defense system were built, it could be used to target space launchers as well as ballistic missiles. Thus pursuit of such a system would raise questions about U.S. intentions, particularly regarding the United States’ interest in controlling access to space. Some countries could certainly see the system’s capability as threatening, not defensive. Their concerns might induce them to preemptively attack the SBI, pursue the means to do so, or develop similar systems for themselves. ASAT Capabilities of Ground-, Sea-, and Air-Based Missile Defense Systems Because missile defense systems are intended to destroy ballistic missile warheads, which travel at speeds and altitudes comparable to those of satellites, such defense systems also have ASAT capabilities. In fact, while the technologies being developed for long-range missile defenses might not prove very effective against ballistic missiles—for example, because of countermeasure problems inherent in midcourse missile defense—they could be far more effective against satellites. In many ways, attacking satellites is an easier task. Satellites travel in predictable orbits that ground facilities can accurately determine by tracking them. An attacker would have time to plan an attack against a satellite, could choose the time of the attack in advance, and would be able to take as many shots as necessary to destroy it. In addition, an interceptor attacking a satellite would not have to deal with the same countermeasure problems that a midcourse missile defense system would face. For example, in the Ground-Based Midcourse Defense (GMD) system and the Aegis missile defense system, the inability of the interceptors to distinguish between warheads and countermeasures (such as decoys) limits their ability to defend against ballistic missiles. The GMD interceptors deployed at Fort Greely in central Alaska and at Vandenberg Air Force Base in California each consist of a three-stage rocket booster that carries a kill vehicle into space. The kill vehicle, which is intended to intercept above the atmosphere, carries its own fuel for maneuvering as well as an infrared sensor. The sensor is intended to guide the interceptor toward an object and allow it to home on and destroy the target by direct impact. If launched against satellites in low Earth orbit (LEO), the interceptor could use some of its fuel to reach out laterally over thousands of kilometers, allowing it to hit satellites in orbits that do not pass directly over the launch site. Thus even interceptors at a fixed ground site in Alaska could reach a large fraction of satellites in LEO. Similarly, the hit-to-kill intercept technology used by China for its January 2007 satellite destruction was apparently developed as a system that could be used either for ballistic missile defense or ASAT attacks. It is likely that China’s first ballistic missile defense test on January 11, 2010, used this same technology.25 In February 2008, the United States demonstrated the ASAT capability of its Aegis sea-based missile defense system: the Aegis SM-3 Block IA interceptor destroyed a nonresponsive U.S. satellite at an altitude of 240 kilometers (km). U.S. officials said this task required a modification of the missile defense software; however, other countries may assume that this change could readily be made again to give any Aegis interceptor the ability to intercept other satellites. Officials have also stated that the U.S. GMD and Terminal High Altitude Area Defense (THAAD) interceptors have similar capabilities.26 The current Aegis interceptor could reach only the relatively few satellites in orbits below 300 km to 400 km altitude, but the GMD interceptors and future Aegis interceptors would be able to reach satellites throughout LEO (see Figure 2). The demonstrated ASAT capability of the Aegis missile defense system poses additional challenges because the system is likely to be owned by other countries besides the United States. The Aegis system’s interceptor technology is being codeveloped and operated by Japan, and its sale to additional users, including several European countries as well as South Korea, is expected in the future.27 Consequently, the United States should review carefully its plans to sell this capability to other countries. The U.S. Airborne Laser (ABL)28 program is charged with creating a powerful aircraft-borne laser system that could be used to destroy missiles during their boost phase. A system that included a laser with enough power to damage missiles and the ability to focus the laser on a target moving at missile speeds would also be able to attack and damage lower-altitude satellites and their launchers. To be used against ballistic missiles, the aircraft would need to loiter in the adversary’s airspace to wait for the missile launches, and it would have to overcome countermeasures such as protective coatings on the missile body. Given such operational problems in using the ABL in a missile defense role, the system may actually be more useful in an ASAT role. However, a public pledge not to use missile defense systems against satellites would be an important statement of U.S. intent and would help to reinforce the norm against attacking satellites. Moreover, the decision not to test missile defenses in an ASAT mode would prevent this intrinsic capability from becoming an operationally tested one, thus limiting the confidence that military leaders would have in the system for ASAT use. There may be exceptional times when the use of such a capability is deemed important for public safety reasons, as some argued was the case when the United States destroyed its own satellite in February 2008 over stated concerns that it might survive reentry of Earth’s atmosphere and injure people on the ground. Under such circumstances, the country arguing for the ASAT use should consult and seek agreement with other space-faring nations before taking action, and then carry out the mission in as transparent a manner as possible. If another country were to test or use a missile defense system against a satellite, there could be strong pressure for the United States to drop its moratorium and conduct a similar test. However, doing so would undermine U.S. efforts to delegitimize such actions and could encourage other countries to conduct similar tests. Such U.S. action would also be unlikely to strengthen deterrence against the use of such a system against U.S. satellites, given that the United States already has a recognized intrinsic ASAT capability. A more productive course of action for the longer term would be for the United States to strengthen the norm against such actions—by leading the international condemnation of the act—while at the same time strengthening its satellite systems against interference. Step 4. Vigorously pursue a capability-preserving strategy and make satellites less attractive targets by reducing their vulnerabilities; building in redundancies; improving the capacity to rapidly reconstitute key functions; and developing air-, space-, or ground-based backup systems. Multilateral coordination, agreed-upon rules for operating in space, norms of behavior, and deterrence can all reduce risks