# 1NC

### 1-T Appropriation

#### “Appropriation of outer space” is exclusive and permanent

TIMOTHY JUSTIN TRAPP, JD Candidate @ UIUC Law, ’13 quoting Smith 92, TAKING UP SPACE BY ANY OTHER MEANS: COMING TO TERMS WITH THE NONAPPROPRIATION ARTICLE OF THE OUTER SPACE TREATY UNIVERSITY OF ILLINOIS LAW REVIEW [Vol. 2013 No. 4]

The issues presented in relation to the nonappropriation article of the Outer Space Treaty should be clear.214 The ITU has, quite blatantly, created something akin to “property interests in outer space.”215 It allows nations to exclude others from their orbital slots, even when the nation is not currently using that slot.216 This is directly in line with at least one definition of outer-space appropriation.217 [\*\*Start Footnote 217\*\*Id. at 236 (“Appropriation of outer space, therefore, is ‘the exercise of exclusive control or exclusive use’ with a sense of permanence, which limits other nations’ access to it.”) (quoting Milton L. Smith, The Role of the ITU in the Development of Space Law, 17 ANNALS AIR & SPACE L. 157, 165 (1992)). \*\*End Footnote 217\*\*]The ITU even allows nations with unused slots to devise them to other entities, creating a market for the property rights set up by this regulation.218 In some aspects, this seems to effect exactly what those signatory nations of the Bogotá Declaration were trying to accomplish, albeit through different means.219

#### Violation: the removal of satellites isn’t the appropriation of space because they don’t own the space. They just do things in space, which is distinct.

#### “Appropriation” refers to the taking of property for exclusive and permanent use

Gorove 69 [Stephen, Chairman of the Graduate Program of the School of Law and Professor of Law, Ole Miss] “Interpreting Article II of the Outer Space Treaty”, Fordham Law Review, Vol. 37 Issue 3, <https://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=1966&context=flr>, 1969 RE

With respect to the concept of appropriation the basic question is what constitutes "appropriation," as used in the Treaty, especially in contradistinction to casual or temporary use. The term "appropriation" is used most frequently to denote the taking of property for one's own or exclusive use with a sense of permanence. Under such interpretation the establishment of a permanent settlement or the carrying out of commercial activities by nationals of a country on a celestial body may constitute national appropriation if the activities take place under the supreme authority (sovereignty) of the state. Short of this, if the state wields no exclusive authority or jurisdiction in relation to the area in question, the answer would seem to be in the negative, unless, the nationals also use their individual appropriations as cover-ups for their state's activities.5 In this connection, it should be emphasized that the word "appropriation" indicates a taking which involves something more than just a casual use. Thus a temporary occupation of a landing site or other area, just like the temporary or nonexclusive use of property, would not constitute appropriation. By the same token, any use involving consumption or taking with intention of keeping for one's own exclusive use would amount to appropriation.

#### Prefer:

#### 1] Precision--analogous treaties prove

Wrench 19 [John, JD Candidate at Case Western, BA from Pace University] “Non-Appropriation, No Problem: The Outer Space Treaty Is Ready for Asteroid Mining,” Case Western Reserve Journal of International Law, Vol. 51 Issue 1, <https://scholarlycommons.law.case.edu/cgi/viewcontent.cgi?article=2546&context=jil>, 2019 RE

Although the OST does not provide a comprehensive guideline for resource extraction in outer space, its foundational logic provides a workable distinction between ownership and use. This part explores three property regimes developed under the same fundamental constraints as the non-appropriation principle: the United Nations Convention on the Law of the Sea (“UNCLOS”), the Antarctica Treaty System, and the prior appropriation doctrine as applied in United States water law.63 Under each regime, parties may establish some form of ownership in extracted resources despite being restricted from claiming sovereignty over the underlying land.

#### Consensus of the literature votes neg—means our interp is most predictable

Tronchetti 10 [Fabio, Co-Director of the Institute of Space Law and Strategy and as a Zhuoyue Associate Professor at Beihang University, PhD in International Space Law from Leiden University] “The Moon Agreement in the 21st Century: Addressing its Potential Role in the Era of Commercial Exploitation of the Natural Resources of the Moon and Other Celestial Bodies,” Journal of Space Law, Vol. 36 No. 2, Winter 2010, <https://airandspace.confit.dev/pdfs/jsl-36-2.pdf> RE

A key issue, which is not directly addressed by the Treaty and which is of fundamental relevance for the present discussion, concerns the use of outer space resources. In this respect, the main question is whether or not the prohibition on appropriation of outer space is also applicable to its resources. No clear-cut answer can be provided based on the current legal framework. While some authors express the view that the restriction in Article II applies equally to outer space and its resources,28 others, the majority, argue that by analogy with the rules regulating the freedom of the high seas,29 the appropriation of space resources merely forms part of the freedom of exploration and use of outer space.30 This paper shares the opinion of the second group of authors.

#### 2] limits and ground: expanding the topic beyond appropriation allows for affs about any miniscule use of space resources which decimates links to generics which are based on property rights in space and results in a litany of small affirmatives that cause a race to the margins

# Biz Con DA

#### Bizcon high now – hiring is up and covid is down

Rosenberg, 11/5/2021 (Eli Rosenberg, “U.S. economy added 531,000 jobs in October as hiring swelled again,” Washington Post, https://www.washingtonpost.com/business/2021/11/05/october-jobs-report-unemployment/)

The nation added 531,000 jobs in **October**, a strong month of growth that **showed an economy gaining new momentum** in the final months of the year after being slowed by the coronavirus’s surge in the late summer. The **unemployment** rate **dropped**, too, to 4.6 percent from 4.8 percent. It is still up from its pre-pandemic low of 3.5 percent in February 2020 but down significantly from January of this year, when it was at 6.3 percent. The new surge in hiring comes **amid** a spate of **other strong economic news**. The major U.S. **stock indexes have climbed to record levels**. The number of **new coronavirus cases has fallen** markedly in recent weeks, **leading to more optimism among businesses** and households. This is **helping push wages** higher, another trend that reflects a growing sense of optimism about the direction of the economy.

