# Round 2-NDCA-1NC

## 1

#### Interpretation: Topical affirmatives must defend the appropriation of outer space

#### Outer space starts 372 miles above the surface of earth.

National Geographic No Date [National Geographic Society, "Atmosphere," <https://www.nationalgeographic.org/encyclopedia/atmosphere/>] Sachin

Earth’s atmosphere stretches from the surface of the planet up to as far as 10,000 kilometers (6,214 miles) above. After that, the atmosphere blends into space. Not all scientists agree where the actual upper boundary of the atmosphere is, but they can agree that the bulk of the atmosphere is located close to Earth’s surface—up to a distance of around eight to 15 kilometers (five to nine miles). While oxygen is necessary for most life on Earth, the majority of Earth’s atmosphere is not oxygen. Earth’s atmosphere is composed of about 78 percent nitrogen, 21 percent oxygen, 0.9 percent argon, and 0.1 percent other gases. Trace amounts of carbon dioxide, methane, water vapor, and neon are some of the other gases that make up the remaining 0.1 percent. The atmosphere is divided into five different layers, based on temperature. The layer closest to Earth’s surface is the troposphere, reaching from about seven and 15 kilometers (five to 10 miles) from the surface. The troposphere is thickest at the equator, and much thinner at the North and South Poles. The majority of the mass of the entire atmosphere is contained in the troposphere—between approximately 75 and 80 percent. Most of the water vapor in the atmosphere, along with dust and ash particles, are found in the troposphere—explaining why most of Earth’s clouds are located in this layer. Temperatures in the troposphere decrease with altitude. The stratosphere is the next layer up from Earth’s surface. It reaches from the top of the troposphere, which is called the tropopause, to an altitude of approximately 50 kilometers (30 miles). Temperatures in the stratosphere increase with altitude. A high concentration of ozone, a molecule composed of three atoms of oxygen, makes up the ozone layer of the stratosphere. This ozone absorbs some of the incoming solar radiation, shielding life on Earth from potentially harmful ultraviolet (UV) light, and is responsible for the temperature increase in altitude. The top of the stratosphere is called the stratopause. Above that is the mesosphere, which reaches as far as about 85 kilometers (53 miles) above Earth’s surface. Temperatures decrease in the mesosphere with altitude. In fact, the coldest temperatures in the atmosphere are near the top of the mesosphere—about -90°C (-130°F). The atmosphere is thin here, but still thick enough so that meteors will burn up as they pass through the mesosphere—creating what we see as “shooting stars.” The upper boundary of the mesosphere is called the mesopause. The thermosphere is located above the mesopause and reaches out to around 600 kilometers (372 miles). Not much is known about the thermosphere except that temperatures increase with altitude. Solar radiation makes the upper regions of the thermosphere very hot, reaching temperatures as high as 2,000°C (3,600°F). The uppermost layer, that blends with what is considered to be outer space, is the exosphere. The pull of Earth’s gravity is so small here that molecules of gas escape into outer space.

#### Starlink’s satelites reach 340 Miles above earth’s surface.

Mann 19, [Adam Mann, 5-24-2019, "Starlink: SpaceX's satellite internet project," Space, <https://www.space.com/spacex-starlink-satellites.html>] Sachin

The first 60 Starlink satellites were launched on May 23, 2019, aboard a SpaceX Falcon 9 rocket. The satellites successfully reached their operational altitude of 340 miles (550 kilometers) — low enough to get pulled down to Earth by atmospheric drag in a few years so that they don't become space junk once they die.

#### Violation: 340 miles is less than the 372 miles necessary to be considered outer space

#### Vote neg for limits and ground: the aff interpretation explodes the topic to allow any aff about space generally which structurally alters the neg research burden because there’s a qualitative difference between outer space and the atmosohere – kills core neg generics like space col bad and mining that don’t link if you specify a part of space

## 2

#### Interp – the Affirmative must only defend that appropriation of outer space is unjust.

#### Violation: They defend a whole lotta other stuff

#### Standards – Effects and Extra-T which are voters for predictable limits and ground – allowing the Aff to defend implementation through any number of agreements/mechanisms explodes predictable limits – it shifts the topic to not appropriation good/bad but how we should end it which skews pre-tournament prep.

