**1NC**

**Th**

**Interp – the 1AC has to say sth if they skip / cut cards**

**violation – skipped 2 cards / solvency contention**

**standard – clipping – we shouldnt have to follow along w the whole 1ac to know they skipped cards – justifies reading every other card while not saying anything**

**dtd deterrence**

**T**

**Interp – the affirmative must only defend that the appropriation of outer space by private entities is unjust.**

**Violation – legal action**

**"To be" is a linking verb of description, not an action verb**

**GU no date** [Gallaudet University. "ACTION VERBS AND LINKING VERBS," https://www.gallaudet.edu/tutorial-and-instructional-programs/english-center/grammar-and-vocabulary/verbs/action-verbs-and-linking-verbs/] HWIC

A linking verb is a verb that links (connects) the subject of the sentence to **information about that subject**. Linking verbs **do not describe action**. When using linking verbs, the sentence structure will be : SUBJECT--->LINKING VERB---> INFORMATION ABOUT THE SUBJECT (noun)(verb)(adjective, noun, or complement)

Some verbs are ALWAYS linking verbs because they never describe an action. Other verbs can be linking verbs in some sentences and action verbs in other sentences.

The following three verbs are ALWAYS linking verbs:

to be (is, am, are, was, were, has been, have been, had been, is being, are being, was being, will have been, etc.) to become (become, becomes, became, has become, have become, had become, will become, will have become, etc.) to seem (seemed, seeming, seems, has seemed, have seemed, had seemed, is seeming, are seeming, was seeming, were seeming, will seem) Here are some examples of linking verbs that are ALWAYS linking verbs in sentences: “The ball is red.” 'Is' is a linking verb that connects the subject, ball, to information about that subject (that it is red). “The children are smart.” 'Are' is a linking verb that connects the subject, children, to information about that subject (that they are smart). “The child will be tall five years from now.” 'Will be' is the linking verb connecting 'child' to the fact that he will be 'tall five years from now.'“The cat seems fine.”'Seems' links the subject, cat, with information about the cat (that it is fine). “The dog became thin after his surgery.” 'Became' links the subject, the dog, with information about him (that he became thin).

**Legal regime goes beyond the res – gives them extra offense to get out of disads, impact turns, and counterplans – extra T advantages and better solvency.**

**unpredictable and explodes limits because we cant be prepared to answer the legal regime part of the aff**

**those arguments should be alt causes or advantage counterplans, which solve topic ed but allowing them on the aff destroys competitive equity.**

dtd deterrence – 1ar too late – constitutive rule – tells neg what they have to prepare for

ci – arbitrary/judge intervention

no rvis – chilling effect – illogical – substance crowdout

**T**

**Interp: Affirmatives may not defend only specific instances of outer space appropriation by private entities as unjust.**

**Violation: They only defend asteroid mining as unjust**

**Moral statements are generic normative principles – necessitates the generic interpretation**

**McDonald 09** [Hugh P. McDonald, professor of philosophy at the New York City College of Technology. "Principles: The Principles of Principles." The Pluralist, vol. 4, no. 3, [University of Illinois Press, Society for the Advancement of American Philosophy], 2009, pp. 98–126, https://www.jstor.org/stable/20708996] HWIC

"Principle" has a great many meanings: origin, beginning, cause, rule, axiom, and so on.5 However, we cannot assume any necessary relation of these meanings. They may be distinct meanings without relations. Neverthe less we can trace some common roots and thereby interconnections of the meanings. I will concentrate here on certain meanings relevant to the prin ciple of principles, that principles are actual. One meaning is that principles are the "ultimate source, origin, or cause of something" or the "originating or actuating agency or force." Principles are connected with the origin and cause of any "something." Moreover, principles may cause the actuality of the something. A second meaning of principles is that they regulate change, whether internally, as the "method of operation of a thing," or as an external cause. That is, principles are regulative, especially including rules for opera tions, involving changes. As rules, they are universal for a kind, although there may be exceptions to them in certain modes. A principle, then, is an originating rule that universally regulates the formation, operation, or other changes of any actuality, which as universal applies to that kind of thing. Machines may be built according to a principle and operate on the same or even a different principle. Ships presume the principle of floatation but may be built according to principles of woodworking or those of other materials. The principle can have different modes?whether necessary, as in logical inference; general, as in scientific laws; or actualization of possibilities, as in machines or as in moral principles that we follow, but could do otherwise.6 I will cover modes below.

Principles are also a cause as regulative, combining cause and rule. The principle can be external, as in a chemical catalyst; or internal, as in geneti cally caused changes.7 Both kinds of causes involve relations. Internal prin ciples exhibit "tendencies," to borrow the word used in the dictionary. They continue to operate across time. Actions that come under principles may be of kinds whose causes are separate in time, since we may cease an action for a time and then take it up again; while genetic characteristics are tenden cies whose causes are connected by reproduction. As causal, principles may be originary for a kind. Especially in new technologies, for example, flying machines, the principle that organisms could fly (birds, bats, and insects) preceded the invention of the technology, although the principles of aero dynamics were discovered later. However, flying utilized and actualized the latter principles. In this sense, principles can be constitutive rules as the origin of a kind, whether generic or specific.

External principles are regulative and not attributes. They regulate change, such that change is not chaotic. Principles are not bodies, objects, or entities but are the basis of the judgment or evaluation that the latter will persist, since they follow or are regulated by principles. Moreover, there is another sense in which principles are not attributes, since the relation of bodies, ob jects, or other terms for actualities implies a common principle, an identity that is regulated and constituted by the same actual principle. "Object" is a principle uniting instances normatively, for example, that solids persist unless acted upon by heat, etc.

Scientific, engineering, and practical laws are cases of principles. The "law of gravity" is the principle of gravity. **Rules of "right conduct" also exhibit laws**. Principles form an identity of different instances that fall under the law, whether generally or invariably. Laws and rules are regulative identities, applicable to different instances, and whether originary, constitutive, or ex ternally regulative. Voluntary adherence to a rule is bringing actions in line with a principle or enacting a principle.

Since **principles are general,** the statement of a principle includes an abstraction of some identity element of the instance. Principles, then, can constitute the elements in any instance insofar as there are identical ele ments, such as matter, species, and genera. This abstraction both identifies the instance as alike with other instances in some respect and differentiates it from those that do not exhibit the principle. The instance may contain several principles conjointly, matter, the state of the matter, function, aes thetic element, and many others. Thus principles connect like instances in a very complex set of relations. A diamond and a painting may share aesthetic qualities but their material, functional, and cultural principles may be quite different. Since identity and difference are correlative terms, every identity is also a difference and this principle applies to actual principles in the world, one principle of principles. To identify a rock of a certain type as consisting in certain chemical combinations connects it with that kind of mineral in general but also certain chemical elements in general, their physical proper ties (such as consisting of a certain atomic number of protons, electrons, and the like), and other principles. However, it also differentiates the rock from other types with their own specific principles, although some generic prin ciples may overlap, namely, the physical properties of all chemical elements as consisting in protons, electrons, and other principles of atoms. Principles then mark both a difference and an identity. The principles identify a distinc tion, but such identifications differentiate from other identifying principles. The wavelengths for green light are identical at different times of emission from the sun but are not identical with those for red.

**Negate –**

**1] Precision:**

**A] Topicality is the most basic aff burden**

**B] Jurisdiction -- you can’t vote affirmative if they haven’t affirmed**

**C] It’s the only predictable stasis point which means it controls the il to engagement**

**2] Limits: every specific instance of appropriation can be the aff of the week which kills our core generics and explodes our prep burden**

**cross apply paradigm issues**

**CP**

**CP Text: States, except the United States, should ban the appropriation of outer space for asteroid mining by private entities. The United States should fund the appropriation of outer space for the mining of rare earth metals from asteroids by private entities, specifying that the technologies used to do this should not be able to move asteroids.**

**Asteroids have REMs**

**AP 21** “Mining A $10,000 Quadrillion Asteroid.” AP News, Feb 1, 2021, <https://apnews.com/press-release/accesswire/technology-business-science-utilities-electric-utilities-7bb32ecaac33bebef6e4b97ade588c57> TG

**There are several million asteroids. They fall into three main types: carbonaceous asteroids, metallic asteroids, and mixed salicaceous-mineral-metallic asteroids. Many of the metallic asteroids are composed mainly of nickel and iron, but also contain sizeable quantities of important rare earth elements and precious metals** including platinum and gold. **A metallic asteroid just 25 meters across could contain as much as 30 tons of platinum valued around $1 billion. 16 Psyche is a staggering 226 kilometers (140 miles) wide and the most mineral rich asteroid so far detected. It is speculated that 16 Psyche could be worth about $10,000 quadrillion (or €8,240 quadrillion euros). To explore 16 Psyche in greater detail, NASA has approved the Psyche mission, which is scheduled to launch in August 2022. The spacecraft will orbit around 16 Psyche for 21 months while studying the asteroid using a number of different scientific instruments. Twenty four percent of all asteroids are thought to be composed of metals and rare minerals. While it is quite difficult to analyze asteroid composition from here on the earth’s surface, there are another 10 asteroids have been identified as likely cost-effective mining targets to date.**

**China gatekeeps REMs now but the PIC ensures domestic sustainability**

**Stavridis 21** [(James, retired US Navy admiral, chief international diplomacy and national security analyst for NBC News, senior fellow at JHU Applied Physics Library, PhD in Law and Diplomacy from Tufts) “U.S. Needs a Strong Defense Against China’s Rare-Earth Weapon,” Bloomberg Opinion, March 4, 2021, <https://www.bloomberg.com/opinion/articles/2021-03-04/u-s-needs-a-strong-defense-against-china-s-rare-earth-weapon>] TDI

You could be forgiven if you are confused about what’s going on with rare-earth elements. On the one hand, news reports indicate that China may increase production quotas of the minerals this quarter as a [goodwill gesture](https://www.scmp.com/news/china/diplomacy/article/3122501/china-raises-rare-earth-quotas-goodwill-trade-signal-us) to the Joe Biden administration. But other **sources say that China may ultimately ban the export of the rare earths altogether on “**[**security concerns**](https://www.bloomberg.com/news/articles/2021-02-19/china-may-ban-rare-earth-technology-exports-on-security-concerns?sref=QYxyklwO)**.”** What’s really going on here?