#### AND, holiday spending up despite inflation – boosts confidence

AlJazeera 11/16 – [“Despite higher prices, US consumers keep spending up a storm,” https://www.aljazeera.com/economy/2021/11/16/despite-higher-prices-us-consumers-keep-spending-up-a-storm]

Inflation in the United States may have surged to a 30-year high in October, but that didn’t stop consumers from spending up a storm last month as Americans got a jump start on the holiday shopping season.

Sales at retail stores, online and at restaurants in the world’s largest economy increased 1.7 percent in October compared to the previous month, the US Department of Commerce said on Tuesday. That was the biggest gain since March and marked the third straight month of rising retail sales.

Compared to the same period last year, retail and food services sales advanced 15.4 percent in October.

Supply chain snarls as well as shortages of raw materials and workers have been raising prices this year for US businesses, which in turn have been passing those higher costs on to American consumers.

Last month, US consumer prices jumped a blistering 6.2 percent from the same period a year ago, the US Department of Labor said, marking the sharpest acceleration in consumer prices in three decades.

That matters tremendously to the health of the US economy because consumer spending drives two-thirds of the nation’s growth. And some are concerned that mounting inflation could downshift the engine of the US economy.

Consumers tend to spend more when they feel more confident about the outlook for the economy and their own financial prospects. Rising inflation and the perception that not enough is being done to contain it helped drive US consumer confidence to a 10-year low in November, the University of Michigan said in its latest survey.

But with US households still flush with more than $2.5 trillion in savings amassed during the coronavirus pandemic, Americans managed to spend at a faster clip than expected in October.

“An improving Covid situation, easing supply constraints in the auto sector and an early start to holiday shopping all boosted purchases last month,” said Oxford Economics Chief US Economist Gregory Daco in a client note. “Households were still willing to open their wallets in the face of higher prices – which inflated nominal sales figures – but there is increasing evidence that higher inflation is eroding purchasing power.”

While more affluent households have a bigger income cushion to absorb inflation, low-income households are being hit especially hard. Consumers can respond to higher prices by delaying purchases of non-essential items, but there is no putting off shelling out for essentials like food on the table, gasoline, heating, and a roof overhead.

Food spending alone gobbled up 27 percent of household budgets for the lowest-income Americans last year, according to the US Department of Agriculture.

One way consumers can react to higher prices for essentials is to substitute purchases for lower-cost options.

The nation’s – and the world’s- largest retailer, Walmart, known for its bargain prices, said on Tuesday that its online sales and sales at its US stores opened at least a year increased 9.2 percent in its third quarter ending October 29, even though its costs had climbed. The retailing giant also said it grabbed a bigger share of the US grocery market and that more shoppers are returning to its stores.

Even though consumers are searching for bargains to weather the inflation storm, analysts still see the economic recovery staying on track, thanks to climbing wages, an improving jobs market, and declining COVID-19 infections and restrictions.

“As the economy heads into 2022, an improving health situation should reinvigorate consumer confidence while a strengthening jobs recovery and strong wage gains should support income growth,” said Daco.

#### The plan crushes an entire industry – wrecks business confidence and causes collapse

Weinzierl and Sarang 21 - \* Joseph and Jacqueline Elbling Professor of Business Administration at HBS and a Research Associate at the NBER. His research and teaching focus on the design of economic policy and the economics and business of space, \*\*Research Associate at Harvard Business School and the Lunar Exploration Projects Lead for the MIT Space Exploration Initiative [Matt, Mehak, “The Commercial Space Age Is Here,” 2/12/2021, Harvard Business Review, <https://hbr.org/2021/02/the-commercial-space-age-is-here>]

There’s no shortage of hype surrounding the commercial space industry. But while tech leaders promise us moon bases and settlements on Mars, the space economy has thus far remained distinctly local — at least in a cosmic sense. Last year, however, we crossed an important threshold: For the first time in human history, humans accessed space via a vehicle built and owned not by any government, but by a private corporation with its sights set on affordable space settlement. It was the first significant step towards building an economy both in space and for space. The implications — for business, policy, and society at large — are hard to overstate.

In 2019, 95% of the estimated $366 billion in revenue earned in the space sector was from the space-for-earth economy: that is, goods or services produced in space for use on earth. The space-for-earth economy includes telecommunications and internet infrastructure, earth observation capabilities, national security satellites, and more. This economy is booming, and though research shows that it faces the challenges of overcrowding and monopolization that tend to arise whenever companies compete for a scarce natural resource, projections for its future are optimistic. Decreasing costs for launch and space hardware in general have enticed new entrants into this market, and companies in a variety of industries have already begun leveraging satellite technology and access to space to drive innovation and efficiency in their earthbound products and services.

In contrast, the space-for-space economy — that is, goods and services produced in space for use in space, such as mining the Moon or asteroids for material with which to construct in-space habitats or supply refueling depots — has struggled to get off the ground. As far back as the 1970s, research commissioned by NASA predicted the rise of a space-based economy that would supply the demands of hundreds, thousands, even millions of humans living in space, dwarfing the space-for-earth economy (and, eventually, the entire terrestrial economy as well). The realization of such a vision would change how all of us do business, live our lives, and govern our societies — but to date, we’ve never even had more than 13 people in space at one time, leaving that dream as little more than science fiction.

Today, however, there is reason to think that we may finally be reaching the first stages of a true space-for-space economy. SpaceX’s recent achievements (in cooperation with NASA), as well as upcoming efforts by Boeing, Blue Origin, and Virgin Galactic to put people in space sustainably and at scale, mark the opening of a new chapter of spaceflight led by private firms. These firms have both the intention and capability to bring private citizens to space as passengers, tourists, and — eventually — settlers, opening the door for businesses to start meeting the demand those people create over the next several decades with an array of space-for-space goods and services.