## 3

#### Interpretation: the aff cannot specify a type of space appropriation

#### Bare plurals imply a generic “rules reading” in the context of moral statements

Cohen 1 — (Ariel Cohen, Professor of Linguistics @ Ben-Gurion University of the Negev, PhD Computational Linguistics from Carnegie Mellon University, “On the Generic Use of Indefinite Singulars”. Journal of Semantics 18: 183-209, Oxford University Press, 2001, accessed 12-7-20, HKR-AM) \*\*BP = bare plurals

According to the rules and regulations view, on the other hand, generic sentences do not get their truth or falsity as a consequence of properties of individual instances. Instead, generic sentences are evaluated with regard to rules and regulations, which are basic, irreducible entities in the world. Each generic sentence denotes a rule; if the rule is in effect, in some sense (different theories suggest different characterizations of what it means for a rule to be in effect), the sentence is true, otherwise it is false. The rule may be physical, biological, social, moral, etc. The paradigmatic cases for which this view seems readily applicable are sentences that refer to conventions, i.e. man-made, explicit rules and regulations, such as the following example (Carlson 1995: 225):

(40) Bishops move diagonally.

Carlson describes the two approaches as a dichotomy: one has to choose one or the other, but not both. One way to decide which approach to choose is to consider a case where the behavior of observed instances conflicts with an explicit rule. Indeed, Carlson discusses just such a case. He describes a supermarket where bananas sell for $0.49/lb, so that (41a) is true. One day, the manager decides to raise the price to $1.00/lb. Immediately after the price has changed, claims Carlson, sentence (41a) becomes false and sentence (41b) becomes true, although the overwhelming majority of sold bananas were sold for $0.49/lb.

(41) a. Bananas sell for $0.49/lb.

b. Bananas sell for $1.00/lb.

Consequently, Carlson reaches the conclusion that the rules and regulations approach is the correct one, whereas the inductivist view is wrong.

While I share Carlson’s judgements, I do not accept the conclusion he draws from them. Suppose the price has, indeed, changed, but the supermarket employs incompetent cashiers who consistently use the old price by mistake, so that customers are still charged $0.49/lb. In this case, I think there is a reading of (41a) which is true, and a reading of (41b) which is false. These readings are more salient if the sentence is modified by expressions such as actually or in fact:

(42) a. Bananas actually sell for $0.49/lb.

b. In fact, bananas sell for $1.00/lb.

BP generics, I claim, are ambiguous: on one reading they express a descriptive generalization, stating the way things are. Under the other reading, they carry a normative force, and require that things be a certain way. When they are used in the former sense, they should be analysed by some sort of inductivist account; when they are used in the latter sense, they ought to be analysed as referring to a rule or a regulation. The respective logical forms of the two readings are different; whereas the former reading involves, in some form or another, quantification, the latter has a simple predicate-argument structure: the argument is the rule or regulation, and the predicate holds of it just in case the rule is ‘in effect’.

#### Violation—they specified [what they spec]

#### Vote neg for predictable limits—specifying a type of appropriation offers a huge explosion in the topic since they get permutations of hundreds of appropriations. Limits explodes neg prep burden and draws un-reciprocal lines of debate, where the aff is always ahead.

#### Competing interps – reasonability is arbitrary and invites intervention

#### No RVI’s – Forces the 1NC to go all-in on Theory which kills substance education,

## 4

#### Commercial megaconstellations solve communication deserts and intel shortages – that’s key to military dominance and forward deployment in the Arc tic, East Asia, and Eastern Europe. Independently, it solves missile threats to precision strike systems.

Hallex and Cottom 20 — (Matthew A. Hallex, Research Staff Member at the Institute for Defense Analyses, Travis S. Cottom, a Research Associate at the Institute for Defense Analyses, “Proliferated Commercial Satellite Constellations: Implications for National Security”, JFQ 97, 2nd Quarter 2020, Available Online at <https://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-97/jfq-97_20-29_Hallex-Cottom.pdf?ver=2020-03-31-130614-940>, accessed 1-30-22, HKR-AM)