**There are 17 elements considered**[**rare earths**](https://www.bloomberg.com/news/articles/2021-02-16/why-rare-earths-are-achilles-heal-for-europe-u-s-quicktake) — lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, scandium and yttrium — and while many aren’t actually rare in terms of global deposits, **extracting them is difficult and expensive. They are used across high-tech manufacturing, including smartphones, fighter aircraft and components in virtually all advanced electronics. Of particular note, they are essential to many of the clean-energy technologies expected to come online in this decade.**

I began to focus on rare-earth elements when I commanded the North Atlantic Treaty Organization’s presence in Afghanistan, known as the International Security Assistance Force. While Afghans live in an extremely poor country, [studies](https://thediplomat.com/2020/02/afghanistans-mineral-resources-are-a-lost-opportunity-and-a-threat/) have assessed that they sit atop $1 trillion to $3 trillion in a wide variety of minerals, including rare earths. Some [estimates](https://www.fraserinstitute.org/article/afghanistans-rare-earth-element-bonanza) put the rare-earth levels alone at 1.4 million metric tons.

But every time I tried to visit a mining facility, the answer I got from my security team was, “It’s too dangerous right now, admiral.” Unfortunately, despite a great deal of effort by the U.S. and NATO, those security challenges remain, deterring the large foreign-capital investments necessary to harvest the lodes. Which brings us back to Beijing.

**China controls roughly 80% of the rare-earths market, between what it mines itself and processes in raw material from elsewhere. If it decided to wield the weapon of restricting the supply — something it has repeatedly**[**threatened**](https://www.wsj.com/articles/china-trade-fight-raises-specter-of-rare-earth-shortage-11559304000)**to do — it would create a significant challenge for manufacturers and a geopolitical predicament for the industrialized world.**

It could happen. **In 2010, Beijing threatened to cut off exports to Japan over the disputed Senkaku Islands. Two years ago, Beijing was reportedly considering restrictions on exports to the U.S. generally, as well as against specific companies (such as defense giant Lockheed Martin Corp.) that it deemed in violation of its policies against selling advanced weapons to Taiwan.**

President Donald Trump’s administration issued an executive order to spur the production of rare earths domestically, and created an [Energy Resource Governance Initiative](https://www.state.gov/wp-content/uploads/2019/06/Energy-Resource-Governance-Initiative-ERGI-Fact-Sheet.pdf) to promote international mining. The European Union and Japan, among others, are also aggressively seeking newer sources of rare earths.

Given this tension, it was superficially surprising that **China announced it would boost its mining quotas in the first quarter of 2021** by nearly 30%, reflecting a continuation in strong (and rising) demand. But **the increase occurs under a shadow of uncertainty, as the Chinese Communist Party is undertaking a “review” of its policies concerning future sales of rare earths. In all probability, the tactics of the increase are temporary, and fit within a larger strategy.**

**China will go to great lengths to maintain overall control of the global rare-earths supply. This fits neatly within the geo-economic approach of the**[**One Belt, One Road**](https://www.bloomberg.com/opinion/articles/2019-10-30/china-is-determined-to-reshape-the-globe)**initiative**, which seeks to use a variety of carrots and sticks — economic, trade, diplomatic and security — **to create zones of influence globally. In terms of rare earths, the strategy seems to be allowing carefully calibrated access to the elements at a level that makes it economically less attractive for competitors to undertake costly exploration and mining operations. This is similar to the oil-market strategy used by Russia and the Organization of Petroleum Exporting Countries for decades.**

Some free-market advocates believe that China will not take aggressive action choking off supply because that could [precipitate retaliation](https://www.bloomberg.com/opinion/articles/2021-02-22/china-weaponizing-rare-earths-technology-will-probably-backfire) or accelerate the search for alternate sources in global markets. What seems more likely is a series of targeted shutdowns directed against specific entities such as U.S. defense companies, Japanese consumer electronics makers, or European industrial concerns that have offended Beijing.

**The path to rare-earth independence for the U.S. must include: Ensuring supply chains of rare earths necessary for national security; promoting the exploitation of the elements domestically (and removing barriers to responsibly doing so); mandating that defense contractors and other critical-infrastructure entities wean themselves off Chinese rare earths; sponsoring research and development to find alternative materials, especially for clean energy technology; and creating a substantial stockpile of the elements in case of a Chinese boycott.**

**This is a bipartisan agenda. The Trump administration’s**[**strategic assessment**](https://www.commerce.gov/news/press-releases/2019/06/department-commerce-releases-report-critical-minerals) of what needs to be done (which goes beyond just 17 rare earths to include a total of 35 critical minerals) is thoughtful, and **should serve as a basis for the Biden administration** and Congress.

**---- MARKED ---- REM access key to military primacy and tech advancement – alternatives fail**

**Trigaux 12** (David, University Honors Program University of South Florida St. Petersburg) “The US, China and Rare Earth Metals: The Future Of Green Technology, Military Tech, and a Potential Achilles‟ Heel to American Hegemony,” USF St. Petersberg, May 2, 2012, <https://digital.stpetersburg.usf.edu/cgi/viewcontent.cgi?article=1132&context=honorstheses>] TDI

* Ok maybe I painted this tm but it’s a great card

The **implications of a rare earth shortage** aren’t strictly related to the environment, and energy dependence, but **have distinct military implications as well that could threaten the position of the United States world’s strongest military**. The United States place in the world was assured by powerful and decisive deployments in World War One and World War Two. **Our military expansion was built upon a large, powerful industrial base that created more, better weapons of war for our soldiers**. During the World Wars, a well-organized draft that sent millions of men into battle in a short amount of time proved decisive, but as the war ended, and soldiers drafted into service returned to civilian life, **the U.S. technological superiority over its opponents provided it with sustained dominance over its enemies, even as the numerical size of the army declined. New technologies, such as the use of the airplane in combat, rocket launched missiles, radar systems, and later, GPS, precision guided missiles, missile defense systems, high tech tanks, lasers, and other technologies now make the difference between victory and defeat.**

**The United States military now serves many important functions, deterring threats across the world. The United States projects its power internationally, through a network of bases and allied nations. Thus, the United States is a powerful player in all regions of the world, and often serves as a buffer against conflict in these regions. US military presence serves as a buffer against Chinese military modernization in Eastern Asia, against an increasingly nationalist Russia in Europe, and smaller regional actors, such as Venezuela in South America and Iran in the Middle East. The U.S. Navy is deployed all over the world, as the guarantor of international maritime trade routes**. The US Navy leads action against challenges to its maritime sovereignty on the other side of the globe, **such as current action against Somali piracy**. Presence in regions across the world prevents escalation of potential crisis. These could result in either a larger power fighting a smaller nation or nations (Russia and Georgia, Taiwan and China), religious opponents (Israel and Iran), or traditional foes (Ethiopia and Eretria, Venezuela and Colombia, India and Pakistan). **US projection is also key deterring emerging threats such as terrorism and nuclear proliferation**. While not direct challenges to US primacy, both terrorism and nuclear proliferation can kill thousands.

**The US Air Force has a commanding lead over the rest of the world, in terms of both numbers and capabilities.** American ground forces have few peers, and are unmatched in their ability to deploy to anywhere in the world at an equally unmatched pace.