#### Unpredictable shifts ruin biz con AND overall growth

Sarah Chaney Cambon 21, Reporter on The Wall Street Journal's Economics Team, BA in Business Journalism from the University of North Carolina-Chapel Hill, “Capital-Spending Surge Further Lifts Economic Recovery”, Wall Street Journal, 6/27/2021, https://www.wsj.com/articles/capital-spending-surge-further-lifts-economic-recovery-11624798800

Business investment is emerging as a powerful source of U.S. economic growth that will likely help sustain the recovery.

Companies are ramping up orders for computers, machinery and software as they grow more confident in the outlook.

Nonresidential fixed investment, a proxy for business spending, rose at a seasonally adjusted annual rate of 11.7% in the first quarter, led by growth in software and tech-equipment spending, according to the Commerce Department. Business investment also logged double-digit gains in the third and fourth quarters last year after falling during pandemic-related shutdowns. It is now higher than its pre-pandemic peak.

Orders for nondefense capital goods excluding aircraft, another measure for business investment, are near the highest levels for records tracing back to the 1990s, separate Commerce Department figures show.

“Business investment has really been an important engine powering the U.S. economic recovery,” said Robert Rosener, senior U.S. economist at Morgan Stanley. “In our outlook for the economy, it’s certainly one of the bright spots.”

Consumer spending, which accounts for about two-thirds of economic output, is driving the early stages of the recovery. Americans, flush with savings and government stimulus checks, are spending more on goods and services, which they shunned for much of the pandemic.

Robust capital investment will be key to ensuring that the recovery maintains strength after the spending boost from fiscal stimulus and business reopenings eventually fades, according to some economists.

Rising business investment helps fuel economic output. It also lifts worker productivity, or output per hour. That metric grew at a sluggish pace throughout the last economic expansion but is now showing signs of resurgence.

The recovery in business investment is shaping up to be much stronger than in the years following the 2007-09 recession. “The events especially in late ’08, early ’09 put a lot of businesses really close to the edge,” said Phil Suttle, founder of Suttle Economics. “I think a lot of them said, ‘We’ve just got to be really cautious for a long while.’”

Businesses appear to be less risk-averse now, he said.

After the financial crisis, businesses grew by adding workers, rather than investing in capital. Hiring was more attractive than capital spending because labor was abundant and relatively cheap. Now the supply of workers is tight. Companies are raising pay to lure employees. As a result, many firms have more incentive to grow by investing in capital.

Economists at Morgan Stanley predict that U.S. capital spending will rise to 116% of prerecession levels after three years. By comparison, investment took 10 years to reach those levels once the 2007-09 recession hit.

Company executives are increasingly confident in the economy’s trajectory. The Business Roundtable’s economic-outlook index—a composite of large companies’ plans for hiring and spending, as well as sales projections—increased by nine points in the second quarter to 116, just below 2018’s record high, according to a survey conducted between May 25 and June 9. In the second quarter, the share of companies planning to boost capital investment increased to 59% from 57% in the first.

“We’re seeing really strong reopening demand, and a lot of times capital investment follows that,” said Joe Song, senior U.S. economist at BofA Securities.

Mr. Song added that less uncertainty regarding trade tensions between the U.S. and China should further underpin business confidence and investment. “At the very least, businesses will understand the strategy that the Biden administration is trying to follow and will be able to plan around that,” he said.

#### Decline cascades---nuclear war

Dr. Mathew Maavak 21, PhD in Risk Foresight from the Universiti Teknologi Malaysia, External Researcher (PLATBIDAFO) at the Kazimieras Simonavicius University, Expert and Regular Commentator on Risk-Related Geostrategic Issues at the Russian International Affairs Council, “Horizon 2030: Will Emerging Risks Unravel Our Global Systems?”, Salus Journal – The Australian Journal for Law Enforcement, Security and Intelligence Professionals, Volume 9, Number 1, p. 2-8

Various scholars and institutions regard global social instability as the greatest threat facing this decade. The catalyst has been postulated to be a Second Great Depression which, in turn, will have profound implications for global security and national integrity. This paper, written from a broad systems perspective, illustrates how emerging risks are getting more complex and intertwined; blurring boundaries between the economic, environmental, geopolitical, societal and technological taxonomy used by the World Economic Forum for its annual global risk forecasts. Tight couplings in our global systems have also enabled risks accrued in one area to snowball into a full-blown crisis elsewhere. The COVID-19 pandemic and its socioeconomic fallouts exemplify this systemic chain-reaction. Onceinexorable forces of globalization are rupturing as the current global system can no longer be sustained due to poor governance and runaway wealth fractionation. The coronavirus pandemic is also enabling Big Tech to expropriate the levers of governments and mass communications worldwide. This paper concludes by highlighting how this development poses a dilemma for security professionals.

Key Words: Global Systems, Emergence, VUCA, COVID-9, Social Instability, Big Tech, Great Reset

INTRODUCTION

The new decade is witnessing rising volatility across global systems. Pick any random “system” today and chart out its trajectory: Are our education systems becoming more robust and affordable? What about food security? Are our healthcare systems improving? Are our pension systems sound? Wherever one looks, there are dark clouds gathering on a global horizon marked by volatility, uncertainty, complexity and ambiguity (VUCA).

But what exactly is a global system? Our planet itself is an autonomous and selfsustaining mega-system, marked by periodic cycles and elemental vagaries. Human activities within however are not system isolates as our banking, utility, farming, healthcare and retail sectors etc. are increasingly entwined. Risks accrued in one system may cascade into an unforeseen crisis within and/or without (Choo, Smith & McCusker, 2007). Scholars call this phenomenon “emergence”; one where the behaviour of intersecting systems is determined by complex and largely invisible interactions at the substratum (Goldstein, 1999; Holland, 1998).