The emergence of proliferated constellations will lead to easier access to satellite communications, space imagery, and other capabilities that can support U.S. and adversary military operations in the ground, maritime, and air domains. Adapting to these changes will likely require the development of new joint operational concepts to better exploit space systems in support of the joint fight as well as address new force protection challenges when fighting space-enabled state and nonstate actors. Proliferated constellations will substantially increase the availability of communications bandwidth for military operations. These satellites would provide high bandwidth to forces with less latency than existing GEO satellites,32 which, in turn, would improve access to reachback communications to forward-deployed military forces, and would also help meet the growing demand for transfer capacity for data collected by unmanned systems and other forward sensors. Proliferated LEO communications constellations would also offer coverage in theaters that are poorly served by commercial satellite communications today. Satellites in GEO do not sufficiently support operations in the Arctic and other high-latitude regions that are growing in economic and national security importance.33 Similarly, naval and air forces operating in the Pacific theater have less access to commercial communications than other theaters due to the lack of commercial customers in the open ocean. Proliferated commercial LEO constellations would provide greater communications handling in both regions because of their global coverage. While unable to provide the high-resolution imagery and other specialized capabilities of existing national security satellites, proliferated LEO constellations could help to address some of the intelligence challenges the U.S. military faces. During the first Gulf War, the United States was unable to track and target Iraq’s Scud missile systems despite enjoying almost total air superiority. Since then, mobile missiles and other elusive targets have multiplied as potential adversaries seek to defeat U.S. conventional precision and nuclear strike systems. Imagery proliferated constellations could provide continuous or near-continuous coverage of missile operating areas to better enable the United States to find and eliminate these threat systems. The near continuous imagery coverage proliferated constellations offers—particularly if they include radar satellites that can see through clouds— combined with ground processing capabilities that can automatically detect changes in imagery would also make adversary deception operations less effective.34 Because the United States is likely to be on the defensive in the most worrying scenarios for conflict—such as defending allies in Eastern Europe or East Asia—these new capabilities will support U.S. efforts to detect adversary mobilization and to avoid operational surprise.

#### The US needs the private sector

Hallex and Cottom 20 — (Matthew A. Hallex, Research Staff Member at the Institute for Defense Analyses, Travis S. Cottom, a Research Associate at the Institute for Defense Analyses, “Proliferated Commercial Satellite Constellations: Implications for National Security”, JFQ 97, 2nd Quarter 2020, Available Online at <https://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-97/jfq-97_20-29_Hallex-Cottom.pdf?ver=2020-03-31-130614-940>, accessed 1-30-22, HKR-AM)

The U.S. Government has been the largest and most stable customer for commercial satellite imagery, including resources from new imagery proliferated constellations. For instance, a significant share of Planet’s growth has been through multiple contracts with the National Geospatial-Intelligence Agency.12 Commercial Earth observation companies, however, are seeking to diversify their customer base and reach new markets—to rely less on U.S. Government spending and, consequently, to potentially reduce its sway over commercial actors. With lower prices and increasingly on-demand imagery services, proliferated constellation companies are trying to focus on new, nontraditional satellite imagery markets: industrial monitoring, agriculture, utilities, marine transportation analytics, insurance, resource management, business intelligence, and other data-driven, decisionmaking practices.13 This broader range of services will help drive market expansion, and the Institute for Defense Analyses’ Science and Technology Policy Institute projects the overall commercial small satellite imaging market will grow from $15 million in 2015 to $164 million in 2020.14

#### China will launch public megaconstellations no matter what which thumps the aff BUT the US needs the private sector to stay in the game

Hallex and Cottom 20 — (Matthew A. Hallex, Research Staff Member at the Institute for Defense Analyses, Travis S. Cottom, a Research Associate at the Institute for Defense Analyses, “Proliferated Commercial Satellite Constellations: Implications for National Security”, JFQ 97, 2nd Quarter 2020, Available Online at <https://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-97/jfq-97_20-29_Hallex-Cottom.pdf?ver=2020-03-31-130614-940>, accessed 1-30-22, HKR-AM)

Interest in proliferated constellations is not confined to the United States and Western commercial space actors—both China and Russia are pursuing their own proliferated constellation projects. The development of foreign proliferated constellations will allow not only their owners to access these capabilities, but potentially access also to a wider range of actors. Given China’s willingness to allow for commercial dealings with countries hostile to the United States, these systems could pose a significant threat to U.S. interests. The state-owned China Aerospace Science and Technology Corporation (CASC) is planning the 300-satellite Hongyan LEO broadband communications proliferated constellation, and the state-owned China Aerospace Science and Industry Corporation plans its own 156-satellite Xingyun communications constellation. The first Hongyan satellite was launched in late 2018, and CASC has established a factory in Tianjin capable of producing 130 satellites a year. In 2015, China launched the first of its Jilin commercial imagery satellites to complement the Gaofen civil imagery constellation. The Jilin constellation is planned to reach 60 satellites by 2020 in order to provide global, 30-minute revisit rates, and then 138 satellites by 2030 to obtain 10-minute revisit rates worldwide.15

#### China will launch which takes out aff solvency, maintaining US dominance is key

Chaturvedi 1/29 (Amit Chaturvedi, [Hindustan Times, New Delhi, ], 1-29-2022, “China plans 'megaconstellation' of 13,000 satellites, claims report“, Hindustan Times, accessed: 1-30-2022, https://www.hindustantimes.com/world-news/china-plans-megaconstellation-of-13-000-satellites-claims-report-101643421318766.html) ajs

China is embarking on a mission that has renewed concerns about spying. It plans to send upto 13,000 satellites in space - a ‘megaconstellation’ - that will encircle the Earth in the lower orbit, a report in the Daily Mail said.

