## CP

#### CP: The weaponization of outer space should be banned.

#### Solves their space war advaantage – the only reason miscalc and escalation happen is because we have weapons in space as per cross, and all their ev talks about defending our space interests in space

## DA

#### Strong commercial space catalyzes tech innovation – progress at the margins and spinoff tech change global information networks

Joshua **Hampson 2017**, Security Studies Fellow at the Niskanen Center, 1-25-2017, “The Future of Space Commercialization”, Niskanen Center, https://republicans-science.house.gov/sites/republicans.science.house.gov/files/documents/TheFutureofSpaceCommercializationFinal.pdf

Innovation is generally hard to predict; some new technologies seem to come out of nowhere and others only take off when paired with a new application. It is difficult to predict the future, but **it is reasonable to expect that a growing space economy would open opportunities for technological and organizational innovation**. In terms of technology, **the difficult environment of outer space helps incentivize progress along the margins.** Because each object launched into orbit costs a significant amount of money—at the moment between $27,000 and $43,000 per pound, though that will likely drop in the future —each 19 reduction in payload size saves money or means more can be launched. At the same time, the ability to fit more capability into a smaller satellite opens outer space to actors that previously were priced out of the market. This is one of the reasons why small, affordable satellites are increasingly pursued by companies or organizations that cannot afford to launch larger traditional satellites. These small 20 satellites also provide non-traditional launchers, such as engineering students or prototypers, the opportunity to learn about satellite production and test new technologies before working on a full-sized satellite. **That expansion of developers, experimenters, and testers cannot but help increase innovation opportunities**. **Technological developments from outer space have been applied to terrestrial life since the earliest days of space exploration**. The National Aeronautics and Space Administration (NASA) maintains a website that lists technologies that have spun off from such research projects**. Lightweight** 21 **nanotubes**, useful in protecting astronauts during space exploration, **are now being tested for applications in emergency response gear and electrical insulation**. The need for certainty about the resiliency of materials used in space led to the development of an analytics tool useful across a range of industries. Temper foam, the material used in memory-foam pillows, was developed for NASA for seat covers. **As more companies pursue their own space goals, more innovations will likely come from the commercial sector. Outer space is not just a catalyst for technological development.** Satellite constellations and their unique line-of-sight vantage point **can provide new perspectives to old industries**. Deploying satellites into low-Earth orbit, as Facebook wants to do, can connect large, previously-unreached swathes of 22 humanity to the Internet. **Remote sensing technology could change how whole industries operate, such as crop monitoring, herd management, crisis response, and land evaluation, among others**. 23 While satellites cannot provide all essential information for some of these industries, they can fill in some useful gaps and work as part of a wider system of tools. **Space infrastructure, in helping to change how people connect and perceive Earth, could help spark innovations on the ground as well. These innovations, changes to global networks, and new opportunities could lead to wider economic growth.**

#### The plan crushes private sector R&D by diverting investment and creating government patents that lower the perceived return from space innovation

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Aside from the pure monetary expenses, and the subsequent opportunity costs associated with them, the state-headed research and development for the Mars Exploration Program will likewise be a burden to private innovation. Of course there would be less monetary resources to devote to such studies in the private sector, but the more disturbing outcome is that of the disincentive to private developers. One of the chief issues on this list of costs to private research and development, which includes the regulations on private research and NASA's access to monetary resources, given the government's monopoly on the money supply as well as its ability to tax, is the existence of the patent system.

NASA has long been praised for developing such wonderful inventions such as Velcro, but once it has formulated and patented such a design, the only way for the invention to make its way onto the market is for the design to be sold. Hence, given the legal regulations surrounding patents, and obviously the 'rent-seeking' competition among organizations seeking patents, the market is left with but a few if not a single monopoly producer of patented goods.

In essence, NASA, by developing and selling patents to high-bidders, is robbing private research and development of all incentive to produce and thus, its very purpose, namely to find better ways to satisfy the needs and wants of individuals in the market. Although patents seem to be the fundamental issue associated with these costs, and some of these costs could be alleviated by abolishing the patent system, NASA, being operated and privileged by the federal government alongside the patent offices, certainly has exclusive entitlement in all of its research and development. This goes without saying that NASA itself has a highly protected monopoly on domestic space travel and analogous research and development, and therefore faces little to no competition.