The only perceived challenge to the United States militarily comes from the People’s Republic of China.76 While **the United States outspends all other nations in the world put together in terms of military spending, China follows as a close second, and has begun an extensive modernization program to boot**.77 The Chinese military however, is several decades behind the United States in air power and nuclear capabilities.78 To compensate, China has begun the construction of access-denial technology, preventing the US from exercising its dominance in China’s sphere of influence.79 **Chinese modernization efforts have a serious long-term advantage over the United States; access to rare earth metals, and a large concentration of rare earth chemists doing research.80 This advantage, coupled with the U.S. losing access to rare earth metals, will even the odds much quicker than policymakers had previously anticipated**. 81

**The largest example is US airpower**. With every successive generation of military aircraft, **the U.S. Air Force becomes more and more dependent on Rare Earth Metals.82 As planes get faster and faster, they have to get lighter and lighter, while adding weight from extra computers and other features on board**.83 To lighten the weight of the plane, **scandium is used to produce lightweight aluminum alloys for the body of the plane**. Rare Earth metals are also useful in fighter jet engines, and fuel cells.84 For example, **rare earths are required to producing miniaturized fins, and samarium is required to build the motors for the F-35 fighter jet**.85 **F-35 jets are the next generation fighter jet that works together to form the dual plane combination that cements U.S. dominance in air power over the Russian PAK FA**.86

**Rare earth shortages don’t just affect air power, also compromising the navigation system of Abrams Tanks, which need samarium cobalt magnets. The Abrams Tank is the primary offensive mechanized vehicle in the U.S. arsenal. The Aegis Spy 1 Radar also uses samarium.87 Many naval ships require neodymium. Hell Fire missiles, satellites, night vision goggles, avionics, and precision guided munitions all require rare earth metals**. 88

**American military superiority is based on technological advancement that outstrips the rest of the world. Command and control technology allows the U.S. to fight multiple wars at once and maintain readiness for other issues, as well as have overwhelming force against rising challengers. This technology helps the U.S. know who, where, and what is going to attack them, and respond effectively, regardless of the source of the threat.**

**Rare Earth Elements make this technological superiority possible.**

To make matters worse, the defense industrial base is often a single market industry, dependent on government contracts for its business. **If China tightens the export quotas further, major US defense contractors will be in trouble.89 Every sector of the defense industrial base is dependent on rare earth metals. Without rare earths, these contractors can’t build anything, which collapses the industry**.90

Rare Earth shortages are actually already affecting our military, with **shortages of lanthanum, cerium, europium and gadolinium happening in the status quo. This prevents us not only from building the next generation of high tech weaponry, but also from constructing more of the weapons and munitions that are needed in the status quo**. As current weapon systems age and they can’t be replaced, the US primacy will be undermined. Of special concern is that U.S. domestic mining doesn’t produce “heavy” rare earth metals that are needed for many advanced components of military technologies. **Given the nature of many military applications, substitutions aren’t possible**. 91

**Primacy and allied commitments solve arms races and great power war – unipolarity is sustainable, and prevents power vacuums and global escalation**

**Brands 18** [Hal, Henry Kissinger Distinguished Professor at Johns Hopkins University's School of Advanced International Studies and a senior fellow at the Center for Strategic and Budgetary Assessments." American Grand Strategy in the Age of Trump." Page 129-133] TDI

**Since World War II, the United States has had a military** second to none. Since the Cold War, **America has** committed **to having** overwhelming military primacy. The idea, as George W. Bush declared in 2002, that America must possess “strengths beyond challenge” has featured in every major U.S. strategy document for a quarter century; it has also been reflected in concrete terms.6

From the early 1990s, for example, the U**nited** S**tates consistently accounted for around 35 to 45 percent of world defense spending and maintained** peerless global power-projection capabilities.7 Perhaps more important, U.S. **primacy was also unrivaled in key overseas** strategic regions—Europe, East Asia, the Middle East. **From** thrashing Saddam Hussein’s million-man Iraqi military **during Operation Desert Storm, to deploying—with impunity—two carrier strike groups off Taiwan during the China-Taiwan crisis of 1995– 96, Washington has been able to project military power** superior **to anything a** regional rival **could employ even** on its own geopolitical doorstep.

This military dominance **has constituted the** hard-power backbone **of an ambitious global strategy.** After the Cold War, U.S. **policymakers committed to averting a return to the** unstable multipolarity **of earlier eras, and to perpetuating the more favorable unipolar order.** **They committed to building on the successes of the postwar era by further advancing** liberal political values **and an open international** economy**, and to** suppressing **international scourges such as** rogue states**,** nuclear proliferation**, and catastrophic** terrorism**.** And because they recognized that military force remained the ultima ratio regum, **they understood the** centrality **of military preponderance**.

**Washington would** need **the** military power **necessary to** underwrite **worldwide** alliance commitments**. It would have to preserve** substantial overmatch **versus any potential** great-power rival. It must be able to answer the sharpest challenges to the international system, such as Saddam’s invasion of Kuwait in 1990 or jihadist extremism after 9/11. Finally, **because prevailing global** norms **generally reflect** hard-power realities**, America would need the superiority to assure that its own** values remained ascendant**. It was impolitic to say that U.S. strategy and the international order required “**strengths beyond challenge**,” but it was not at all inaccurate.**

American primacy, moreover, was eminently affordable. At the height of the Cold War, the United States spent over 12 percent of GDP on defense. Since the mid-1990s, the number has usually been between 3 and 4 percent.8 In a historically favorable international environment, Washington could enjoy primacy—and its geopolitical fruits—on the cheap.

Yet U.S. strategy also heeded, at least until recently, **the fact that there was a limit to how cheaply that primacy could be had. The American military did shrink significantly during the 1990s, but U.S. officials understood that if Washington cut back too far, its primacy would erode to a point where it ceased to deliver its geopolitical benefits**. Alliances **would** lose credibility; **the** **stability of key** regions **would be** eroded; rivals would be emboldened; international crises would go unaddressed. American **primacy was thus like a** reasonably priced insurance policy. **It required nontrivial expenditures, but protected against far costlier outcomes.**9 Washington paid its insurance premiums for two decades after the Cold War. But more **recently American primacy and strategic solvency have been imperiled.**

THE DARKENING HORIZON For most of the post–Cold War era, the international system was— by historical standards—remarkably benign. Dangers existed, and as the terrorist attacks of September 11, 2001, demonstrated, they could manifest with horrific effect. But for **two decades after the Soviet collapse, the world was characterized by** remarkably low levels of great-power competition, **high levels of** security **in key theaters such as** Europe **and** East Asia**, and the** comparative weakness **of those “**rogue” actors**—Iran, Iraq, North Korea, al-Qaeda—who most aggressively challenged American power.** During the 1990s, some observers even spoke of a “strategic pause,” the idea being that the end of the Cold War had afforded the United States a respite from normal levels of geopolitical danger and competition. Now, however, the strategic horizon is darkening, due to four factors.

First, great-power military competition is back. **The world’s two leading authoritarian powers**—China **and** Russia—**are seeking** regional hegemony, **contesting global norms such as nonaggression and freedom of navigation, and developing the** military punch **to underwrite these ambitions**. Notwithstanding severe economic and demographic problems**, Russia has conducted a major military** modernization **emphasizing** nuclear weapons**, high-end conventional capabilities, and rapid-deployment and special operations forces— and utilized many of these capabilities in conflicts in Ukraine and Syria**.10 **China**, meanwhile, **has carried out a** buildup of historic proportions, with constant-dollar defense outlays rising from US$26 billion in 1995 to US$226 billion in 2016.11 Ominously, **these expenditures have funded development of** power-projection **and antiaccess/area denial (A2/**AD) tools **necessary to threaten China’s neighbors and complicate U.S. intervention on their behalf**. Washington has grown accustomed to having a generational military lead; **Russian and Chinese modernization efforts are now creating a** far more competitive environment.

**Case**

**Adv**

**Gent 20 says that US policy is terrible, stops multilateralism, and lets countries mine without restriction. This ev proves the plan will get fought tooth and nail by the us and inevitably get watered down**

**AT monitoring – tech and ground radars solve data – paris flip flops prove politics overdetermine climate response**

**Data not key to solve warming – and it’s not used anwyays**

**Starr 14** - psychologist, journalist, and professor emeritus at the City University of New York, Brooklyn College (Bernard, “Our Oceans Are Dying: Mobilizing an Indifferent Public to Confront This Crisis,” Huffington Post, 6-27-14, http://www.huffingtonpost.com/bernard-starr/our-oceans-are-dying\_b\_5533322.html)