The company that has got the responsibility of this work has said that the main goal of the mission is to establish supremacy in lower Earth orbit, the report further said.

Strengthening of 5G network is the aim: China

China's State Administration of Science, Technology and Industry for National Defense (SASTIND) has called for orderly development of small satellites, according to the Daily Mail report.

It said that the group of satellites will be able to provide surveillance over much of the Earth and strengthen internet facilities.

#### That causes war

Hayes 18 [Peter Hayes, Nautilus Institute, Berkeley, California, USA; Center for International Security Studies, Sydney University. Trump and the Interregnum of American Nuclear Hegemony. November 8, 2018. <https://www.tandfonline.com/doi/full/10.1080/25751654.2018.1532525>]

During a **post-hegemonic era**, **long-standing** nuclear **alliances** are likely to be **replaced** by **ad hoc nuclear coalitions**, aligning and realigning around different congeries of threat and even actual **nuclear wars**, with **much higher levels** of **uncertainty** and unpredictability **than** was the case in the **nuclear hegemonic system**.

There are a number of ways that this dynamic could play out during the interregnum, and these dynamics are likely to be inconsistent and contradictory. In some instances, the sheer **momentum** of past policy combined with bureaucratic inertia and the potency of political, military service and corporate interests, may ensure that **residual aspects** of the formerly **hegemonic postures** are adhered to even as formal nuclear alliances rupture. Even as they **reach for** the **old anchors**, these states may be forced to adjust and retrench strategically, or start to **take** their own **nuclear risks** by making **increasingly explicit nuclear threats** and deployments against nuclear-armed adversaries – as **Japan** has begun to do with reference to its “technological deterrent” since about 2012.9 This period could last for many years **until and when** **nuclear war breaks out** and leads to a post-nuclear war disorder; or a new, post-hegemonic strategic framework is established to manage and/or abolish nuclear threat.

**Under** full-blown **American nuclear hegemony**, **fewer states** had **nuclear weapons**, the **major nuclear** weapons **states** entered into **legally binding restraints** on force levels and they learned from nuclear near-misses to **promulgate rules** of the road and tacit understandings. The lines drawn during full-blown collisions involving nuclear weapons were stark and concentrated the minds of leaders greatly. In a nuclear duel, it was clear that only one of two sides could fire first; the only question was which one. Now, with nine nuclear weapons states, and conflicts conceivably involving three, four or more of them, no matter how much leaders concentrate, it will not be evident who is aiming at who, who may fire first, and during a volley, who fired first and even who hit whom.

In a highly proliferated world, nuclear-armed states may feel driven to obtain larger nuclear forces able to deter multiple adversaries at the same time, sufficient to conduct not only a few nuclear attacks but configured to fight **more than one** protracted **nuclear war** **at a time**, especially in nuclear states torn apart by civil war and post-nuclear attack reconstruction. The first time nuclear weapons are used since 1945 will be shocking, the second time, less so, the third time, the **new normal**.

## 5

#### Private LEO mega constellations drive rapid SatCom 6G innovations – that’s key to pervasive communication services that solve medical data flow deficits and solve UN SGDs

Höyhtyä et al 22 Marko Höyhtyä, Senior Member, IEEE, Sandrine Boumard, Anastasia Yastrebova, Pertti Järvensivu, Markku Kiviranta, Senior Member, IEEE and Antti Anttonen, Senior Member, IEEE. "Sustainable Satellite Communications in the 6G Era: A European View for Multi-Layer Systems and Space Safety." arXiv preprint arXiv:2201.02408 (2022)