#### Asteroid mining is the main way companies are looking to profit off of space – that’s key to innovation

#### Tech innovation solves any future existential threats

Dylan **Matthews 18**. Co-founder of Vox, citing Nick Beckstead @ Rutgers University. 10-26-2018. "How to help people millions of years from now." Vox. https://www.vox.com/future-perfect/2018/10/26/18023366/far-future-effective-altruism-existential-risk-doing-good

If you care about improving human lives, you should overwhelmingly care about those quadrillions of lives rather than the comparatively small number of people alive today. The 7.6 billion people now living, after all, amount to less than 0.003 percent of the population that will live in the **future**. It’s reasonable to suggest that those **quadrillions** of future people have, accordingly, **hundreds of thousands of times** more moral weight than those of us living here **today** do. That’s the basic argument behind Nick Beckstead’s 2013 Rutgers philosophy dissertation, “On the overwhelming importance of shaping the far future.” It’s a glorious mindfuck of a thesis, not least because Beckstead shows very convincingly that this is a conclusion any plausible moral view would reach. It’s not just something that weird utilitarians have to deal with. And Beckstead, to his considerable credit, walks the walk on this. He works at the Open Philanthropy Project on grants relating to the far future and runs a charitable fund for donors who want to prioritize the far future. And arguments from him and others have turned “long-termism” into a very vibrant, important strand of the effective altruism community. But what does prioritizing the far future even mean? The most **literal** thing it could mean is preventing human **extinction**, to ensure that the species persists as long as possible. For the long-term-focused effective altruists I know, that typically means identifying concrete threats to humanity’s continued existence — like unfriendly artificial intelligence, or a pandemic, or global warming/out of control geoengineering — and engaging in activities to prevent that specific eventuality. But in a set of slides he made in 2013, Beckstead makes a compelling case that while that’s certainly **part** of what caring about the far future entails, approaches that address **specific threats** to humanity (which he calls “**targeted**” approaches to the far future) have to **complement** “**broad**” approaches, where instead of trying to **predict** what’s going to kill us all, you just **generally try to keep civilization running as best it can**, so that it is, as a whole, well-equipped to deal with **potential** extinction events in the **future**, not just in 2030 or 2040 but in 3500 or 95000 or even 37 million. In other words, caring about the far future **doesn’t mean just paying attention to low-probability risks of total annihilation**; it also means **acting on pressing needs now**. For example: We’re going to be **better prepared** to prevent extinction from **AI** or a **supervirus** or **global warming** if society as a whole makes **a lot of scientific progress**. And a significant bottleneck there is that the vast majority of humanity doesn’t get high-enough-quality education to engage in scientific research, if they want to, which reduces the odds that we have enough trained scientists to come up with the breakthroughs we need as a civilization to survive and thrive. So maybe one of the **best thing**s we can do for the **far future** is to improve school systems — here and now — to harness the group economist Raj Chetty calls “lost Einsteins” (**potential innovators** who are thwarted by poverty and inequality in rich countries) and, more importantly, the hundreds of millions of kids in developing countries dealing with even worse education systems than those in depressed communities in the rich world. What if living ethically for the far future means living ethically now? Beckstead mentions some other broad, or very broad, ideas (these are all his descriptions): Help make computers faster so that people everywhere can work more efficiently Change intellectual property law so that technological innovation can happen more quickly Advocate for open borders so that people from poorly governed countries can move to better-governed countries and be more productive Meta-research: improve **incentives** and **norms** in **academic work** to better advance human knowledge Improve education Advocate for political party X to make future people have values more like political party X ”If you look at these areas (economic growth and technological progress, access to information, individual capability, social coordination, motives) a lot of everyday good works contribute,” Beckstead writes. “An implication of this is that a lot of everyday good works are good from a broad perspective, even though hardly anyone thinks explicitly in terms of far future standards.” Look at those examples again: It’s just a list of what normal altruistically motivated people, not effective altruism folks, generally do. Charities in the US love talking about the lost opportunities for innovation that poverty creates. Lots of smart people who want to make a difference become scientists, or try to work as teachers or on improving education policy, and lord knows there are plenty of people who become political party operatives out of a conviction that the moral consequences of the party’s platform are good. All of which is to say: Maybe effective altruists aren’t that special, or at least maybe we don’t have access to that many specific and weird conclusions about how best to help the world. If the far future is what matters, and generally trying to make the world work better is among the best ways to help the far future, then effective altruism just becomes plain ol’ do-goodery.\*