After an eighteen-month investigation, the Commission, made up of former heads of state, government officials, and prominent business leaders concluded that our oceans are dying from climate change, pollution, and over-fishing. The Commission proposes an eight point program to rescue the oceans over the next five years. Why should we be concerned? José María Figueres, Co-chair of the Commission and former president of Costa Rica, has summed up the dire situation with these words: "The ocean provides 50 percent of our oxygen and fixes 25 percent of global carbon emissions. Our food chain begins in that 70 percent of the planet." He added that "a healthy ocean is key to our well-being, and we need to reverse its degradation." He warned: "Unless we turn the tide on ocean decline within five years, the international community should consider turning the high seas into an off-limits regeneration zone until its condition is restored." A Commission video states the crisis even more starkly: "No ocean, no us!" In his brief talk at the reception, David Miliband, also co-chair of the Ocean Commission and former UK Foreign Secretary, urged politicians, scientists, journalists, and ordinary citizens to rally behind the salvation of our oceans and the planet -- and to get the message out to others. Will getting the message out turn the tide in the battle to save the planet? I doubt it. **We are swimming in information and messages**. Earlier the this year leading scientists declared that we are fast approaching the critical point of no return for climate change -- a point with predictable devastating consequences. But **who is listening?** The public continues to be **frighteningly indifferent**. Who among the public is willing to place the salvation of the planet over immediate personal concerns? That question was dramatically called to my attention recently when I presented a list of critical issues to a group of seniors enrolled in a life-long learning program and asked them which one they would place first. The list included: terrorism and national defense, global warming, jobs, vanishing icebergs, protecting Social Security, income inequality, ocean pollution, sustaining Medicare, protecting the Amazon rain forests, reducing fossil fuel emissions, regulating Wall Street and the banks, stopping fracking (shale gas drilling), protecting wildlife (elephants, lions, whales, etc.), eliminating genetically modified foods (GMOs), campaign finance reform, free college education for all, national healthcare (Medicare for all). I was particularly interested in the seniors' answers since popular wisdom says that seniors are more concerned than other age groups with the welfare of children, grandchildren, and future generations. And no issue is more vital for the well-being of future generations than the viability of life on the planet. Psychologist Erik Erikson called this concern of older adults "generativity." But the seniors defied conventional wisdom. Jobs, Social Security, and income inequality topped their listings. Only one person, toward the end of the discussion, cited climate change -- and his response seemed almost gratuitous in recognition that we were about to screen a documentary on the melting of icebergs. Perhaps I should not have been surprised. Politicians avoid talking about environmental issues for fear of losing favor with their constituents, who are clamoring for jobs, mortgage relief, and financial security. During the 2012 presidential debates between Barack Obama and Mitt Romney environmental issues took a far **back** seat; in fact, they were barely mentioned. Both candidates knew instinctively that in the throes of an economic crisis placing the salvation of the planet high on the national agenda would not generate votes. It might even take away votes from people who feared the candidate would be indifferent to their personal struggles. So where does this leave us? If more environmental studies and more alarming news will not mobilize leaders and the public for an all-out commitment to the preservation of our small vulnerable corner of the universe, what will? Perhaps we need to shift our focus from information to changing human behavior. Let's enlist leading behavioral scientists and psychological associations to address how to awaken the public to the urgency of protecting the planet. Let's launch a campaign to make this the number-one priority. And let's adopt these mantras: No planet, no jobs; no planet, no Social Security; no planet, no mortgages; no planet, no corporate bonus packages. No planet, no us.

**Ozone impact is hype – emissions not key, ozone hole not dangerous**

**Ridley 14** -- Matthew White Ridley, 5th Viscount Ridley DL FRSL FMedSci, known commonly as Matt Ridley, is a British journalist, businessman and author of popular science books. Since 2013 Ridley has been a Conservative hereditary peer in the House of Lords. “THE OZONE HOLE WAS EXAGGERATED AS A PROBLEM” http://www.rationaloptimist.com/blog/the-ozone-hole-was-exaggerated-as-a-problem.aspx

**Serial hyperbole does the environmental movement no favours** My recent [Times column](http://www.thetimes.co.uk/tto/opinion/columnists/article4206440.ece) argued that the alleged healing of the ozone layer is exaggerated, but so was the impact of the ozone hole over Antarctica: The ozone layer is healing. Or so said the news last week. Thanks to a treaty signed in Montreal in 1989 to get rid of refrigerant chemicals called chlorofluorocarbons (CFCs), the planet’s stratospheric sunscreen has at last begun thickening again. Planetary disaster has been averted by politics. For reasons I will explain, this news deserves to be taken with a large pinch of salt. You do not have to dig far to find evidence that the ozone hole **was never nearly as dangerous as** some **people said**, that it is not necessarily healing yet and that it might not have been caused mainly by CFCs anyway. The timing of the announcement was plainly political: it came on the 25th anniversary of the treaty, and just before a big United Nations climate conference in New York, the aim of which is to push for a climate treaty modelled on the ozone one. Here’s what was actually announced last week, in the words of a Nasa scientist, Paul Newman: “From 2000 to 2013, ozone levels climbed 4 per cent in the key mid-northern latitudes.” That’s a pretty small change and it is in the wrong place. The ozone thinning that worried everybody in the 1980s was over Antarctica. Over northern latitudes, ozone concentration has been falling by about 4 per cent each March before recovering. Over Antarctica, since 1980, the ozone concentration has fallen by [40 or 50 per cent each September](http://bigstory.ap.org/article/scientists-say-ozone-layer-recovering) before the sun rebuilds it. So what’s happening to the Antarctic ozone hole? Thanks to a diligent blogger named Anthony Watts, I came across a press release also from Nasa about nine months ago, which said: “ [Two new studies show](http://wattsupwiththat.com/2014/09/12/is-the-atmospheric-ozone-recovery-real-or-just-for-scoring-political-points/) that signs of recovery are not yet present, and that temperature and winds are still driving any annual changes in ozone hole size.” As recently as 2006, Nasa announced, quoting Paul Newman again, that the Antarctic ozone hole that year was “the largest ever recorded”. The following year a paper in Nature magazine from Markus Rex, a German scientist, presented new evidence that suggested CFCs may be responsible for less than 40 per cent of ozone destruction anyway. Besides, nobody knows for sure how big the ozone hole was each spring before CFCs were invented. All we know is that it varies from year to year. How much damage did the ozone hole ever threaten to do anyway? It is fascinating to go back and read what the usual hyperventilating eco-exaggerators said about ozone thinning in the 1980s. As a result of the extra ultraviolet light coming through the Antarctic ozone hole, southernmost parts of Patagonia and New Zealand see about 12 per cent more UV light than expected. This means that the weak September sunshine, though it feels much the same, has the power to cause sunburn more like that of latitudes a few hundred miles north. **Hardly Armageddon**. The New York Times reported “an increase in Twilight Zone-type reports of sheep and rabbits with cataracts” in southern Chile. Not to be outdone, Al Gore wrote that “hunters now report finding blind rabbits; fisherman catch blind salmon”. Zoologists briefly blamed the near extinction of many amphibian species on thin ozone. [Melanoma in people](http://www.wunderground.com/resources/climate/holefaq.asp?MR=1) was also said to be on the rise as a result. This was nonsense. Frogs were dying out because of a fungal disease spread from Africa — nothing to do with ozone. Rabbits and fish blinded by a little extra sunlight proved to be as mythical as unicorns. An eye disease in Chilean sheep was happening outside the ozone-depleted zone and was caused by an infection called pinkeye — nothing to do with UV light. And melanoma incidence in people actually levelled out during the period when the [ozone got thinner](http://www.heritage.org/research/commentary/2007/09/ozone-the-hole-truth). Then remember that the ozone hole appears when the sky is dark all day, and over an uninhabited continent. Even if it persists into the Antarctic spring and spills north briefly, the hole allows 50 times less ultraviolet light through than would hit your skin at the equator at sea level (let alone at a high altitude) in the tropics. So it would be bonkers to worry about UV as you sailed round Cape Horn in spring, say, but not when you stopped at the Galapagos: the skin cancer risk is 50 times higher in the latter place. This kind of eco-exaggeration has been going on for 50 years. In the 1960s Rachel Carson said there was an epidemic of childhood cancer caused by DDT; it was not true — DDT had environmental effects but did not cause human cancers.

**No impact to Ozone hole- also unknown causes**

**Hand 16**. Eric Hand is a staff writer who writes about planetary issures. <http://www.sciencemag.org/news/2016/02/record-ozone-hole-may-open-over-arctic-spring>, Ben Bernstein

Lingering atmospheric pollutants and a blast of frigid air have carved an unusually deep hole in Earth’s protective ozone layer over the Arctic, and it threatens to get deeper. Atmospheric scientists are analyzing data from weather balloons and satellites for clues to how the ozone will fare when sunlight—a third factor in ozone loss—returns to the Arctic in the spring. But they are already worrying about how extra ultraviolet light might affect humans and ecosystems below and wondering whether climate change will make such Arctic holes more common or severe. Record cold temperatures in the Arctic stratospheric ozone layer, 15 to 35 kilometers up, are the proximate cause for this year’s losses, because they help to unleash ozone-destroying chemicals. “This winter has been stunning,” says Markus Rex, an atmospheric chemist at the Alfred Wegener Institute in Potsdam, Germany. By next week, about 25% of the Arctic’s ozone will be destroyed, he says. This time of year, the stratosphere tends to warm up with the breakdown of the polar vortex, a cyclone that traps cold air. But if a strong vortex persists another month as light returns to the Arctic after the dark winter, ozone losses will get much bigger, Rex says. Conditions are ripe for losses to surpass a record Arctic ozone hole observed in the spring of 2011, he adds. At Earth’s surface, ozone is a caustic chemical and a health hazard. But in the stratosphere, it shields the planet from ultraviolet light. Scientists noticed in the 1980s that chlorine-containing chemicals commonly used in refrigerants were reacting to form compounds that ate away stratospheric ozone, especially over the poles. The 1989 Montreal Protocol led to the phaseout of those chemicals, but their long atmospheric lifetime means that seasonal ozone losses will persist well into this century. Every year, a major ozone hole opens up over Antarctica, where winters are colder and polar vortices are stronger and more stable than over the Arctic. But this year, the Arctic could be the poster child. Cold temperatures have allowed nitric acid, mostly from natural sources, to condense and form the peculiar, iridescent clouds that have been spotted all over northern latitudes this winter. “They’re beautiful, but once I see them, I’m concerned—they’re dangerous,” Rex says. That’s because the clouds catalyze the reactions that mobilize chlorine into active chemicals that can react in the presence of sunlight to destroy ozone. An instrument on the NASA AURA satellite has detected record lows of the inert forms of chlorine and rising amounts of the active ones, notes Gloria Manney, an atmospheric scientist at NorthWest Research Associates in Socorro, New Mexico. “Conditions are primed,” she says. “The last ingredient we need is sunlight.” Weather models are predicting some warming of the stratosphere this week, she adds, but probably not enough to halt the ozone destroying brew. The Arctic vortex tends to behave erratically, with blobs of cold air often dipping into more heavily populated northern latitudes. The influx of ozone-poor air could cause problems for people there, who are unused to wearing sunscreen in March, Rex says. “If we get such a deep minimum, then people need to be informed,” he says. The extra radiation could even adversely affect phytoplankton, which typically bloom in the Arctic Ocean each spring, Rex suggests. Ross Salawitch, an atmospheric chemist at the University of Maryland, College Park, says the health hazards shouldn’t be sensationalized. “**The worst-case scenario would be folks in high northern latitudes being in a type of ultraviolet environment that people are exposed to all the time in San Diego**.” For Salawitch, the bigger question is what role climate change might be playing. The notoriously mercurial polar weather is the main factor determining how much ozone is destroyed each spring, he says. But climate change is also expected to cool the stratosphere over the long run. The same greenhouse gases that trap heat in the lower atmosphere allow the stratosphere to more effectively radiate energy into space. On its own, the stratospheric cooling could make bad ozone years in the Arctic more common. It should also make polar vortices stronger, and more stable. But there is evidence that storminess at lower latitudes—another thing that is expected to increase in a warming world—will make stable polar vortices less common. Which effects will win out? Salawitch offers a parallel to hurricanes. Climate change is expected to make tropical hurricanes less frequent but more intense. Persistent Arctic vortices, too, could become scarcer but stronger. “When you have cold winters, they tend to be whoppers.” And that could mean that Arctic holes like this year’s could get deeper in the future.