THE two main disruptions driving the development and rapid growth of satellite communications (SatCom) are increasing satellite constellations sizes and integration of satellite and terrestrial networks. The former also aims to provide broadband services to currently underserved areas with improved performance. The latter is related to the evolution of mobile networks where different wireless and wired technologies converge together. This creates vast amount of new opportunities in different application fields such as public safety, digital health, logistics and Internet services in developing countries. The annual space business related to 5th generation (5G) and 6th generation (6G) of communication systems is expected to grow to more than €500B during the next two decades [1]–[3]. This is more than the whole space business currently including scientific missions, earth observation (EO) and navigations. At the same time the whole space sector is in the transformation phase due to so called New Space Economy. Significant reduction of launch costs and easy and affordable access to space have attracted new innovative players to space business [4], [5]. Especially Low Earth Orbit (LEO) systems and small satellites are increasing rapidly. The most typical orbit heights are above 500 km but there are significant efforts to use also very low Earth orbits (vLEO) to provide sensing and communications services. The so called Karman line, defining where atmosphere ends and space begins, is above 80 km and orbiting objects can survive multiple perigees passages at altitudes around 80–90 km [6]. Small satellites in the range of 80-220 kg can be seen as a sweet spot [5] since they are large enough for payloads to support e.g. broadband communications [7]–[9] or synthetic aperture radar (SAR) imaging [10], [11]. A. Multi-Layer Networks 6G systems will be used to provide pervasive services worldwide in order to support both dense and less dense areas. To achieve this goal, 6G systems will need to integrate terrestrial, airborne (drones, high-altitude platforms (HAPs)) and satellite communications at different orbits [12], [13]. This means that in contrast to traditional research and development (R&D) work, network analysis, planning and optimization will be updated from two dimensions to three dimensions (3D), where also the heights of communications nodes are taken into consideration [12]–[15]. In this way, 6G networks will be able to provide drastically higher performance to support e.g., passengers in ships and airplanes. The initiatives spawned recently range from very high throughput geostationary orbit (GEO) systems to unmanned aerial vehicles (UAVs) [16]–[18] and small satellite systems dedicated to machine-to-machine (M2M) and Internet-of- things (IoT) services [19]–[21]. Especially interesting are mega-constellations consisting of hundreds to thousands of small and medium size satellites like those proprietary ones envisaged by OneWeb, Starlink, Orbcomm and Telesat to mention but a few. There is also ongoing active work in the 3rd Generation Partnership Project (3GPP) standardization to define non-terrestrial networks (NTN) with interoperable interfaces in order to have truly seamless connectivity in the future, described in detail in Section V.B. B. Space Safety and Sustainability There are not only technical drivers in the development of the multi-layer 6G networks. It is essential to develop services and technologies in a sustainable way in order to ensure high quality services also to coming generations. To mention a few examples: 1) According to International Telecommunication Union (ITU) only half of the world’s population has access to broadband services above 256 kbits/s currently [22]. 2) The COVID-19 pandemic has shown that video communications provide means for people and businesses, including medical professionals, and their patients to remain in virtual contact, avoiding the need for travel while remaining socially, professionally, and commercially active [23]. A comprehensive analysis to linkage between 6G and the United Nations Sustainable Development Goals (UN SDGs) from technological, business and regulation perspectives has been provided in [24], [25]. A very good overview on how European Space Agency (ESA) programs support SDGs is given in [26]. For instance, satellite communication technologies provide e-learning in Congo, tools for telemedicine and transmission of key medical data to and from remote locations, and means to gather and share data on arctic sea and climate conditions. Thus, it supports multitude of SDGs including good health and wellbeing, climate action, quality education, sustainable cities and communities, reduced inequalities, and life on land by helping to protect terrestrial ecosystems. Therefore, modern communication networks will be purposefully designed to be socially, economically and environmentally sustainable, and they will provide means to support equality globally. The main sustainability aspects are visualized in Figure 1. In the following, we list a couple of key points from the SatCom point of view.

#### 6G uniquely solves emerging biodisasters – extinction

**Su ’21** [Zhaohui; 2021; Center on Smart and Connected Health Technologies, Mays Cancer Center, School of Nursing, UT Health San Antonio; The Hong Kong Polytechnic University, “Addressing Biodisaster X Threats with Artificial Intelligence and 6G Technologies: Literature Review and Critical Insights,” https://arxiv.org/pdf/2105.08870.pdf]