to satellites. During a conflict, however, satellites’ great value could make them attractive targets for deliberate interference despite these protections. Because satellites are readily observed and their future positions can be predicted, they are intrinsically vulnerable to attack. But if smart planning becomes a central guiding principle for U.S. space policy, space cannot become the Achilles heel of the nation’s military. Moreover, an effective capability-preserving strategy will diminish the incentive for other countries to interfere with U.S. satellites in the first place. Useful approaches (discussed in more detail below) include: • Building key satellites with protections against interference • Embedding redundancy into satellite systems so that the failure or compromise of one component can be compensated for by another • Developing the capability to bypass damaged satellites or to rapidly replace them • Distributing a single satellite’s function among clusters of satellites • Reproducing lost satellite’s functions on a regional basis by using backup air- and ground-based systems. Smart Planning: Reducing the Vulnerability of Individual Satellites Individual satellites can be made less vulnerable to some types of interference, such as the jamming— whether intentional or accidental—of communication links between the satellite and the ground.29 Some protections are currently available; for example, communication channels of critical military satellites include sophisticated onboard electronic anti-jamming technology. Providers of commercial satellite communications services are being encouraged to adopt such protections too, in part because commercial satellites now carry a large fraction of U.S. military communications.30 Some cooperation already exists between the U. S. government, commercial and foreign-government satellite-service providers, and nongovernmental organizations, and it has fostered the development of measures that could help ensure the availability of secure satellite-based commercial communications channels.31 If jamming does occur, governmental and commercial services developed for this purpose can locate its source increasingly quickly. The United States may opt to resolve the problem through diplomatic initiatives or by disabling the jammers. Physical shutters or filters on satellite sensors can help limit damage from laser weapons, and electronic filters can protect against microwave attacks. Shielding can be added to protect sensitive parts of satellites against collisions with debris of up to about one centimeter in size. But because launch costs scale with satellite mass, such shielding is infrequently implemented. This could change if the danger from space debris increased or if the cost of shielding important satellites were government subsidized. Armoring satellites to survive collisions with significantly larger objects is not feasible. A frequently discussed scenario for attacking satellites is a nuclear weapon launched on a mediumrange ballistic missile and detonated at an altitude of a few hundred kilometers. Without sufficient shielding, satellites in the line of sight of a detonation would immediately sustain damage or ultimately cease to function from exposure to X-rays. Depending on the altitude of the detonation, such an attack could affect 5 to 10 percent of LEO satellites. The surviving LEO satellites would be exposed to radiation generated by high-energy electrons—by-products of the blast—that were trapped in Earth’s magnetic field. Damage incurred by cumulative exposure over the subsequent months could cause the onboard electronics to fail if the satellites were not sufficiently shielded. Radiation shielding can be incorporated, however, for about 2 to 3 percent of the cost of the satellite. Satellites such as NAVSTAR and military communications satellites, which operate in naturally occurring high-radiation environments, are routinely hardened against radiation, thereby demonstrating the possibility of effective shielding (Defense Threat Reduction Agency 2001). For other important satellites, the cost of shielding could also be seen as a reasonable investment. Space-based “bodyguard” weapons, which would be placed in orbit near a valuable satellite in order to intercept an approaching object, cannot provide reliable protection and their testing and deployment may generate additional problems. (See Appendix for details.) Smart Planning: Reducing the Vulnerability of Satellite Systems In addition to taking the kinds of useful steps outlined above, the United States should design systems and capabilities so that they cannot be impaired by attacks on individual satellites. In some cases, lost satellites can be bypassed or replaced. For example, to maintain service in the event of a transponder or satellite failure, commercial satellite operators routinely develop plans for rerouting communication traffic from the failed transponder or satellite to an operating one; or, in the most extreme cases, for moving a satellite that is on standby into the failed satellite’s position, as Iridium did after the 2009 collision that destroyed one of its communication satellites.32 Additionally, satellite constellations can be organized not just with mission performance in mind but also with an eye toward reducing both their vulnerability to attack and the impact of the loss of an individual satellite. The Global Positioning System NAVSTAR constellation is a good example of this kind of architecture.33 In the future, technological advances may reduce satellite systems’ vulnerability to disruption. Smaller (and less expensive) satellites are becoming more sophisticated, and for certain applications a cluster of small satellites may be able to provide capability similar to that of a large satellite in operation today. Distributing the capacity in this way could allow the owner to preserve capability despite the loss of one or a few satellites. Moreover, smaller satellites can be placed in orbit by smaller launch vehicles, which carry reduced launch costs and are able to launch satellites more quickly than large launchers. The promise of such rapid-response and affordable satellite launch has not yet been realized, however. Air- and ground-based backup systems could provide, on a regional basis, some of the militarily relevant and time-urgent capabilities that would be lost if a satellite system were disrupted or destroyed. Routing communications, relaying navigation signals, and collecting imagery can be usefully done from the air, and some communications and navigations tasks may be supported via ground-based assets such as ground-based navigation-signal repeaters and fiber-optic links. While it is often noted that United States has the most assets to lose in space, it also has the greatest ability to compensate for the loss of its satellites; the nation has the technological and economic resources to provide backup capability for its critical missions. A potential adversary should know not only that an attack on a satellite may not have a serious or lasting effect on U.S. capabilities but also that the attacker would still bear the consequences of such an action