**Xu speaks In extreme hypotheticals as discussed on the K, and speaks of national races. It doesn’t say bezos and musk are going to go to war over a random asteroid, which is the only scenario they can solve for**

**Grego 18 is also in the context of international war, and no nations are going to war to protect the asteroid that a given company wants**

**Wall 20 concedes public sector alt cause in the small text:**

For decades, spacefaring nations have been licensing launches internally, without much international coordination, cooperation or long-term planning. In recent years, low-Earth orbit has become crowded enough with satellites and hunks of debris that collisions are a real concern. For example, the International Space Station has had to maneuver itself away from potential impacts three times so far in 2020 alone.

**Debris and long standing legal framework promote restraint in outer space**

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

A. Limited Accessibility Space is difficult. Over 60 years have passed since the first Sputnik launch and only nine countries (ten including the EU) have orbital launch capabilities. Moreover, a launch programme alone does not guarantee the **resources** and **precision required** to **operate a meaningful ASAT capability**. Given this, one possible reason why **space wars have not broken out** is simply because only the US has ever had the ability to fight one [21, p. 402], [22, pp. 419–420]. Although launch technology may become cheaper and easier, it is unclear to what extent these advances will be distributed among presently non-spacefaring nations. **Limited access to orbit** necessarily reduces the scenarios which could plausibly escalate to ASAT usage. Only major conflicts between the handful of states with ‘space club’ membership could be considered possible flashpoints. Even then, the **fragility of an attacker’s own space assets** creates **de-escalatory pressures** due to the **deterrent effect of retaliation**. Since the earliest days of the space race, dominant powers have recognized this dynamic and demonstrated an inclination **towards de-escalatory space strategies** [23]. B. Attributable Norms There also exists a **long-standing normative framework** favouring the **peaceful use of space**. The effectiveness of this regime, centred around the Outer Space Treaty (**OST**), is highly contentious and many have pointed out its serious legal and political shortcomings [24]–[26]. Nevertheless, this status quo framework has somehow supported over **six decades of relative peace** in orbit. Over these six decades, **norms have become deeply ingrained** into the way states describe and perceive space weaponization. This de facto codification was dramatically demonstrated in 2005 when the US found itself on the short end of a 160-1 UN vote after opposing a non-binding resolution on space weaponization. Although states have occasionally pushed the boundaries of these norms, this has typically occurred through incremental legal re-interpretation rather than outright opposition [27]. Even the most notable incidents, such as the 2007-2008 US and Chinese ASAT demonstrations, were couched in rhetoric from both the norm violators and defenders, depicting space as a peaceful global commons [27, p. 56]. Altogether, this suggests that **states perceive real costs** to breaking this normative tradition and may even **moderate their behaviours** accordingly. One further factor supporting this norms regime is the **high degree of attributability** surrounding ASAT weapons. For kinetic ASAT technology, **plausible deniability** and **stealth** are essentially **impossible**. The literally explosive act of launching a rocket cannot evade detection and, if used offensively, retaliation. This imposes **high diplomatic costs** on ASAT usage and testing, particularly during peacetime. C. Environmental Interdependence A third stabilizing force relates to the **orbital debris consequences** of ASATs. China’s 2007 ASAT demonstration was the largest debris-generating event in history, as the targeted satellite dissipated into thousands of dangerous debris particles [28, p. 4]. Since debris particles are indiscriminate and unpredictable, they often threaten the attacker’s own space assets [22, p. 420]. This is compounded by Kessler syndrome, a phenomenon whereby orbital debris ‘breeds’ as large pieces of debris collide and disintegrate. As space debris remains in orbit for hundreds of years, the **cascade effect** of an ASAT attack can constrain the attacker’s long-term use of space [29, pp. 295– 296]. Any state with kinetic ASAT capabilities will likely also operate satellites of its own, and they are necessarily exposed to this collateral damage threat. Space debris thus acts as a strong strategic deterrent to ASAT usage.

**NASA rock relocations thump the aff --- plan doesn’t affect, and there’s other methods of mining**

Sarah **Scoles 15**, “Dust from asteroid mining spells danger for satellites,” New Scientist, 5-27-2015, https://www.newscientist.com/article/mg22630235-100-dust-from-asteroid-mining-spells-danger-for-satellites/

NASA chose the second option for its Asteroid Redirect Mission, which aims to pluck a boulder from an asteroid’s surface and relocate it to a stable orbit around the moon. But an asteroid’s gravity is so weak that it’s not hard for surface particles to escape into space. **Now a new model warns that debris shed by such transplanted rocks could intrude where many defence and communication satellites live** – in geosynchronous orbit. According to Casey Handmer of the California Institute of Technology in Pasadena and Javier Roa of the Technical University of Madrid in Spain, 5 per cent of the escaped debris will end up in regions traversed by satellites. Over 10 years, it would cross geosynchronous orbit 63 times on average. **A satellite in the wrong spot at the wrong time will suffer a damaging high-speed collision with that dust.** The study also looks at the “catastrophic disruption” of an asteroid 5 metres across or bigger. Its total break-up into a pile of rubble would increase the risk to satellites by more than 30 per cent (arxiv.org/abs/1505.03800). That may not have immediate consequences. But as Earth orbits get more crowded with spent rocket stages and satellites, we will have to worry about cascades of collisions like the one depicted in the movie Gravity. Handmer and Roa want to point out the problem now so that we can find a solution before any satellites get dinged. **“It is possible to quantify and manage the risk**,” says Handmer. “**A few basic precautions will prevent harm due to stray asteroid material.”**

**Collision risk is infinitesimally small**

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

The orbital area around earth can be broken down into four regions. **Low LEO** - Up to about 400km. Things that orbit here burn up in the earth’s atmosphere quickly - between a few months to two years. The space station operates at the high end of this range. It loses about a kilometer of altitude a month and if not pushed higher every few months, would soon burn up. For all practical purposes, Low LEO **doesn’t matter** for Kessler Syndrome. If Low LEO was ever full of space junk, we’d just wait a year and a half, and the problem would be over. **High LEO** - 400km to 2000km. This where most heavy satellites and most space junk orbits. The air is thin enough here that satellites only go down slowly, and they have a much farther distance to fall. It can take 50 years for stuff here to get down. This is where Kessler Syndrome could be an issue. **Mid Orbit** - **GPS** satellites and other navigation satellites travel here in lonely, long lives. The **volume of space is so huge**, and the **number of satellites so few**, that we **don’t need to worry** about Kessler **here**. **GEO** - If you put a satellite far enough out from earth, the speed that the satellite travels around the earth will match the speed of the surface of the earth rotating under it. From the ground, the satellite will appear to hang motionless. Usually the geostationary orbit is used by big weather satellites and big TV broadcasting satellites. (This apparent motionlessness is why satellite TV dishes can be mounted pointing in a fixed direction. You can find approximate south just by looking around at the dishes in your northern hemisphere neighborhood.) For Kessler purposes, GEO orbit is roughly a ring 384,400 km around. However, all the satellites here are moving the same direction at the same speed - debris doesn’t get free velocity from the speed of the satellites. Also, it’s quite expensive to get a satellite here, and so there aren’t many, only about **one satellite per 1000km** of the ring. Kessler is **not a problem** here. How bad could Kessler Syndrome in High LEO be? Let’s imagine a **worst case** scenario. An evil alien intelligence chops up everything in High LEO, **turn**ing it into 1cm cubes of death orbiting at 1000km, spread as evenly across the surface of this sphere as orbital mechanics would allow. Is humanity cut off from space? I’m guessing the world has launched about 10,000 tons of satellites total. For guessing purposes, I’ll assume 2,500 tons of satellites and junk currently in High LEO. If satellites are made of aluminum, with a density of 2.70 g/cm3, then that’s **839,985,870 1cm cubes**. A sphere for an orbit of 1,000km has a surface area of 682,752,000 square KM. So there would be one cube of junk per .81 square KM. If a rocket traveled through that, its odds of hitting that cube are **tiny - less than 1 in 10,000**.