A disaster can be defined as “a serious disruption of the functioning of a community or society involving widespread human, material, economic, or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources” [47]. Based on the contributing causes, disasters are usually categorized as **natural** (eg, **earthquakes**, infectious disease-inducing epidemics, or **pandemics** of natural origin) and **anthropogenic** (eg, armed **conflicts**, **nuclear accidents**, or the release of **pathogenic genetically modified organisms** from laboratory settings). In the context of this study, **biodisasters** are defined as disasters that occur as a result of **infectious** **pathogens** **with bioweapon potential**, which are unleashed by state or nonstate actors **accidentally** and **intentionally** (eg, the Japanese government’s controversial decision to dump Fukushima’s contaminated water into the boundless and borderless ocean shared by all life forms on earth, including humans and sharks [48]). In the context of biodisasters, a state actor often takes the form of a nation that deliberately and systematically designs and develops infectious pathogens with its national interest in mind. In contrast, a nonstate actor is an individual or group acting independently to obtain or manufacture a pathogen either owing to misguidance or malice. Of note, although existing multilateral agreements prohibit the production and use of bioweapons by state actors (termed biowarfare) [49], the presence of signed agreements **does not imply** that accidental or intentional development and release of pathogens by state actors **will not occur**. The concept of “bioterrorism,” defined as the deliberate release of pathogens that could cause illnesses and deaths in society, is not the focus of this study because “**bioterrorism**” entails both deliberation and malice (eg, to elicit terror to the public) [50]; antecedents **may not necessarily apply** to Biodisaster X threats. Insights from behavioral science [51-53] and evidence regarding individual-caused mass casualty events (eg, indiscriminate mass shootings) [54-56] suggest that individual actors’ behaviors, potentially leading to the onset of Biodisaster X, may or may not include conscious deliberation to harm. In other words, while it is possible that individual actors’ malicious actions might cause **some** biodisasters, it is also possible that some individual-caused biodisasters are **accidental**. Furthermore, the term bioterrorism is **limited**, in that “**terror**” is the main outcome. We believe that for Biodisaster X, which could **upend lives**, **livelihoods**, and **economies**, “**disaster**” is a more appropriate description that sheds light on the **scale** and **severity** of its consequences and is more diverse than “terror.” Drawing insight from real-world examples, similar to the prevalent ransomware hacks, it is possible that state or individual actors could develop and utilize infectious pathogens as “ransomgens” for financial gain rather than merely aiming to generate terror in society. Therefore, under the current research context, we adopted the term “biodisaster” instead of “bioterrorism.” Furthermore, considering that various studies have discussed approaches to address state actor–initiated biodisasters [57-61], this study focuses on biodisasters that are infectious in nature, caused by individual actors, and can result in catastrophic human and economic consequences. Biodisaster X vs Disease X The risk of biodisasters, such as Biodisaster X, is **increasing** **in likelihood**: advances in technology, particularly the **availability** and **maturity** of **biotech**nology, have grown **considerably** in recent years. Inadvertently, these advances may resemble those of **Oppenheimer** [62] in facilitating the release of destructive factors. One example of the misuse of biotechnology is a microbiologist, vaccinologist, and senior biodefense researcher who worked at the United States Army Medical Research Institute of Infectious Diseases, who allegedly engineered the 2001 anthrax attacks [63-65]. While the scale of the 2001 **anthrax** attacks was minor, it demonstrated how **easily** biodisasters can occur and how **unprepared** society was for these events. As seen in the lack of **adequate preparation** and **coherent responses** to infectious disease–induced **pandemics**, including **COVID**-19 [66-69], Biodisaster X’s effects may be **compounded** to the same, if not greater, degree by **incompetence** across international, national, and regional agencies and organizations. The concept of Biodisaster X can be best understood in contrast with Disease X. In terms of similarities, both Biodisaster X and Disease X are driven by pathogens unknown to humans and have the potential to cause crippling effects on society. Furthermore, based on previous inadequacies in response to emergency events including pandemics [66-74], the world at large may be ill-prepared for both Biodisaster X and Disease X. In terms of unique attributes, compared to Disease X, Biodisaster X is more likely to have the following characteristics: (1) having a pathogen directly affiliated to a laboratory; (2) having distinctive and engineered attributes tailored by the capabilities and intentions of the developer; and (3) the origin, development, and history can be definitively ascertained upon identification of the developer, which is not possible for naturally occurring pathogens (eg, the 1918 influenza pandemic), where there is always uncertainty regarding the origin and evolutionary history of the disaster [75-77]. The Imperative of Preparing for Biodisaster X Some of the **deadliest** **pandemics**—the most recent ones ranging from AIDS, severe acute respiratory syndrome, Middle East respiratory syndrome, Ebola, and COVID-19—all have zoonotic origins [78]. Studies have further shown that for viruses that can transmit from animals to humans, especially those that can infect a diverse range of host species, the transmission speeds are **substantially amplified** once human-to-human transmission is established, and the diseases can **quickly evolve** into **global pandemics** [79]. Consequently, once a pathogen is transmissible within a population, there is a **low access threshold**: an individual actor can “obtain” these deadly pathogens **without** the need for **advanced laboratory skills** or **extensive financial resources**. However, costs to physical and mental health may reveal a counternarrative. Based on available evidence, it is difficult to determine whether an individual can be a malicious “patient zero”; an individual who intentionally contracts a novel virus intending to cause infectious disease outbreaks in a society [80]. It is not impossible to purposely study and capture known or unknown deadly pathogens that can trigger infectious diseases; microbial surveys are commonly conducted to identify novel pathogens before they pose a threat to public health [81-84]. In theory, there could be individual actors, with adequate knowledge or experience (similar to the microbiologist allegedly behind the 2011 anthrax attacks [63-65]), who may take the same actions but with different motives, ranging from scientific curiosity to ill-guided intentions. Considering the **rich biodiversity** of wildlife, along with the large number of “**missing viruses**” and “missing **zoonoses**” that remain unidentified [85], close contacts with latent deadly pathogens are **nearly impossible** to control, which in turn, renders it challenging to locate or identify individual actors who might utilize them. Advances in **synthetic biology** may further compound the situation, especially considering the scholarly endeavors using pathogens in laboratory settings, which could amount to the level of real-world pandemics (eg, laboratory-cultured viruses such as smallpox [86-88]). The likelihood of Biodisaster X increases in proportion to these factors. Overall, considering the species diversity of wildlife, the unknown factors related to the scale and severity of viruses in animals, which have the latent potential to infect humans, and the varying degrees of competency of community health centers in detecting infectious disease outbreaks in a bottom-up manner, it could be tremendously difficult for health experts and government officials to monitor potentially emerging Biodisaster X threats. However, not all hope is lost. Technology-based solutions, especially those utilizing AI and 6G technologies, can help address these issues. The Need for Advanced Technology Solutions for Monitoring and Managing Biodisaster X The Need for Technology-Based Solutions Once Biodisaster X becomes a reality, human contact will drive transmission and become the primary fuel for exacerbating infections and deaths caused by the disaster. As seen during the COVID-19 pandemic, owing to virus spread and subsequent public health policies (eg, lockdowns), many **critical** **societal** **functions** could be **substantially** **disrupted**. The potential to **control** and **contain** human and economic **consequences** of Biodisaster X, such as the functionality of the health care systems (eg, infected health care professionals) [89-91], may also become **critically undermined**. In these circumstances, **tech**nology-based solutions could be the **key** to addressing these crises, as they are different from conventional solutions; they are **not** **highly** **dependent** on physical interactions and transportation. Overall, technology-based solutions require **limited** human resources (eg, with the ability to operate without human input), can be delivered **independent** of physical human contact (eg, web-based and remote deployment), and are **immune** to