## Case

### Debris

#### Squo solves debris – private tracking, surveillance, in-orbit servicing and green satellite tech all happening now – includes Starlink

CSTP 20 – OECD Committee, The strategic objectives of the Committee as defined in its Mandate and by the work priorities agreed by Member countries' Ministers responsible for science and technology provide the framework for the Secretariat's proposals for activities to be developed or initiated under the aegis of the Committee itself or its subsidiary bodies (NESTI, TIP, GSF, BNCT and IPSO) [This paper was approved and declassified by written procedure by the Committee for Scientific and Technological Policy (CSTP) on 11 March 2020 and prepared for publication by the OECD Secretariat, “SPACE SUSTAINABILITYTHE ECONOMICS OF SPACE DEBRIS IN PERSPECTIVE,” OECD Science, Technology and Industry Policy Papers, April 2020, No. 87, https://www.oecd-ilibrary.org/science-and-technology/space-sustainability\_a339de43-en]

An emerging “space debris economy”?

* Will we see a more intensive use of cubesats and miniaturised technologies in lower orbits? Cubesats have been the fastest-growing category of launched satellites in the last years and, when launched at lower altitudes, are naturally compliant with debris mitigation guidelines. They are also ever more performant and affordable, and dedicated launch opportunities become more widespread. Furthermore, they increasingly receive preferential treatment in risk-based national legislations (e.g. introduction of sliding scale in the UK Outer Space Act for insurance requirements).
* Space surveillance and tracking capabilities, in both GEO and LEO: New (private) sources of situational awareness data are becoming increasingly important, with data analytics and modelling fuelled by advances in digital technologies. Private sector debris catalogues and tracking capabilities for the geostationary orbit may now be almost as good as government capabilities (IDA, 2016[76]), while solutions for the low-earth orbit are emerging. Start-ups such as LeoLabs provide data and services based on low-cost ground equipment and sophisticated data analysis. The company, which in October 2019 had three radars in the United States and New Zealand, has developed a cloud-based “Space Regulatory and Sustainability Platform” for the New Zealand Space Agency, a first of its kind, destined to track objects launched from New Zealand to ensure compliance with permit conditions (MBIE, 2019[77]). A novel project called TruSat intends to use blockchain technology to crowdsource and validate satellite orbital positions worldwide via open source software (TruSat, 2019[78]). The US Air Force Research Laboratory has signed agreements with several commercial space situational awareness data providers (e.g. Numerica, LeoLabs, ExoAnalytics) to get access to sensor networks and algorithms (Numerica, 2019[79]). The Space Situational Awareness (SSA) open-architecture data-sharing platform under development by the US Department of Commerce, including data from different government agencies, is also expected to spur innovative value-added products and services.
* In-orbit servicing solutions: Several governmental agencies and commercial companies have developed, or are in the process of acquiring, some capabilities for in-orbit servicing (e.g. NASA, DARPA, ESA, JAXA). In-orbit servicing involves a number of complex operations in space: the servicing of space platforms (e.g. satellite, space station) to replenish consumables and degradables (e.g. propellants, batteries, solar array); replacing failed functionality; and/or enhancing the mission through software and hardware upgrades. This is a major challenge as, when on orbit, space platforms can move at speeds of several kilometres a minute. The first commercial in-orbit servicing mission was launched in 2019, by a MEV-1 spacecraft developed by Orbital ATK for an Intelsat geostationary satellite. The main short-term market is seen in the life extension of geostationary satellites, with some 300 potential candidates, at least in theory (Kennedy, 2018[80]). However, the key benefits of in-orbit servicing are expected in the future. Satellite design is currently heavily restricted by extreme launch conditions, but the possibility of servicing could enable a much more flexible and modular satellite design, able to take advantage of the latest advances in materials and electronics, beyond software upgrades (Jaffart, 2018[81]). Market forecasts estimate a USD 3 billion market for in-orbit servicing over the 2017-27 period, mainly driven by life extension services (Northern Sky Research, 2018[82]).
* Active debris removal solutions: Active debris removal is at a less mature technological level, but several firms are preparing demonstration missions (e.g. Astroscale in 2020). Potential candidates for removal include more than 200 critical debris objects (3-9 tonnes); mainly rocket bodies, but also the European Envisat satellite. JAXA, has formally launched a project to remove a large piece of debris by 2025 (a Japanese rocket body) in a public-private partnership (Japanese Delegation to UNCOPUOS, 2019[83]). Both Airbus and Thales Alenia Space are developing in-orbit servicing vehicles with debris removal functions, some of which have been tested on the RemoveDEBRIS mission (Surrey Space Centre, 2019[84]; OECD, 2019[11]).