The ongoing COVID-19 pandemic is a case in point. While experts remain divided over the source and morphology of the virus, the contagion has ramified into a global health crisis and supply chain nightmare. It is also tilting the geopolitical balance. China is the largest exporter of intermediate products, and had generated nearly 20% of global imports in 2015 alone (Cousin, 2020). The pharmaceutical sector is particularly vulnerable. Nearly “85% of medicines in the U.S. strategic national stockpile” sources components from China (Owens, 2020).

An initial run on respiratory masks has now been eclipsed by rowdy queues at supermarkets and the bankruptcy of small businesses. The entire global population – save for major pockets such as Sweden, Belarus, Taiwan and Japan – have been subjected to cyclical lockdowns and quarantines. Never before in history have humans faced such a systemic, borderless calamity.

COVID-19 represents a classic emergent crisis that necessitates real-time response and adaptivity in a real-time world, particularly since the global Just-in-Time (JIT) production and delivery system serves as both an enabler and vector for transboundary risks. From a systems thinking perspective, emerging risk management should therefore address a whole spectrum of activity across the economic, environmental, geopolitical, societal and technological (EEGST) taxonomy. Every emerging threat can be slotted into this taxonomy – a reason why it is used by the World Economic Forum (WEF) for its annual global risk exercises (Maavak, 2019a). As traditional forces of globalization unravel, security professionals should take cognizance of emerging threats through a systems thinking approach.

METHODOLOGY

An EEGST sectional breakdown was adopted to illustrate a sampling of extreme risks facing the world for the 2020-2030 decade. The transcendental quality of emerging risks, as outlined on Figure 1, below, was primarily informed by the following pillars of systems thinking (Rickards, 2020):

• Diminishing diversity (or increasing homogeneity) of actors in the global system (Boli & Thomas, 1997; Meyer, 2000; Young et al, 2006);

• Interconnections in the global system (Homer-Dixon et al, 2015; Lee & Preston, 2012);

• Interactions of actors, events and components in the global system (Buldyrev et al, 2010; Bashan et al, 2013; Homer-Dixon et al, 2015); and

• Adaptive qualities in particular systems (Bodin & Norberg, 2005; Scheffer et al, 2012) Since scholastic material on this topic remains somewhat inchoate, this paper buttresses many of its contentions through secondary (i.e. news/institutional) sources.

ECONOMY

According to Professor Stanislaw Drozdz (2018) of the Polish Academy of Sciences, “a global financial crash of a previously unprecedented scale is highly probable” by the mid- 2020s. This will lead to a trickle-down meltdown, impacting all areas of human activity.

The economist John Mauldin (2018) similarly warns that the “2020s might be the worst decade in US history” and may lead to a Second Great Depression. Other forecasts are equally alarming. According to the International Institute of Finance, global debt may have surpassed $255 trillion by 2020 (IIF, 2019). Yet another study revealed that global debts and liabilities amounted to a staggering $2.5 quadrillion (Ausman, 2018). The reader should note that these figures were tabulated before the COVID-19 outbreak.

The IMF singles out widening income inequality as the trigger for the next Great Depression (Georgieva, 2020). The wealthiest 1% now own more than twice as much wealth as 6.9 billion people (Coffey et al, 2020) and this chasm is widening with each passing month. COVID-19 had, in fact, boosted global billionaire wealth to an unprecedented $10.2 trillion by July 2020 (UBS-PWC, 2020). Global GDP, worth $88 trillion in 2019, may have contracted by 5.2% in 2020 (World Bank, 2020).

As the Greek historian Plutarch warned in the 1st century AD: “An imbalance between rich and poor is the oldest and most fatal ailment of all republics” (Mauldin, 2014). The stability of a society, as Aristotle argued even earlier, depends on a robust middle element or middle class. At the rate the global middle class is facing catastrophic debt and unemployment levels, widespread social disaffection may morph into outright anarchy (Maavak, 2012; DCDC, 2007).

Economic stressors, in transcendent VUCA fashion, may also induce radical geopolitical realignments. Bullions now carry more weight than NATO’s security guarantees in Eastern Europe. After Poland repatriated 100 tons of gold from the Bank of England in 2019, Slovakia, Serbia and Hungary quickly followed suit.

According to former Slovak Premier Robert Fico, this erosion in regional trust was based on historical precedents – in particular the 1938 Munich Agreement which ceded Czechoslovakia’s Sudetenland to Nazi Germany. As Fico reiterated (Dudik & Tomek, 2019):

“You can hardly trust even the closest allies after the Munich Agreement… I guarantee that if something happens, we won’t see a single gram of this (offshore-held) gold. Let’s do it (repatriation) as quickly as possible.” (Parenthesis added by author).

President Aleksandar Vucic of Serbia (a non-NATO nation) justified his central bank’s gold-repatriation program by hinting at economic headwinds ahead: “We see in which direction the crisis in the world is moving” (Dudik & Tomek, 2019). Indeed, with two global Titanics – the United States and China – set on a collision course with a quadrillions-denominated iceberg in the middle, and a viral outbreak on its tip, the seismic ripples will be felt far, wide and for a considerable period.

A reality check is nonetheless needed here: Can additional bullions realistically circumvallate the economies of 80 million plus peoples in these Eastern European nations, worth a collective $1.8 trillion by purchasing power parity? Gold however is a potent psychological symbol as it represents national sovereignty and economic reassurance in a potentially hyperinflationary world. The portents are clear: The current global economic system will be weakened by rising nationalism and autarkic demands. Much uncertainty remains ahead. Mauldin (2018) proposes the introduction of Old Testament-style debt jubilees to facilitate gradual national recoveries. The World Economic Forum, on the other hand, has long proposed a “Great Reset” by 2030; a socialist utopia where “you’ll own nothing and you’ll be happy” (WEF, 2016).

In the final analysis, COVID-19 is not the root cause of the current global economic turmoil; it is merely an accelerant to a burning house of cards that was left smouldering since the 2008 Great Recession (Maavak, 2020a). We also see how the four main pillars of systems thinking (diversity, interconnectivity, interactivity and “adaptivity”) form the mise en scene in a VUCA decade.