**No Astro-terror – no one will use deflection technology.**

**Wall 11** Mike Wall 11-4-2011 “Why Asteroids Make Lousy Space Weapons” <https://www.space.com/13515-asteroid-deflection-space-weapons.html> (Ph.D. in evolutionary biology from the University of Sydney, Australia)//Elmer

If you lie awake at night worrying about some supervillain steering giant asteroids toward your hometown, you really should relax, experts say. It's not going to happen anytime soon. Humanity does indeed have the technical skills to move space rocks around, and we may employ this know-how at some point to avoid a catastrophic impact like the one that killed the dinosaurs 65 million years ago. But **the odds of any rogue state using asteroids to rain death down on its enemies are minuscule**, experts say. "**It's a lousy weapon**," said former astronaut Rusty Schweickart, chairman of the B612 Foundation, a group dedicated to predicting and preventing cataclysmic asteroid impacts on Earth. "**You get a chance to use one once every several hundred years**," Schweickart said during a recent panel discussion called "Moving an Asteroid" at the California Institute of Technology in Pasadena. "And **even then, you can only deflect it to hit someplace along a sort of arbitrary line** across the Earth." [Top 10 Space Weapons] Serious spaceflight skills Changing the orbit of a massive asteroid hurtling through deep space sounds like a daunting task, but our species knows how to do it. For example, we could launch a spacecraft that would rendezvous with an asteroid, then travel alongside it for months or years. Over time, the probe's modest gravity would tug on the space rock, pulling it into a different orbit, Schweickart said. Given enough time to act, this so-called "gravity tractor" method could work in quite precise and predictable ways. And we've demonstrated the skills necessary to make it happen. Multiple missions have met up with asteroids in deep space. For example, NASA's Dawn spacecraft is currently in orbit around Vesta, the second-largest object in the main asteroid belt between Mars and Jupiter. And in 2005, Japan's Hayabusa probe rendezvoused with a space rock called Itokawa. The craft even scraped some samples off Itokawa and sent them back to Earth for analysis. It's a good thing we possess these potential asteroid-moving skills, Schweickart said, for they may save our bacon someday. Earth has been pummeled by many dangerous asteroids throughout its history, and there's no reason to think the barrage will stop in the future. Space rocks big enough to cause major damage and disruption to the global economy and society (were they to strike a populated area today) have hit Earth, on average, every 200 or 300 years, Schweickart said. Firing a weapon once every 300 years That bombardment rate is scarily frequent to anyone worried about the long-term survival of human civilization. But **it's not nearly frequent enough to make asteroids good weapons** of mass destruction, according to Schweickart. [5 Reasons to Care About Asteroids] "You're going to have an opportunity once every two or three hundred years to go up and have a weapon to hit Baghdad," Schweickart said. "Of course, the problem is that by that time, the Zambian space program is the world's premier space program, and Baghdad is a buddy of yours." Potential asteroid wranglers also **wouldn't be able to direct a space rock just anywhere** on Earth, he added. For the foreseeable future, we'll be able only to speed up or slow down an asteroid, moving it in an "east-west" direction along its trajectory. **Moving it in the "north-south" plane is not an option.** "**If you do anything other than speed up or slow down the asteroid, it has almost no effect**," Schweickart said. "You've got to go along that line; it's the only way physics lets you do it." So anyone wishing to asteroid-bomb the United States would have to manipulate a space rock whose trajectory already crossed American territory. The trick would be tweaking its velocity enough to ensure an impact on American soil. In practice, therefore, **the wait for a suitable asteroid weapon could be considerably longer than 200 or 300 years.** Protecting Earth Schweickart and other panelists argued that humanity will need to deflect a killer asteroid away from Earth someday. **It would be a shame**, they said, **if unfounded fears** about possible nefarious uses of asteroid-moving technology **impeded its development**. "The public perception of asteroids can be pretty scary," Schweickart said. "There's going to be a lot of scare stuff. It's already out there, it's going to get worse and that is going to be a very serious challenge that we on the technical side will have to deal with." People worried about death from above should focus their anxiety elsewhere, fellow panelist Bill Nye said. There are plenty of much more viable space weapons than asteroids already up there. "Space is already pretty weaponized," said Nye, executive director of the Planetary Society and former host of the science-themed TV show "Bill Nye the Science Guy." "The global positioning system that we all know and love was designed to guide weapons. So using an asteroid as a weapon is sort of coming late to the party."

**Concede asteroid collisions cause extinction – means 0 impact to limited deflection because any asteroid collision wipes out humanity regardless of where the collision is so no war could emerge afterward**

**Satellites are crucial for large, industrial megafarms**

Les **Johnson 13**, Deputy Manager for NASA's Advanced Concepts Office at the Marshall Space Flight Center, Co-Investigator for the JAXA T-Rex Space Tether Experiment and PI of NASA's ProSEDS Experiment, Master's Degree in Physics from Vanderbilt University, Popular Science Writer, and NASA Technologist, Frequent Contributor to the Journal of the British Interplanetary Sodety and Member of the American Institute of Aeronautics and Astronautics, National Space Society, the World Future Society, and MENSA, Sky Alert!: When Satellites Fail, p. 106

Agriculture

To feed the Earth's growing population affordably, farming has gone from a **mostly decentralized, family-owned business** to **corporate farming** on a **scale** never before imagined. These **industrial megafarms** are a primary reason that many people in the world can enjoy plentiful and varied foods at a reasonable cost. On this scale, deciding what crop to plant in a given field is not just business - it's science. And the science **relies**, in large part, on **data from space**.

Companies such as the Satellite Imaging Corporation (SIC) provide data from space on overall crop health, soil analysis, and irrigation impacts and efficiencies. From space, you can easily map soil variations, finding areas rich in organic matter and others less so - this allows optimized planting to take advantage of crops that thrive in any given soil environment. **Very large** farms also use satellite images to assess the overall health of their crops by land area, spotting those that are being impacted by non-optimal soil moisture content, etc., allowing the farmer to take corrective action while there is still time to save the crop.

**Industrial ag’s unsustainable and causes extinction**

Alice **Friedemann 17**, Systems Architect and Engineer For Over 25 Years, Science, Energy, and Agriculture Writer, Investigative Journalist and Energy Expert, Founder of Energy Skeptic, Author of When Trucks Stop Running: Energy and the Future of Transportation, “Chemical Industrial Agriculture is Unsustainable. Here’s Why”, Resilience, 5-27, http://www.resilience.org/stories/2017-03-27/chemical-industrial-farming-unsustainable-heres/

We hear a lot about how we’re running out of antibiotics. But we are also doomed to run out of pesticides, because insects **inevitably** develop resistance, whether toxic chemicals are sprayed directly or genetically engineered into the plants.

Worse yet, weeds, insects, and fungus develop resistance in **just 5 years** on average, which has caused the chemicals to grow increasingly lethal over the past 60 years. And it takes on average eight to ten years to identify, test, and develop a new pesticide, though that isn’t long enough to discover the long-term toxicity to humans and other organisms.

And this devil’s bargain hasn’t even provided most of the gains in crop yields, which is due to natural-gas and phosphate fertilizers plus soil-crushing tractors and harvesters that can do the work of millions of men and horses quickly on farms that grow only one crop on thousands of acres.

Yet before pesticides, farmers lost a third of their crops to pests, after pesticides, farmers still lose a third of their crops.

Even without pesticides, **industrial agriculture is doomed to fail** from extremely high rates of soil erosion and soil compaction at rates that far exceed losses in the past, since soil couldn’t wash or blow away as easily on small farms that grew many crops.

But pest killing chemicals are surely **accelerating the day of reckoning** sooner rather than later. Enormous amounts of toxic chemicals are dumped on land every year — over **1 billion pounds** are used in the United State (US) every year and 5.6 billion pounds globally (Alavanja 2009).

This **destroys the very ecosystems** that used to help plants fight off pests, and is a **major factor** biodiversity loss and **extinction**.

Evidence also points to pesticides playing a **key role in the loss of bees** and their pollination services. Although paleo-diet fanatics won’t mind eating mostly meat when fruit, vegetable, and nut crops are gone, they will not be so happy about having to eat more carbohydrates. Wheat and other grains will still be around, since they are wind-pollinated.

Agricultural chemicals **render land lifeless** and toxic to beneficial creatures, also **killing the food chain above** — fish, amphibians, birds, and **humans** (from cancer, chronic disease, and suicide).