• “Green” satellite design and technology: The demand for space-environment friendly satellite design is picking up. This includes features to reduce or avoid debris creation (explosion-safe batteries, deorbit technologies) and/or facilitating active removal (e.g. markers or grapple fixtures). One example is OneWeb, which is installing grapple fixtures on their satellites. In Europe, all future Sentinel satellites will be designed for demise. Affordable deorbit technologies are already being tested on orbit. Canada’s three-kilo CanX-7 satellite was launched in 2016 and is currently using its four 1 m2 drag sails to deorbit at a significantly faster rate than it would have without the sails. Amazon’s Kuiper constellation intends to use unpressurised and non-explosive propellant to mitigate accidental explosions, and satellites losing contact with ground control would automatically deactivate themselves, first by self-passivation and orbit-lowering, then depleting all energy reservoirs and switching off charging circuits (FCC, 2019[85]). SpaceX’ Starlink satellites are equipped with automated collision avoidance systems (although it is unclear which role the system played in the near-collision with the ESA Aeolus satellite).

A recent promising initiative is the “Space Sustainability Rating” scheme, originally conceived by teams from the MIT Media Lab, European Space Agency, and World Economic Forum. The initiative intends to be similar to the most widely used green building rating system in the construction industry, called the LEED certification for Leadership in Energy and Environmental Design. The objective is to promote mission designs and operational concepts that mitigate debris creation, and create a label that can encourage operators to behave more responsibly.

#### Starlink ACA systems and de-orbiting solves any debris impact – Russian ASAT test proves and also non-uniques their impact

Kan 21 – [Michael, “Starlink Satellite Orbits Changed to Avoid Debris After Russia's Missile Test,” PC Mag, 12/1/2021, https://www.pcmag.com/news/starlink-satellite-orbits-changed-to-avoid-debris-after-russias-missile]

SpaceX has altered the orbits for its Starlink satellites, likely to prevent them from colliding with debris from Russia’s anti-satellite missile test.

On Tuesday, SpaceX CEO Elon Musk mentioned the issue after NASA abruptly delayed a spacewalk on the International Space Station due to the threat of space debris. In his tweet, Musk said: “We had to shift some Starlink satellite orbits to reduce probability of collision. Not great, but not terrible either.”

Musk didn’t explicitly blame the space debris on Russia’s anti-satellite missile test. Nevertheless, the “Not great, but not terrible” quote may be a subtle jab at the Russian government. The same line is used in the HBO series Chernobyl, which dramatizes the 1986 nuclear plant disaster in the Soviet Union. (In the show, a nuclear plant worker utters the line “Not great, but not terrible,” when in reality the conditions at the facility are catastrophic.)

Last month, the US was quick to condemn Russia’s anti-satellite missile test, which involved the Kremlin sending up a missile to destroy one of its own defunct satellites. The ensuing impact caused hundreds of thousands of pieces of debris to spill out into orbit, according to the US.

Because space debris can travel up to 17,500 miles per hour, even a small artifact can cause serious damage if strikes a spacecraft or an astronaut. "Russia's dangerous and irresponsible behavior jeopardizes the long-term sustainability of outer space,” the US State Department said at the time.