ENVIRONMENTAL

What happens to the environment when our economies implode? Think of a debt-laden workforce at sensitive nuclear and chemical plants, along with a concomitant surge in industrial accidents? Economic stressors, workforce demoralization and rampant profiteering – rather than manmade climate change – arguably pose the biggest threats to the environment. In a WEF report, Buehler et al (2017) made the following pre-COVID-19 observation:

The ILO estimates that the annual cost to the global economy from accidents and work-related diseases alone is a staggering $3 trillion. Moreover, a recent report suggests the world’s 3.2 billion workers are increasingly unwell, with the vast majority facing significant economic insecurity: 77% work in part-time, temporary, “vulnerable” or unpaid jobs.

Shouldn’t this phenomenon be better categorized as a societal or economic risk rather than an environmental one? In line with the systems thinking approach, however, global risks can no longer be boxed into a taxonomical silo. Frazzled workforces may precipitate another Bhopal (1984), Chernobyl (1986), Deepwater Horizon (2010) or Flint water crisis (2014). These disasters were notably not the result of manmade climate change. Neither was the Fukushima nuclear disaster (2011) nor the Indian Ocean tsunami (2004). Indeed, the combustion of a long-overlooked cargo of 2,750 tonnes of ammonium nitrate had nearly levelled the city of Beirut, Lebanon, on Aug 4 2020. The explosion left 204 dead; 7,500 injured; US$15 billion in property damages; and an estimated 300,000 people homeless (Urbina, 2020). The environmental costs have yet to be adequately tabulated.

Environmental disasters are more attributable to Black Swan events, systems breakdowns and corporate greed rather than to mundane human activity.

Our JIT world aggravates the cascading potential of risks (Korowicz, 2012). Production and delivery delays, caused by the COVID-19 outbreak, will eventually require industrial overcompensation. This will further stress senior executives, workers, machines and a variety of computerized systems. The trickle-down effects will likely include substandard products, contaminated food and a general lowering in health and safety standards (Maavak, 2019a). Unpaid or demoralized sanitation workers may also resort to indiscriminate waste dumping. Many cities across the United States (and elsewhere in the world) are no longer recycling wastes due to prohibitive costs in the global corona-economy (Liacko, 2021).

Even in good times, strict protocols on waste disposals were routinely ignored. While Sweden championed the global climate change narrative, its clothing flagship H&M was busy covering up toxic effluences disgorged by vendors along the Citarum River in Java, Indonesia. As a result, countless children among 14 million Indonesians straddling the “world’s most polluted river” began to suffer from dermatitis, intestinal problems, developmental disorders, renal failure, chronic bronchitis and cancer (DW, 2020). It is also in cauldrons like the Citarum River where pathogens may mutate with emergent ramifications.

On an equally alarming note, depressed economic conditions have traditionally provided a waste disposal boon for organized crime elements. Throughout 1980s, the Calabriabased ‘Ndrangheta mafia – in collusion with governments in Europe and North America – began to dump radioactive wastes along the coast of Somalia. Reeling from pollution and revenue loss, Somali fisherman eventually resorted to mass piracy (Knaup, 2008).

The coast of Somalia is now a maritime hotspot, and exemplifies an entwined form of economic-environmental-geopolitical-societal emergence. In a VUCA world, indiscriminate waste dumping can unexpectedly morph into a Black Hawk Down incident. The laws of unintended consequences are governed by actors, interconnections, interactions and adaptations in a system under study – as outlined in the methodology section.

Environmentally-devastating industrial sabotages – whether by disgruntled workers, industrial competitors, ideological maniacs or terrorist groups – cannot be discounted in a VUCA world. Immiserated societies, in stark defiance of climate change diktats, may resort to dirty coal plants and wood stoves for survival. Interlinked ecosystems, particularly water resources, may be hijacked by nationalist sentiments. The environmental fallouts of critical infrastructure (CI) breakdowns loom like a Sword of Damocles over this decade.

GEOPOLITICAL

The primary catalyst behind WWII was the Great Depression. Since history often repeats itself, expect familiar bogeymen to reappear in societies roiling with impoverishment and ideological clefts. Anti-Semitism – a societal risk on its own – may reach alarming proportions in the West (Reuters, 2019), possibly forcing Israel to undertake reprisal operations inside allied nations. If that happens, how will affected nations react? Will security resources be reallocated to protect certain minorities (or the Top 1%) while larger segments of society are exposed to restive forces? Balloon effects like these present a classic VUCA problematic.

Contemporary geopolitical risks include a possible Iran-Israel war; US-China military confrontation over Taiwan or the South China Sea; North Korean proliferation of nuclear and missile technologies; an India-Pakistan nuclear war; an Iranian closure of the Straits of Hormuz; fundamentalist-driven implosion in the Islamic world; or a nuclear confrontation between NATO and Russia. Fears that the Jan 3 2020 assassination of Iranian Maj. Gen. Qasem Soleimani might lead to WWIII were grossly overblown. From a systems perspective, the killing of Soleimani did not fundamentally change the actor-interconnection-interaction adaptivity equation in the Middle East. Soleimani was simply a cog who got replaced.

# AT Case

### AT Debris Cascades-1NC

#### No cascades:

#### Space is too big for frequent collisions---debris is spread widely across multiple huge planes and small objects quickly deorbit, clearing space. It’d take centuries to snowball, but adaptation solves first: intervening controls coming online check debris.