Surely a day is coming when pesticides stop working, resulting in **massive famines**. But who is there to speak for the grandchildren? And those that do speak for them are mowed down by the logic of libertarian capitalism, which only cares about profits today. Given that a political party is now in power in the U.S. that wants to get rid of the protections the Environmental Protection Agency (EPA) and other agencies provide, may make matters worse if agricultural chemicals are allowed to be more toxic, long-lasting, and released earlier, before being fully tested for health effects.

Meanwhile chemical and genetic engineering companies are making a fortune, because the farmers have to pay full price, since the pests develop resistance long before a product is old enough to be made generically. Except for glyphosate, but weeds have developed resistance. Predictably.

In fact, the inevitability of resistance has been known for nearly seven decades. In 1951, as the world began using synthetic chemicals, Dr. Reginald Painter at Kansas State University published “Insect Resistance in Crop Plants”. He made a case that it would be better to understand how a crop plant fought off insects, since it was inevitable that insects would develop genetic or behavioral resistance. At best, chemicals might be used as an emergency control measure.

Farmers will say that we simply must carry on like this, there’s no other choice. But that’s simply not true.

Consider the corn rootworm, that costs farmers about $2 billion a year in lost crops despite spending hundreds of millions on chemicals and the hundreds of millions of dollars chemical companies spend developing new chemicals.

To lower the chances of corn pests developing resistance, corn crops were rotated with soybeans. Predictably, a few mutated to eat soybeans plus changed their behavior. They used to only lay eggs on nearby corn plants, now they disperse to lay eggs on soybean crops as well. Worse yet, corn is more profitable than soy and many farmers began growing continuous corn. Already the corn rootworm is developing resistance to the latest and greatest chemicals.

But the corn rootworm is not causing devastation in Europe, because farms are smaller and most farmers rotate not just soy, but wheat, alfalfa, sorghum and oats with corn (Nordhaus 2017).

Before planting, farmers try to get rid of pests that survived the winter and apply fumigants to kill fungi and nematodes, and pre-emergent chemicals to reduce weed seeds from emerging. Even farmers practicing no-till farming douse the land with herbicides by using GMO herbicide-resistant crops. Then over the course of crop growth, farmers may apply several rounds of additional pesticides to control different pests. For example, cotton growers apply chemicals from 12 to 30 times before harvest.

Currently, the potential harm is only assessed for 2 to 3 years before a permit is issued, even though the damage might occur up to 20 years later.

Although these chemicals appear to be just like antibiotics, that isn’t entirely true. We develop some immunity to a disease after antibiotics help us recover, but a plant is still vulnerable to the pests and weeds with the genetics or behavior to survive and chemical assault.

Although there are thousands of chemical toxins, what matters is how they kill, their method of action (MOA). For herbicides there are only 29 MOAs, for insecticides, just 28. So if a pest develops resistance to one chemical within an MOA, it will be resistant to all of the thousands of chemicals within that MOA.

The demand for chemicals has also grown due the high level of bioinvasive species. It takes a while to find native pests and make sure they won’t do more harm than good. In the 1950s there were just three main corn pests. By 1978 there were 40, and they vary regionally. For example, California has 30 arthropods and over 14 fungal diseases to cope with.

When I was learning how to grow food organically back in the 90s, I remember how outraged organic farmers were that Monsanto was going to genetically engineer plants to have the Bt bacteria in them. This is because the only insecticide organic farmers can use is Bt bacteria, because it is found in the soil. It’s natural. Organic farmers have been careful to spray only in emergencies so that insects didn’t develop resistance to their only remedy. Since 1996, GMO plants have been engineered to have Bt in them, and predictably, insects have developed resistance. For example, in 2015, 81% of all corn was planted with genetically engineered Bt. But corn earworms have developed resistance, especially in North Carolina and Georgia, setting the stage for damage across the nation. Five other insects have developed resistance to Bt as well.

GMO plants were also going to reduce pesticide use. They did for a while, but not for long. Chemical use has increased 7% to 202,000 tons a year in the past 10 years.

Resistance can come in other ways than mutations. Behavior can change. Cockroach bait is laced with glucose, so cockroaches that developed glucose-aversion now no longer take the bait.

It is worth repeating that chemicals and other practices are ruining the long-term viability of agriculture. Here is how author Dyer explains it:

“Ultimately the practice of modern farming is **not sustainable**” because “the damage to the soil and natural ecosystems is so great that farming becomes dependent not on the land but on the artificial inputs into the process, such as fertilizers and pesticides. In many ways, our battle against the diverse array of pest species is a battle against the health of the system itself. As we kill pest species, we also kill related species that may be beneficial. We kill predators that could assist our efforts. We reduce the ecosystem’s ability to recover due to reduced diversity, and we interfere with the organisms that affect the biogeochemical processes that maintain the soils in which the plants grow.

Soil is a complex, multifaceted living thing that is far more than the sum of the sand, silt, clay, fungi, microbes, nematodes, and other invertebrates. All biotic components interact as an ecosystem within the soil and at the surface, and in relation to the larger components such as herbivores that move across the land. Organisms grow and dig through the soil, aerate it, reorganize it, and add and subtract organic material. Mature soil is structured and layered and, very importantly, it remains in place. Plowing of the soil turns everything upside down. What was hidden from light is exposed. What was kept at a constant temperature is now varying with the day and night and seasons. What cannot tolerate drying conditions at the surface is likely killed. And very sensitive and delicate structures within the soil are disrupted and destroyed.

Conventional tillage disrupts the **entire soil ecosystem**. Tractors and farm equipment are large and heavy; they compact the soil, which removes air space and water-holding capacity. Wind and water erosion remove the smallest soil particles, which typically hold most of the micronutrients needed by plants. Synthetic fertilizers are added to supplement the loss of oil nutrients but often are relatively toxic to many soil organisms. And chemicals such as pre-emergents, fumigants, herbicides, insecticides, acaricides, fungicides, and defoliants eventually kill all but the most tolerant or resistant soil organisms. It does not take long to reduce a native, living, dynamic soil to a relatively **lifeless collection** of inorganic particles with little of the natural structure and function of undisturbed soil”.

When I told my husband all the reasons we use agricultural chemicals and the harm done, my husband got angry and said “Farmers aren’t stupid, that can’t be right!”

I think there are a number of reasons why farmers don’t go back to sustainable organic farming.

First, there is far too much money to be made in the chemical herbicide, pesticide, and insecticide industry to stop this juggernaut. After reading Lessig’s book “Republic, Lost”, one of the best, if not the best book on campaign finance reform, I despair of campaign financing ever happening. So chemical lobbyists will continue to donate enough money to politicians to maintain the status quo. Plus the chemical industry has infiltrated regulatory agencies via the revolving door for decades and is now in a position to assassinate the EPA, with newly appointed Scott Pruitt, who would like to get rid of the EPA.

Second, about half of farmers are hired guns. They don’t own the land and care about passing it on in good health to their children. They rent the land, and their goal, and the owner’s goal is for them to make as much profit as possible.

Third, renters and farmers both would lose money, maybe go out of business in the years it would take to convert an industrial monoculture farm to multiple crops rotated, or an organic farm.

Fourth, it takes time to learn to farm organically properly. So even if the farmer survives financially, mistakes will be made. Hopefully made up for by the higher price of organic food, but as wealth grows increasingly more unevenly distributed, and the risk of another economic crash grows (not to mention lack of reforms, being in more debt now than 2008, etc).

Fifth, industrial farming is what is taught at most universities. There are only a handful of universities that offer programs in organic agriculture.

Sixth, subsidies favor large farmers, who are also the only farmers who have the money to profit from economies of scale, and buy their own giant tractors to farm a thousand acres of monoculture crops. Industrial farming has driven 5 million farmers off the land who couldn’t compete with the profits made by larger farms in the area.

But farmers will have to go organic **whether they like it or not**

It’s hard to say whether this will happen because we’ve **run out** of pesticides, whether from **resistance** or a **financial crash** reducing new chemical research, or whether peak oil, peak coal, and peak natural gas will cause the decline of chemical farming. Agriculture uses about 15 to 20% of fossil fuel energy, from natural gas fertilizer, oil-based chemicals, farm vehicle and equipment fuel, the agricultural cold chain, distribution, packaging, refrigeration, and cooking to name a few of the uses.

At some point of fossil decline, **there won’t be enough fuel or pesticides** to continue business as usual.

Farmers will be **forced** to go organic at some point. Wouldn’t it be easier to start the transition **now**?

**Loss of satellites shuts down drones**

Daniel **Ventre 11**, Engineer for CNRS and Researcher for CESDIP, Cyberwar and Information Warfare, p. 198-199

The introduction of cyberspace operations is part of a specific context; a major evolution in the operation environment and the nature of the conflicts, which make irregular wars the rule, and make regular actors the exception to the rule. But the battle against unconventional, non-state governed, irregular actors raises specific problems: there are multiple actors, unpredictable at that, who do not abide by the same rules. New orders in conflicts are imposing the implementation of an ever more important need for information, and information collection and processing. Networks now have an **incredible importance**. The document refers to the growing threats against American heritage: the USA is a target and the increasing amount of attacks against their networks is indeed the proof of this. There are many obstacles which need to be removed before they can achieve real superiority and freedom to act, especially as vulnerable points may originate within the very operations of the armed forces. An example of this is the vulnerability of using products (software and hardware), commercial products (off-the-shelf), and sometimes even foreign products123. This brings to mind the fact that the US Air Force uses commercial, even foreign, applications for its cyberspace operations.