However, Russia claims the resulting debris poses no danger to any space activity. The Kremlin also points out other countries have embarked on their own anti-satellite missile tests too.

To avoid space debris, SpaceX has equipped each Starlink satellite with an “autonomous collision avoidance” system. The same satellites will eventually descend and burn up in Earth’s atmosphere within one to five years if the propulsion system on board ever fails.

In his tweet, Musk added that the International Space Station and SpaceX’s own Dragon craft possess “micrometeorite shields,” which can withstand high-velocity impacts. However, spacesuits lack such protection, hence the need for NASA to cancel the spacewalk.

#### Low altitude orbits zeroes risk of collision and doesn’t contribute to overall debris in dense areas – even if satellites fail no impact

Grush 18 – [Loren, “SpaceX wants to fly some internet satellites closer to Earth to cut down on space trash,” 10/9/2018, <https://www.theverge.com/2018/11/9/18016962/spacex-internet-satellites-space-debris-trash-orbit-closer-earth-distance-atmosphere>]

SpaceX is revising its satellite internet initiative, Starlink, and it now hopes to operate some of its spacecraft at a lower altitude than originally planned. In a new filing to the Federal Communications Commission (FCC), SpaceX is asking the agency to modify its license so that more than 1,500 Starlink satellites can operate at an altitude 600 kilometers lower than the company originally requested.

SpaceX argues that this change will make the space environment safer, as it will be easier to get rid of these satellites at this new altitude when they run low on fuel or can no longer function properly in orbit. This update could also explain the unexpected behavior of two of SpaceX’s test satellites for Starlink, which have remained in lower orbits than expected.

Back in March, the FCC approved SpaceX’s license for the first phase of its ambitious Starlink initiative — the company’s long-term plan to launch nearly 12,000 satellites into orbit to beam internet coverage down to Earth. Initially, SpaceX asked the FCC for permission to launch 4,425 satellites into orbits ranging between 1,110 to 1,325 kilometers high. But with this new filing, SpaceX is requesting that 1,584 of those satellites, which were supposed to operate at 1,110 kilometers, be allowed to operate at 550 kilometers instead.

SpaceX says moving the satellites to a lower altitude means it can do more with less. Originally, the company said it needed 1,600 satellites to operate at the 1,110-kilometer altitude, but moving them lower means the company can get the same results with 16 fewer spacecraft. And the lower altitude makes it easy to dispose of these satellites once they’re done in space. At this height, particles from Earth’s atmosphere bombard the spacecraft more rapidly, pushing them out of orbit and dragging them down to the planet. And on the way down, they burn up in the atmosphere.

Making sure these spacecraft come out of orbit in a timely manner is crucial because of the vast number of vehicles that SpaceX wants to put into orbit. A constellation the size of Starlink could dramatically increase the number of operational satellites in space, raising the risk of in-space collisions. A recent NASA study argued that 99 percent of these satellites will need to be taken out of orbit, reliably, within five years of launch, or the risk of satellite collisions goes up quite a bit.

De-orbiting a satellite typically entails bringing the vehicle to a low enough altitude with thrusters where Earth’s air particles and gravity drag the probe down so that it burns up. Now, with this new filing, SpaceX won’t have to significantly move 1,584 of its satellites to get rid of them. The atmosphere at 550 kilometers should do the job within a few years. That’s also helpful in case the spacecraft fails in orbit. Satellites that fail in higher altitudes could turn into unoperational space debris that stay in orbit for long periods of time. At lower altitudes, they can still fail, and the atmosphere will still swallow them up in a timely manner.

#### Collision risk is infinitesimally small

Fange 17 Daniel Von Fange 17, Web Application Engineer, Founder and Owner of LeanCoder, Full Stack, Polyglot Web Developer, “Kessler Syndrome is Over Hyped”, 5/21/2017, http://braino.org/essays/kessler\_syndrome\_is\_over\_hyped/

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.

#### Uncertainty from debris collisions creates restraint not instability.

MacDonald 16, B., et al. "Crisis stability in space: China and other challenges." Foreign Policy Institute. Washington, DC (2016). (senior director of the Nonproliferation and Arms Control Project with the Center for Conflict Analysis and Prevention)//Elmer