#### Amounts will increase only 30% after 200 years, assuming zero mitigation

Hugh Lewis 15, Senior Lecturer in Aerospace Engineering at the University of Southampton, Member of the UK Space Agency delegation to the Inter-Agency Space Debris Coordination Committee and Member of the UK delegation to the United Nations Committee on the Peaceful Uses of Outer Space, “Space Debris, Kessler Syndrome, and The Unreasonable Expectation of Certainty”, ROOM The Space Journal, Issue #3(5), October, https://room.eu.com/article/Space\_debris\_Kessler\_Syndrome\_and\_the\_unreasonable\_expectation\_of\_certainty

There is now widespread awareness of the space debris problem amongst policymakers, scientists, engineers and the public. Thanks to pivotal work by J.C. Liou and Nicholas Johnson in 2006 we now understand that the continued growth of the debris population is likely in the future even if all launch activity is halted. The reason for this sustained growth, and for the concern of many satellite operators who are forced to act to protect their assets, are collisions that are expected to occur between objects – satellites and rocket stages – already in orbit. In spite of several commentators warning that these collisions are just the start of a collision cascade that will render access to low Earth orbit all but impossible – a process commonly referred to as the ‘Kessler Syndrome’ after the debris scientist Donald Kessler – the reality is not likely to be on the scale of these predictions or the events depicted in the film Gravity. Indeed, results presented by the Inter-Agency Space Debris Coordination Committee (IADC) at the Sixth European Conference on Space Debris show an expected increase in the debris population of only 30% after 200 years with continued launch activity.

Collisions are still predicted to occur, but this is far from the catastrophic scenario feared by some. Constraining the population increase to a modest level can be achieved, the IADC suggested, through widespread and good compliance with existing space debris mitigation guidelines, especially those relating to passivation (whereby all sources of stored energy on a satellite are depleted at the end of its mission) and post-mission disposal, such as de-orbiting the satellite or re-orbiting it to a graveyard orbit. Nevertheless, the anticipated growth of the debris population in spite of these robust efforts merits the investigation of additional measures to address the debris threat, according to the IADC.

#### Collisions are unlikely because all debris is moving in the same direction, at the same speed

Michael McClennen 18, Research Informaticist in the Department of Geoscience at the University of Wisconsin-Madison, “With So Many Satellites and Space Junk Floating Around the Earth, How Is It That There Are Not Very Many of Them Colliding With One Another or Crashing Into The Space Station or Even New Ships Sent Into Space?”, Quora, 10/10/2018, https://www.quora.com/With-so-many-satellites-and-space-junk-floating-around-the-earth-how-is-it-that-there-are-not-very-many-of-them-colliding-with-one-another-or-crashing-into-the-space-station-or-even-new-ships-sent-into-space

In addition to the other answers, there is another very important factor. A large majority of the orbiting objects (both satellites and debris) are all going in roughly the same direction around Earth, in the same direction as Earth’s rotation with an orbital inclination of between 0º and 22º with respect to the equator. This is due primarily to the fact that launching due East is more efficient than launching in any other direction, and allows you to use the least amount of fuel in getting your payload to orbit. In addition, the laws of physics mandate that all of the objects at a given orbital altitude are moving at roughly the same speed. These basic facts substantially lower the chances of collision. As these objects all move around the globe, they are roughly keeping station with respect to most of the other objects at the same altitude.

There is, of course, another group of satellites and debris that are moving in polar orbits, which are roughly perpendicular to the the mostly-equatorial orbits I discussed in the previous paragraph. These satellites and most of their associated debris were deliberately placed into orbit at a different range of altitudes from the equatorially-orbiting satellites, specifically so that the two populations of objects would not crash into each other.

So it is not the case that the tracks of orbiting objects randomly cross in all directions. Rather the ones at any given altitude are (mostly) moving in the same direction and at roughly the same speed. This has helped quite a bit to keep the orbital-debris situation tolerable so far.

#### Kessler recanted

Dr. Alice Gorman 14, Professor of Archeology at Flinders University and Adjunct Fellow at the Research School of Astronomy and Astrophysics at the Australian National University, “Robot Avatars: The Material Culture of Human Activity in Earth Orbit” in Archaeology and Heritage of the Human Movement into Space, Ed. O’Leary and Capelotti, p. 42

At the same time as this proposed evolution of orbital objects, entropy may be on the verge of taking over the system. The so-called Kessler Syndrome is an emergence that could occur in the near future. In popular (and occasionally scien- tific) contexts, the Kessler Syndrome is the worst case scenario for space junk: a cascade of random collisions that create so much debris the Earth is enveloped and cut off from space. When Fengyun 1C was destroyed, many feared it would be the ‘tipping point’ into the cascade. However, this conception is not strictly accurate.

The Kessler Syndrome derives from an early paper by Kessler and Cour-Palais (1978), in which they argued that a situation could arise in which “the debris flux will increase exponentially with lime, even though a zero net input may be main- tained” (Kessler et al. 2010: 47). The idea of such a cascade derives from planetary formation, where collisions cause the lowering of inclination and the eventual formation of a ring or belt around a celestial body. However, LEO debris collisions are highly unlikely to behave like other planetary rings, as the smaller particles will be removed by atmospheric drag before that point. While Kessler et al. (2010) argue that the orbital debris situation is indeed critical, they stop short of endorsing the irreversible negative feedback version of the Syndrome.

#### It’ll take decades

Donald J. Kessler 10, Retired Senior Scientist for Orbital Debris Research at NASA/JSC, Nicholas L. Johnson, Chief Scientist for Orbital Debris Research, Orbital Debris Program Office, NASA Johnson Space Center, and J.-C. Liou, Lead Scientist for In-Situ Measurements, Orbital Debris Program Office, and Mark Matney, Lead Scientist for Modeling, Orbital Debris Program Office, NASA Johnson Space Center, “The Kessler Syndrome: Implications to Future Space Operations”, 33rd Annual AAS Guidance and Control Conference, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.394.6767&rep=rep1&type=pdf2/10/2010,

INTRODUCTION

Since the beginning of the space program through the 1970’s, it was generally believed that NORAD was tracking all man-made objects in Earth orbit and that the catalogued objects represented the major collision threat to other operational spacecraft. In 1978, Kessler and Cour-Palais published the paper Collision Frequency of Artificial Satellites: The Creation of a Debris Belt.1 The paper concluded that if the past growth rate in the catalogued population continued, around the year 2000 a more hazardous population of small debris would be generated as a result of fragments from random collisions between cataloged objects. This new source of debris would quickly produce a hazard that exceeds the hazard from natural meteoroids, and over a longer period of time the growth in small debris would become exponential, even if a zero net input rate in the catalogue is maintained. Shortly after the publication, John Gabbard from NORAD (known for his “Gabbard Plot”), introduced the term “Kessler Syndrome” to describe the future collisional cascading described in the paper. Over the years, the term has developed definitions from the press that are not necessarily consistent with the paper or Mr. Gabbard’s intent.