## Case

#### Starlink is a service that’s contracted out to public entities so no private appropriation is involved – their own ev – we read blue

Bernat 19 “The Inevitability of Militarization of Outer Space” Paweł Bernat [Assistant Professor, Polish Air Force University] Safety & Defense 5(1) (2019) 49–54 <https://philarchive.org/archive/BERTIO-52> SM

Another example is the mentioned already Starlink system that will provide broadband internet for the Northern US and parts of Canada already in 2020, and the plan is to create the global system before 2027 (Mosher, 2019). Again, the system, although designed for civil purposes, will be used by the military – the US Air Force is testing SpaceX’s Starlink technology in military aircraft to deliver high bandwidth into the cockpit of Air Force planes under a program called Global Lightning (Malik, 2019). The facts are straightforward – there are more and more satellite systems that play an essential role in countries’ security and are part of critical infrastructure, so in order to secure their interests and protect that infrastructure, these national states keep developing both defensive and offensive means. The Worldwide Threat Assessment of the US Intelligence Community is very clear in its predictions in this regard:

#### 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.

#### No miscalc from satellite disruptions or ASAT attacks – empirically denied

Mazur 12 [Jonathan Mazur, Manager Engineering at Northrop Grumman, writing in Space & Defense, from the Eisenhower Center for Space and Defense Studies. Past U.S. Actions: Redlines in Space. Space & Defense, Volume 6, Number 1, Fall 2012. https://inss.ndu.edu/Portals/97/Space\_and\_Defense\_6\_1.pdf?ver=2018-09-06-135424-147]