In any crisis that threatens to escalate into major power conflict, political and military leaders will face uncertainty about the effectiveness of their plans and decisions. This uncertainty will be compounded when potential conflict extends to the space and cyber domains, where weapon effectiveness is largely untested and uncertain, infrastructure interdependencies are unclear, and damaging an adversary could also harm oneself or one’s allies. Unless the stakes become very high, no country will likely want to gamble its well-being in a “single cosmic throw of the dice,” in Harold Brown’s memorable phrase. 96 The novelty of space and cyber warfare, coupled with risk aversion and worst-case assessments, could lead space adversaries into a situation of what can be called “hysteresis,” where each adversary is restrained by its own uncertainty of success. This is conceptually shown in Figures 1 and 2 for offensive counter-space capabilities, though it applies more generally. 97 These graphs portray the hypothetical differences between perceived and actual performance capabilities of offensive counter-space weapons, on a scale from zero to one hundred percent effectiveness. Where uncertainty and risk aversion are absent for two adversaries, no difference would exist between the likely performance of their offensive counter-space assets and their confidence in the performance of those weapons: a simple, straight-line correlation would exist, as in Figure 1. The more interesting, and more realistic, case is notionally presented in Figure 2, which assumes for simplicity that the offensive capabilities of each adversary are comparable. In stark contrast to the case of Figure 1, uncertainty and risk aversion are present and become important factors. Given the high stakes involved in a possible large-scale attack against adversary space assets, a cautious adversary is more likely to be conservative in estimating the effectiveness of its offensive capabilities, while more generously assessing the capabilities of its adversary. Thus, if both side’s weapons were 50% effective and each side had a similar level of risk aversion, each may conservatively assess its own capabilities to be 30% effective and its adversary’s weapons to be 70% effective. Likewise, if each side’s weapons were 25% effective in reality, each would estimate its own capabilities to be less than 25% effective and its adversary’s to be more than 25% effective, and so on. In Figure 2, this difference appears, in oversimplified fashion, as a gap that represents the realistic worry that a country’s own weapons will under-perform while its adversary’s weapons will over-perform in terms of effectiveness. If both countries face comparable uncertainty and exhibit comparable risk aversion, each may be deterred from initiating an attack by its unwillingness to accept the necessary risks. This gap could represent an “island of stability,” as shown in Figure 2. In essence, given the enormous stakes involved in a major strike against the adversary’s space assets, a potential attacker will likely demonstrate some risk aversion, possessing less confidence in an attack’s effectiveness. It is uncertain how robust this hysteresis may prove to be, but the phenomenon may provide at least some stabilizing influence in a crisis. In the nuclear domain, the immediate, direct consequences of military use, including blast, fire, and direct radiation effects, were appreciated at the outset. Nonetheless, significant uncertainty and under-appreciation persisted with regard to the collateral, indirect, and climatological effects of using such weapons on a large scale. In contrast, the immediate, direct effects of major space conflict are not well understood, and potential indirect and interdependent effects are even less understood. Indirect effects of large-scale space and cyber warfare would be virtually impossible to confidently calculate, as the infrastructures such warfare would affect are constantly changing in design and technology. Added to this is a likely anxiety that if an attack were less successful than planned, a highly aggrieved and powerful adversary could retaliate in unanticipated ways, possibly with highly destructive consequences. As a result, two adversaries facing potential conflict may lack confidence both in the potential effectiveness of their own attacks and in the ineffectiveness of any subsequent retaliation. Such mutual uncertainty would ultimately be stabilizing, though probably not particularly robust. This is reflected in Figure 2, where each side shows more caution than the technical effectiveness of its systems may suggest. Each curve notionally represents one state’s confidence in its offensive counter-space effectiveness relative to their actual effectiveness. Until true space asset resilience becomes a trusted feature of space architectures, deterrence by risk aversion, and cross-domain deterrence, may be the only means for deterrence to function in space.

#### No Escalation over Satellites:

#### 1] Planning Priorities

Bowen 18 Bleddyn Bowen 2-20-2018 “The Art of Space Deterrence” <https://www.europeanleadershipnetwork.org/commentary/the-art-of-space-deterrence/> (Lecturer in International Relations at the University of Leicester)//Elmer

Space is often an afterthought or a miscellaneous ancillary in the grand strategic views of top-level decision-makers. A president may not care that one satellite may be lost or go dark; it may cause panic and Twitter-based hysteria for the space community, of course. But the terrestrial context and consequences, as well as the political stakes and symbolism of any exchange of hostilities in space matters more. The political and media dimension can magnify or minimise the perceived consequences of losing specific satellites out of all proportion to their actual strategic effect.