A segment of the Japanese animated TV series Planetes,2 set in the year 2075, is an example of a popular definition of the Kessler Syndrome that includes both factual and exaggerated components. While an episode appropriately defines the Kessler Syndrome as the cascading of fragments from collisions breaking up other intact objects at an increasing rate, it goes on to say that, once initiated, “…. billions of other pieces [would be generated] in a very short time [and] the Earth would be surrounded by debris …. completely cut off from space.” In general, collisional cascading is a slow process, but very much depends on the population density and size of the objects in orbit. Current population densities would require decades to produce a significant change in the small debris environment, and much longer to approach a condition where the Earth might be “completely cut off from space”. However, it is conceivable that some ill-planned rapid expansion in the use of low Earth orbit could produce a much more rapid increase in small debris as a result of collisional cascading.

#### Modelling proves

Lawrence M. Wein 9, Jeffrey S. Skoll Professor of Management Science at Stanford University and Senior Fellow at Stanford’s Center for International Security and Cooperation, former DEC Leaders for Manufacturing Professor of Management Science at MIT, and Andrew M. Bradley, PhD-Institute for Computational and Mathematical Engineering at Stanford University, Space Debris: Assessing Risk and Responsibility, Advances in Space Research 43 (2009) 1372–1390

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

In summary, in the absence of the removal of large objects from space, the sustainable lifetime risks in Figs. 3–5 do not appear to be obviously above or below a tolerable level. Even if these risks are deemed acceptable, it is prudent to invest in research and development for space remediation technologies, which is a topic of current study (Proposal for forming an IAA study group, 2000). However, given the optimality of full deorbit compliance from a societal, sustainable perspective, and the sensitivity of sustainable lifetime risk to postmission deorbit compliance, the primary focus for policymakers should be on increasing compliance, which leads us to a discussion of economic instruments that could be used to address this issue.

#### This accounts for future launches

Jakub Drmola 18, Division of Security and Strategic Studies, Department of Political Science at the Faculty of Social Sciences of Masaryk University. Tomas Hubik, Department of Theoretical Computer Science and Mathematical Logic, Faculty of Mathematics and Physics, Charles University. Kessler Syndrome: System Dynamics Model. Space Policy Volumes 44–45, August 2018, Pages 29-39. https://www.sciencedirect.com/science/article/pii/S0265964617300966?via%3Dihub

The baseline scenario represents a continuation of the current trends, which are simply extended into the future. An average 1% growth rate of yearly launches of new satellites (starting at 89) is assumed, together with constant success rate in satellites’ ability to actively avoid collisions with debris and other satellites, constant lifetime, and failure rate. This basic model lacks any sudden events or major policy changes that would markedly influence the debris propagation. However, it serves both as a foundation for all the following scenarios and as a basis of comparison to see what the impact would be.

Given high uncertainty regarding future state of the satellite industry (how many satellites will be launched per year, of what type and size, etc.), we elected to limit our simulations to 50 years. The model can certainly continue beyond this point, but the associated unknowns make the simulations progressively less useful.

Running this model for its full 50 years (2016–2066) yields the expected result of perpetually growing amount of debris in the LEO. One can observe nearly 2-fold increase in the large debris (over 10 cm) and 3-fold increase in small debris (less than 1 cm) quantities (Fig. 5). The oscillations visible in the graph are caused by the aforementioned solar cycles which influence the rate of reentry for all simulated populations except the still active (i.e. powered) satellites. Also please note that throughout the article, the graphs use quite different scales for debris populations because of the considerable variations between scenarios. Using any single scale for all graphs would render some of them unintelligible.

We can see that this increase in numbers still does not result in realization of the Kessler syndrome as most of the satellites being launched remain intact for their full expected service life. However, it comes with a considerable increase in risk to satellites, which is manifested by their higher yearly losses, making satellites operations riskier and more expensive for governments and private companies alike. This increased amount of debris in LEO combined with the larger number of active satellites makes it approximately twice as likely that an active satellite will suffer a disabling hit or a total disintegration during its lifetime. It should be noted that this risk might possibly be offset by future improvements in satellite reliability, debris tracking, and navigation [17].

### AT Asteroid Accidents

#### No impact to asteroids – the solar system is safer than its ever been and there are no civilization ending asteroids that pose a risk for 2400 years – don’t vote aff on a vague assertion that an asteroid \*could\* hit earth

Siegel 16 (Ethan. 12/21. Ph.D. astrophysicist, author, and science communicator, who professes physics and astronomy at various colleges. “No, Earth is not overdue for a massive asteroid strike” <https://medium.com/starts-with-a-bang/no-earth-is-not-overdue-for-a-massive-asteroid-strike-59ce8edc0cf8>) 9/1/19 RK