U.S. Reactions To Foreign Disruption Of U.S. Capabilities

In the 1970s, it was suspected that a U.S. maritime communications satellite was turned off by the Soviets when it was outside of the range of U.S. tracking stations.25 There does not appear to be any documented U.S. reaction, and I suspect there was none. In the mid-1990s, satellite hackers in Brazil began hijacking U.S. military communication satellite signals to broadcast their own information, though it took until 2009 for Brazil to crack down on the illegal activity with the support of the DoD.26 In 1998, a U.S.-German satellite known as ROSAT was rendered useless after it turned suddenly toward the sun. NASA investigators later determined the accident was possibly linked to a cyber-intrusion by Russia.

The fallout? Though there was an ongoing criminal investigation as of 2008; NASA security officials have seemed determined to publicly minimize the seriousness of the threat.27 In 2003, a signal originating from Cuba—later determined to be coming from Iranian embassy property— was jamming a U.S. communications satellite that was transmitting Voice of America programming over Iran, which was publicly referred to as an “act of war” by a U.S. official. 28 Press reporting indicates the U.S. administration was [frozen]“paralyzed” about how to cope with the jamming that continued for at least a month, even after U.S. diplomatic protests to Cuba.29 In 2005, U.S. diplomats protested to the Libyan government after two international satellites were illegally jammed disrupting American diplomatic, military, and FBI communications.30 In 2006, press reporting indicates that China hit a U.S. spy satellite with a ground-based laser. This action was acknowledged by the then director of the NRO, though the DoD remained tight lipped about the incident.31

“We’re at a point where the technology’s out there, and the capability for people to do things to our satellites is there. I’m focused on it beyond any single event.” – Air Force Space Command Commander, General Chilton, 2006 32

In 2009, a U.S. commercial Iridium communications satellite—extensively used by the DoD—was accidently destroyed by a collision with a dead Russian satellite.33 The U.S. company, Iridium, was able to minimize any loss of service by implementing a network solution within a few days.34 As of early 2011, no legal action had been taken by the company either because it is not clear who was at fault or because it might be politically problematic for the United States, which is trying to enter into bi-lateral transparency and confidence-building measures (TCBM) with Russia regarding space activities.35 Since August of 2010, North Korea has been intermittently using GPS jamming equipment, which reportedly has been interfering with U.S. and South Korean military operations and civilian use south of the North Korean border.36 Reportedly, only South Korea and the United Nations International Telecommunications Union—at the request of South Korea—have issued letters to Pyongyang demanding the cessation of disruptive communications signals in South Korea.37

It appears that the only time the U.S. military has responded with force to a disruption in U.S. space capabilities was in 2003, a few days after the start of the Iraq war.38 According to U.S. officials, Iraq was using multiple GPS jammers—which supposedly did not affect military GPS functionality. However, the U.S. military bombed the jammers anyway after a diplomatic complaint to Russia.39 The use of military force against the GPS jamming threat was possibly because the United States was already intervening in Iraq, and the bombing probably would not have occurred if the United States was not at war.

#### Sat attacks don’t cause nuke war

Zarybnisky 18 [Eric J. Zarybnisky, MA in National Security Studies from the Naval War College, PhD in Operations Research from the MIT Sloan School of Management, Lt Col, USAF. Celestial Deterrence: Deterring Aggression in the Global Commons of Space. March 28, 2018. <https://apps.dtic.mil/dtic/tr/fulltext/u2/1062004.pdf>]

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.

#### No impact and not anthro

Ridley 8/17/12 [Matt Ridley, columnist for The Wall Street Journal and author of *The Rational Optimist: How Prosperity Evolves,* “Apocalypse Not: Here’s Why You Shouldn’t Worry About End Times,” <http://www.wired.com/wiredscience/2012/08/ff_apocalypsenot/all/>]

The threat to the ozone layer came next. In the 1970s scientists discovered a decline in the concentration of ozone over Antarctica during several springs, and the Armageddon megaphone was dusted off yet again. The blame was pinned on chlorofluorocarbons, used in refrigerators and aerosol cans, reacting with sunlight. The disappearance of frogs and an alleged rise of melanoma in people were both attributed to ozone depletion. So too was a supposed rash of blindness in animals: Al Gore wrote in 1992 about blind salmon and rabbits, while The New York Times reported “an increase in Twilight Zone-type reports of sheep and rabbits with cataracts” in Patagonia. But all these accounts proved incorrect.