#### 2] Military Precedent

Zarybnisky 18, Eric J. Celestial Deterrence: Deterring Aggression in the Global Commons of Space. Naval War College Newport United States, 2018. (Senior Materiel Leader at United States Air Force)//Elmer

PREVENTING AGGRESSION IN SPACE While deterrence and the Cold War are strongly linked in the public’s mind through the nuclear standoff between the United States and the Soviet Union, the fundamentals of deterrence date back millennia and deterrence remains relevant. Thucydides alludes to the concept of deterrence in his telling of the Peloponnesian War when he describes rivals seeking advantages, such as recruiting allies, to dissuade an adversary from starting or expanding a conflict.6F 6 Aggression in space was successfully avoided during the Cold War because both sides viewed an attack on military satellites as highly escalatory, and such an action would likely result in general nuclear war.7F 7 In today’s more nuanced world, attacking satellites, including military satellites, does not necessarily result in nuclear war. For instance, foreign countries have used highpowered lasers against American intelligence-gathering satellites8F 8 and the United States has been reluctant to respond, let alone retaliate with nuclear weapons. This shift in policy is a result of the broader use of gray zone operations, to which countries struggle to respond while limiting escalation. Beginning with the fundamentals of deterrence illuminates how it applies to prevention of aggression in space.

### Asteroids

#### Megaconstillations not key – about observatories on earth but other telescopes in space aren’t blocked

#### Either the asteroids are small and not existential OR we’d have forever to prepare.

Martin Rees 18. Astronomer Royal, founded the Centre for the Study of Existential Risk, Fellow of Trinity College and Emeritus Professor of Cosmology and Astrophysics at the University of Cambridge. 10/16/2018. On the Future: Prospects for Humanity. Princeton University Press.

You may guess that, being an astronomer, anxiety about asteroid collisions keeps me awake at night. Not so. Indeed, this is one of the few threats that we can quantify— and be confident is unlikely. Every ten million years or so, a body a few kilometres across will hit the Earth, causing global catastrophe— so there are a few chances in a million that such an impact occurs within a human lifetime. There are larger numbers of smaller asteroids that could cause regional or local devastation. The 1908 Tunguska event, which flattened hundreds of square kilometres of (fortunately unpopulated) forests in Siberia, released energy equivalent to several hundred Hiroshima bombs. Can we be forewarned of these crash landings? The answer is yes. Plans are afoot to create a data set of the one million potential Earth- crossing asteroids larger than 50 metres and track their orbits precisely enough to identify those that might come dangerously close. With the forewarning of an impact, the most vulnerable areas could be evacuated. Even better news is that we could feasibly develop spacecraft that could protect us. A ‘nudge’, imparted in space several years before the threatened impact, would only need to change an asteroid’s velocity by a few centimetres per second to deflect it from a collision course with the Earth.

#### Newest research from NASA proves any threat is at least a thousand years away

Mack 19 (Eric, “NASA says city-smashing asteroids aren't so common,” 6-27, <https://www.cnet.com/news/nasa-says-city-smashing-asteroids-arent-so-common/>)

Asteroids are all around us, but we shouldn't be losing sleep over the big buggers. A small space rock was spotted just before slamming into the atmosphere last weekend, and over 20,000 near-earth asteroids have been cataloged, but new research from NASA finds impacts that could do serious damage aren't very frequent. Perhaps the last time an asteroid large enough to inflict serious hurt on a limited

part of the Earth's surface (we're not talking about an extinction-level space rock like the one that ended the dinosaurs) came knocking was in 1908. In June of that year, the so-called Tunguska Event impacted an unpopulated part of Siberia and was witnessed by only a handful of people, but it flattened 500,000 acres of forest, scorched the Earth and knocked people out of their chairs 40 miles away (64 km). It's easy and terrifying to imagine what the result might have been had chance dictated the impact occurred over a major metropolitan area instead. "Tunguska is the largest cosmic impact witnessed by modern humans," David Morrison, a planetary science researcher at NASA's Ames Research Center in Silicon Valley, said in a release. "It also is characteristic of the sort of impact we are likely to have to protect against in the future." But when researchers revisited the Tunguska Event with the help of computer models and tooked into account the latest data on the population of asteroids in our neighborhood, they found that such major impacts are exceedingly rare. The results, published in the journal Icarus, find that such a powerful impact should only be expected roughly every thousand years or longer rather than once every century or so, as was previously thought. While this is certainly good news for all earthly life forms, the threat of an asteroid impact is still very real and worth preparing for, as the 2013 bolide explosion over Russia reminded us. "A lot of uncertainty remains about how large asteroids break up in the atmosphere and how much damage they could cause on the ground," said NASA researcher and co-author Lorien Wheeler. "However, recent advancements in computational models, along with analyses of the Chelyabinsk and other meteor events, are helping to improve our understanding of these factors so that we can better evaluate potential asteroid threats in the future."