Information space extends to space124, particularly via communication and observation satellites125. Satellites are the keystone to the cyberspace and communication systems, but also the security system: monitoring (Echelon network is the symbol), observation, communication. These are at the heart of the C4ISR systems, without which a concept such as network-centric warfare could not exist. **There would be no drones without satellites**. It is even a question of extending the Internet to extra-atmospheric space. Projects in this vein (Interplanetary Networks) were being formed in the 1990s, but ran into several technical difficulties (delays in important transmissions due to high distances and costs) [GEL 06]. NASA dedicates a few pages on its website to this project126. The development of communication systems based on the infrastructures in extra-atmospheric space will also raise questions for legal, geopolitical and geostrategic domains: questions of seizing this space, questions of regulation of human activity in this space, of sovereignty, new territoriality and independence.

**Drone prolif is inevitable and causes global nuclear war**

Dr. Michael C. **Horowitz 19**, Professor of Political Science at University of Pennsylvania, NDT Champion from Emory University, PhD in Government from Harvard University, Adjunct Senior Fellow at the Center for a New American Security, “When Speed Kills: Autonomous Weapon Systems, Deterrence, and Stability”, 5/2/2019, https://papers.ssrn.com/sol3/papers.cfm?abstract\_id=3348356

Thus, the reason to deploy autonomous systems would have to be their reliability and effectiveness rather than signaling. And giving up human control to algorithms in a crisis that could end with **global nuclear war** would require an extremely high level of perceived reliability and effectiveness. Few things are more important to militaries in crisis situations than informational awareness and control over decisions, and there might be fear that autonomous systems are prone to **accidents**.

This counterfactual illustrates that the development and deployment of lethal autonomous weapon systems by national militaries, if it occurs, is unlikely to have simple, easy, and linear consequences. Instead, human factors, including the psychological desire for control and organizational politics, will strongly shape how militaries think about developing and using LAWS. This will not just influence the potential for arms races in peacetime, but deterrence and wartime stability due to the organizational processes militaries implement for the deployment and use of autonomous systems on the battlefield.

This paper draws on research in strategic studies and examples from military history to assess how LAWS could influence the development and deployment of military systems, including **arms races**, **crisis stability**, and wartime stability, especially the risk of **escalation**. It also discusses the potential for arms control. It focuses on these questions through the lens of key characteristics of LAWS, especially the potential for increased operational speed and, simultaneously, less human control over battlefield choices. One of the primary attractions of autonomous systems, even compared to remotely piloted systems, is the potential to operate at machine speed. Another potential benefit is the possibility of machine-like accuracy in following programming, but that comes with a potential downside: the loss of control and the accompanying risk of **accidents**, adversarial **spoofing**, and **miscalculation**. Even if LAWS malfunction at the same rate as humans in a given scenario, the ability of operators to control the impact of those malfunctions may be lower, which could make LAWS less predictable on the battlefield. The paper then examines how these issues interact with the large uncertainty parameter associated with AI-based military capabilities at present, both in terms of the range of the possible and the opacity of their programming.

The results highlight several critical issues surrounding the development and deployment of LAWS.1 First, the desire to fight at machine speed with autonomous systems, while making a military more effective in a conflict, could increase **crisis instability**. As countries fear losing conflicts faster, it will generate **escalation pressure**, including an increased incentive for **first strikes**. Second, in addition to the actual risk of accidents and miscalculation from LAWS, the fear of accidents and losing control of autonomous systems could limit the willingness of militaries to deploy them, particularly since many militaries are conservative when it comes to emerging technologies and have high standards for system reliability. Third, the dual-use, or even general purpose, character of the basic science underlying many autonomous systems will make the technology hard to control, giving many countries and actors access to basic algorithms, though whether this is described as diffusion, proliferation, or an arms race will depend on political dynamics as much as anything.

Finally, multiple uncertainty parameters concerning lethal autonomous weapon systems could exacerbate **security dilemmas**.

Uncertainty over the range of the possible concerning the programming of lethal autonomous weapon systems will increase fear of those systems in the near term, making restraint less likely for competitive reasons. Moreover, the inherent differences between remotely piloted systems and LAWS at the platform level come from software, not hardware. There is arguably an inherent opacity to lethal autonomous weapon systems. If an arms race over lethal autonomous weapon systems occurs, it will likely be because of worse-case assumptions about capability development by potential adversaries.

What is Autonomy or Artificial Intelligence?

Artificial intelligence is the use of computing power, in the form of algorithms, to conduct tasks that previously required human intelligence.2 Artificial intelligence in this context is best thought of as an umbrella technology or enabler, like the combustion engine or electricity. Military applications of artificial intelligence are potentially broad – from image recognition for surveillance to more efficient logistics to battle management.3 These include both non-kinetic applications, including in the cyber realm, as well as kinetic applications.4 One potential application of artificial intelligence is through armed autonomous systems that could be deployed on the battlefield, or what are most popularly called lethal autonomous weapon systems or lethal autonomous weapon systems. This differs from remotely-piloted systems where a human, though at a distance, still operates a given vehicle or system.

What is a lethal autonomous weapon system? While simple to describe on first glance, and easy to understand in the extreme – an armed humanoid robot with extremely broad programming making decisions about engaging in warfare – drawing the line between a lethal autonomous weapon system and other weapon systems is complex. In Directive 3000.09, published in 2012, the US Department of Defense defines an autonomous weapon as “A weapon system that, once activated, can select and engage targets without further intervention by a human operator.”5 What it means to select and engage a target is not entirely clear, however. For example, homing munitions, which have existed since World War II, select and engage targets, according to a common sense understanding of the terms.6

Exactly what functions are autonomous also matters. A system could have automatic piloting, for example, that flies or drives a platform to a target, but still have complete human control over the use of the weapon. That would be a system with a high level of automation, though not a lethal autonomous weapon system according to most perspectives. Heather Roff measures the level of autonomy in a weapon system based on three subcomponents: self-mobility, self-direction, and self-determination. This helps distinguish systems where there might be autonomy concerning the best way a missile should get to a target, but the target itself is designated by a person fromsystems where an algorithm might be making higher-level engagement decisions.7 There are already some applications of limited machine autonomy in military systems, with the most prominent example being the automatic mode present on many Close-In Weapon Systems (CIWS), such as the Phalanx, used to defend ships and incoming missiles from attack.8

This article will not resolve the definitional debate surrounding lethal autonomous weapon systems, which is still ongoing in meetings of the Group of Governmental Experts focused on lethal autonomous weapon systems in the United Nations Convention on Certain Conventional Weapons. Provisionally, this article adopts the Scharre and Horowitz definition that a lethal autonomous weapon system is “[A] weapon system that, once activated, is intended to select and engage targets where a human has not decided those specific targets are to be engaged.”9 However, moving beyond the close cases (e.g. particular types of missile guidance systems) and considering those weapon systems that clearly use machine intelligence to search for, select, and/or engage targets can help clarify what is at stake in this debate in the first place.10 After all, if most militaries most of the time would not have any need for lethal autonomous weapon systems, or those systems have significant disadvantages relative to remotely-piloted military robotics or soldiers on the battlefield, the stakes are lower. In contrast, if the integration of machine intelligence with military systems could give countries or violent non-state actors a significant advantage in how they employ force, it becomes even more crucial to engage the topic.

It is important to note that this article does not address concerns about existential risk related to artificial general intelligence – the fear that a superintelligence could decide to destroy the human race, either because it decides humans are malign or because humans program it to achieve a goal it can only accomplish by destroying humans.11 The existential risk issue associated with artificial intelligence is not necessarily closely coupled to military applications of artificial intelligence. If a super-intelligent machine learning system has the ability to take over human society in the interest of a goal – any goal – whether autonomous systems at much smaller orders of magnitude already exist in military systems will likely be unimportant. The super-intelligent system would simply create what it needed.

Why Invest in Autonomous Systems?

Militaries are already increasing their investments in remotely-piloted robotic systems. From UAVs such as the MQ-9 Reaper (**U**nited **S**tates) to uninhabited surface vehicles (USVs) such as the Guardium (**Israel**) to uninhabited ground vehicles (UGV) such as Platform-M (**Russia**), militaries **around the world** are investing in remotely piloted platforms, some of which can carry weapons. In these systems, human control over the use of force is not fundamentally different from the use of force with inhabited systems. In some cases, such as the MQ-9 Reaper, the sensor system a drone pilot uses to launch a weapon might even be the same sensor system a pilot in the cockpit of an inhabited fighter uses. Using remotely piloted systems gives militaries the ability to reduce the risk to their own soldiers while still projecting power in similar ways to how they used force previously.12 The first places militaries are likely to use kinetic lethal autonomous weapon systems include relatively “clear” environments such as air-to-air combat or naval combat, especially in geographic arenas where civilians are extremely unlikely to be present.13