It’s only a matter of time before a massive asteroid strike occurs on our world. There’s no doubt about it, as the Solar System and beyond is filled with massive rocks that travel, under the influence of gravity, through the interplanetary and interstellar medium. Every year carries with it a rough probability of such an impact for bodies of all sizes, from the pebbles that will never make it to the ground (a virtual certainty) to a 5–10 kilometer behemoth like the one that wiped out the dinosaurs (less than 0.000001[1/100,000]% odds). But there’s a myth going around — propagated by scientists\* at reputable agencies like Los Alamos National Laboratory, the American Geophysical Union and NASA’s Planetary Defense Coordination Office — that we’re overdue for one, and so one is likelier-than-normal in our future. The scientific truth indicates otherwise. A map of the known asteroids in the Solar System. Image credit: The United Kingdom Spaceguard Centre. The asteroid population in our Solar System is the number one source of potentially hazardous impacts for our world. Almost all of the Earth-orbit-crossing objects we know of originate from the asteroid belt; of the impacts we find on our world and the other terrestrial planets (Mercury, Venus, Mars and even the Moon), the vast majority indicate an ultimate origin from our asteroid belt as well. A map of the Solar System’s asteroid population by size. Image credit: Marco Colombo, DensityDesign Research Lab, under a c.c.a.-s.a.-4.0 license. Based on what we’ve found in our Solar System, there are approximately a few million potential “10”s on the Torino scale, over 50 million potential “9”s and nearly a billion estimated potential “8”s. With lower likelihoods, Earth is also at risk from impacts due to centaurs, Kuiper belt objects, the Oort cloud and passing objects from the interstellar medium. But when rare events occur, they seem to inspire the worst fears in us. A meteorite trail is seen above a residential apartment block in the Urals city of Chelyabinsk, following the meteor strike on February 15, 2013. Image credit: Oleg Kargopolov/AFP/Getty Images. 2013 was a banner year for collision terror. The year started off with the Chelyabinsk meteor, which caused millions of dollars of property damage and injured more than a thousand people. Then, a fast-moving Oort cloud comet — Comet C/2013 A1 (Siding Spring) — was discovered on a near-collision course with Mars. It was approximately half a kilometer across and wound up missing Mars by only 140,000 kilometers, or roughly 11 Earth diameters. If that object had struck Earth, it would have been a Torino-scale “9” disaster. A composite image of Comet Siding Spring/C2013 A1 near Mars at closest approach, as taken with the Hubble Space Telescope. Image credit: NASA, ESA, PSI, JHU/APL, STScI/AURA. But a near-miss is still a miss. In fact, the largest impact in all of human history — both recorded and archaeologically discovered after-the-fact — is Barringer (meteor) crater in Arizona, which itself only rated an “8” on the Torino scale: the same rating as the 1908 Tunguska event. These events occur every few hundred years at most, and we can often go thousands or perhaps even ten thousand years between them. The Chelyabinsk event’s damage came mostly from broken glass; no meteors of the past century have had enough energy to rate above a “0” on the Torino scale. Meteor (Barringer) crater, in the Arizona desert, is over 1.1 km (0.7 mi) in diameter, and represents only a 3–10 MegaTon release of energy. A 300–400 meter asteroid strike would release 10–100 times the energy. Image credit: USGS/D. Roddy. Moreover, the Solar System itself is more cleared of potential impactors than at any time in history. They still occur, of course, but with lower frequency than ever before. Getting hit by a giant, fast-moving massive space rock is still a real threat, but there are only two common classes of impact. The most common type of impacts — from asteroids — are the most easily trackable. If we do a dedicated ongoing sky survey of the asteroid belt and all near-Earth asteroids, we could give ourselves decades or even centuries of lead time when it comes to these potentially hazardous objects. Asteroids in the early Solar System were more numerous, and cratering was catastrophic. The rate has plummeted over the past 4.5 billion years. Image credit: NASA / GSFC, BENNU’S JOURNEY — Heavy Bombardment. The less common type — from long-period objects — are likely to give us less than two years of lead time, and potentially only months. If a fast-moving, massive body from beyond Jupiter, Neptune or even farther out plummets in towards the Sun, and happens to be on a collision course with Earth, our best option is to get to it as fast as possible with a nuclear impactor to try and divert it or break it up as much as possible. It’s the worst-case scenario, but thankfully, it’s a very unlikely one. While asteroids (grey) and Kuiper Belt objects beyond Neptune (blue and orange) are generally considered Earth’s greatest threats, the centaurs (green) number over 44,000. Image credit: WilyD at English Wikipedia. Trans-Neptunian objects are most likely to head towards Earth after a recent encounter with a nearby, passing star. But we haven’t had one in many hundreds of thousands of years, and there isn’t one slated for perhaps millions more. The odds of a city-killer asteroid striking Earth are below 0.1% every year, and most of the ones that will hit us will land in the ocean (70%) or over a relatively unpopulated area (25%). Only around 5% of the Earth’s surface has a sizable human population density inhabiting it, and the fallout from those events are minor even a small distance away from the direct impact. The extinction-level events are so low-risk that the most dangerous object known to humanity doesn’t pose any danger at all for more than the next 2400 years. The orbital path of Comet Swift-Tuttle, which passes perilously close to crossing Earth’s actual path around the Sun. Image credit: Howard of Teaching Stars, via http://www.teachingstars.com/2012/08/08/the-2012-perseid-meteor-shower/orbital-path-of-swift-tuttle-outer-solar-system\_crop-2/. The odds of a massive asteroid strike are lower than they’ve ever been at any point in Earth’s history. Small asteroids will still hit us and we should still invest in the study and exploration of our Solar System and beyond, but we shouldn’t be afraid. The “quietness” of the past few millennia doesn’t mean we’re overdue for a city-killer asteroid; if anything, it means we’re living in a period of relatively low risk. Don’t let the catastrophic consequences in the game of “what if” blind you to the realities that of all the natural and human-caused disasters facing Earth, asteroids aren’t the one that should be topping our priority lists.

### AT Ozone

#### The damage is already done- no way to save the ozone

Mohatta 8 (C.D., 2/20, pg. http://www.americanchronicle.com/articles/52843)

No. It would help the earth a lot to lower the population, but the problem of global warming is complex. Even if there were suddenly no people on earth, global warming would not cease to be a problem and would take time to resolve. Solving global warming will require a concert of solutions. Unfortunately, what we have already done will continue to damage the ozone layer for years to come.