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### Ozone

#### Ozone Layer is increasing – flips U/Q.

Horton 21 Helena Horton 9-15-2021 "‘Larger than usual’: this year’s ozone layer hole bigger than Antarctica" <https://www.theguardian.com/environment/2021/sep/16/larger-than-usual-ozone-layer-hole-bigger-than-antarctica> (Environmental Journalist for the Guardian)//Elmer

The hole in the ozone layer that develops annually is “rather larger than usual” and is currently bigger than Antartica, say the scientists responsible for monitoring it. Researchers from the Copernicus Atmosphere Monitoring Service say that this year’s hole is growing quickly and is larger than 75% of ozone holes at this stage in the season since 1979. Ozone exists about seven to 25 miles (11-40km) above the Earth’s surface, in the stratosphere, and acts like a sunscreen for the planet, shielding it from ultraviolet radiation. Every year, a hole forms during the late winter of thesouthern hemisphere as the sun causes ozone-depleting reactions, which involve chemically active forms of chlorine and bromine derived from human-made compounds. In a statement Copernicus said that this year’s hole “has evolved into a rather larger than usual one”. Vincent-Henri Peuch, the service’s director, told the Guardian: “We cannot really say at this stage how the ozone hole will evolve. However, the hole of this year is remarkably similar to the one of 2020, which was among the deepest and the longest-lasting – it closed around Christmas – in our records since 1979.

#### No Ozone Impact.

Ridley 14 (Matthew White Ridley, BA and PhD in Zoology from Oxford. “THE OZONE HOLE WAS EXAGGERATED AS A PROBLEM,” *Rational Optimist*, 9/25/14, <http://www.rationaloptimist.com/blog/the-ozone-hole-was-exaggerated-as-a-problem.aspx>) dwc 19

Serial hyperbole does the environmental movement no favours My recent Times column argued that the alleged healing of the ozone layer is exaggerated, but so was the impact of the ozone hole over Antarctica: The ozone layer is healing. Or so said the news last week. Thanks to a treaty signed in Montreal in 1989 to get rid of refrigerant chemicals called chlorofluorocarbons (CFCs), the planet’s stratospheric sunscreen has at last begun thickening again. Planetary disaster has been averted by politics. For reasons I will explain, this news deserves to be taken with a large pinch of salt. You do not have to dig far to find evidence that the ozone hole was never nearly as dangerous as some people said, that it is not necessarily healing yet and that it might not have been caused mainly by CFCs anyway. The timing of the announcement was plainly political: it came on the 25th anniversary of the treaty, and just before a big United Nations climate conference in New York, the aim of which is to push for a climate treaty modelled on the ozone one. Here’s what was actually announced last week, in the words of a Nasa scientist, Paul Newman: “From 2000 to 2013, ozone levels climbed 4 per cent in the key mid-northern latitudes.” That’s a pretty small change and it is in the wrong place. The ozone thinning that worried everybody in the 1980s was over Antarctica. Over northern latitudes, ozone concentration has been falling by about 4 per cent each March before recovering. Over Antarctica, since 1980, the ozone concentration has fallen by 40 or 50 per cent each September before the sun rebuilds it. So what’s happening to the Antarctic ozone hole? Thanks to a diligent blogger named Anthony Watts, I came across a press release also from Nasa about nine months ago, which said: “ Two new studies show that signs of recovery are not yet present, and that temperature and winds are still driving any annual changes in ozone hole size.” As recently as 2006, Nasa announced, quoting Paul Newman again, that the Antarctic ozone hole that year was “the largest ever recorded”. The following year a paper in Nature magazine from Markus Rex, a German scientist, presented new evidence that suggested CFCs may be responsible for less than 40 per cent of ozone destruction anyway. Besides, nobody knows for sure how big the ozone hole was each spring before CFCs were invented. All we know is that it varies from year to year. How much damage did the ozone hole ever threaten to do anyway? It is fascinating to go back and read what the usual hyperventilating eco-exaggerators said about ozone thinning in the 1980s. As a result of the extra ultraviolet light coming through the Antarctic ozone hole, southernmost parts of Patagonia and New Zealand see about 12 per cent more UV light than expected. This means that the weak September sunshine, though it feels much the same, has the power to cause sunburn more like that of latitudes a few hundred miles north. Hardly Armageddon. The New York Times reported “an increase in Twilight Zone-type reports of sheep and rabbits with cataracts” in southern Chile. Not to be outdone, Al Gore wrote that “hunters now report finding blind rabbits; fisherman catch blind salmon”. Zoologists briefly blamed the near extinction of many amphibian species on thin ozone. Melanoma in people was also said to be on the rise as a result. This was nonsense. Frogs were dying out because of a fungal disease spread from Africa — nothing to do with ozone. Rabbits and fish blinded by a little extra sunlight proved to be as mythical as unicorns. An eye disease in Chilean sheep was happening outside the ozone-depleted zone and was caused by an infection called pinkeye — nothing to do with UV light. And melanoma incidence in people actually levelled out during the period when the ozone got thinner.