## CP

#### CP text: space faring nations should establish an international governing body that:

1. **Regulates commercial operations in outer space and**
2. **Establishes a Space Resource Fund**

#### CP solves - Creating a legal regime ensures everyone benefits from mining creates sustainable mining while avoiding conflict & promoting competition

Morgan **Saletta 16,** PhD, History and Philosophy of Science, The University of Melbourne, “All of humanity should share in the space mining boom,” Conversation, 4-17-2016, https://theconversation.com/all-of-humanity-should-share-in-the-space-mining-boom-57740

One solitary asteroid might be worth trillions of dollars in platinum and other metals. Exploiting these resources could lead to a global boom in wealth, which could raise living standards worldwide and potentially benefit all of humanity. There are already companies, such as Planetary Resources, hoping to make mining in space a reality. Peter Diamondis, co-founder of Planetary Resources and founder of the XPrize Grand Challenges, believes that the benefits to humanity give us a moral imperative to explore and utilise space. He has also declared “there are twenty-trillion-dollar checks up there, waiting to be cashed!” However, behind the utopian rhetoric and dazzling dreams of riches lie some very real problems. Ownership and the Outer Space Treaty The framework of international space law is given by the Outer Space Treaty (OST), which entered into force in 1967. Among its main principals, the OST includes these statements: the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind and, outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means Because the OST is generally interpreted as preventing anything like private fee-simple ownership, it is sometimes claimed to be an obstacle to commercial ventures in space. But such claims simply do not hold water. There are numerous terrestrial examples where resources are profitably exploited in the absence of fee-simple ownership. Governments routinely licence companies to engage in timber extraction, mining, offshore oil exploration and other activities, receiving royalties payments on production. In the United States, revenues from such royalties totalled some US$13.5 billion dollars in 2014 from federally owned or managed lands alone. Nevertheless, some proponents of mining in outer space argue for serious modification or an end to the Outer Space Treaty and claim, against the evidence, that without fee-simple ownership, there is no incentive for commercial exploitation. The Unites States’ Space Act of 2015 was just one volley – and a deliberately vague one at that – in this ongoing international debate. A balanced approach? The riches exist, but how will humanity benefit from mining in outer space, or for that matter, **other global commons such as the deep sea floor?** Behind the lofty rhetoric of benefits to humanity, there is a dark shadow of voodoo economics, the shambling, walking dead figure of trickle down economics– and the possibility of a world where a few trillionaires enjoy the view from space while others barely eke a living on its surface. Yet we do suggest that commercial interests and profit seeking can be a healthy part of the exploration of outer space. Yet outer space is not the Wild West frontier of Frederick Jackson Turner, nor do we live in the Gold Rush days of Jack London’s tale of greed and death. In the common heritage of space, with multiple state and private actors engaging in exploration and potentially exploitation, **international cooperation and oversight will benefit all.** The Alaskan model There is a balanced, pragmatic approach that will promote commercial and profit driven activities, while also producing tangible benefits to all of humanity. Importantly, this pragmatic approach has a well established precedent that has existed for nearly 40 years. And this comes not from a social democracy or left-wing ideology, but was the brainchild of a libertarian, Republican governor of Alaska, Jay Hammond. That model is the Alaska Permanent Fund Corporation (APFC) created in 1976, and its unique “citizen’s dividend”. The APF is a resource wealth fund, which derives its revenue primarily from leases on oil fields. In 1977, Hammond suggested that “rather than permitting government to spend all public monies earned through the exploitation of the public’s resources for what government thinks best, let’s grant shares to Alaskans.” The first dividend payment was made in 1982, and in 2015 that payment amounted to US$2,072. Linking a citizen’s dividend to a sovereign wealth fund was unique, but the idea of a citizen’s dividend has a long and venerable tradition. One of the earliest advocates was no less than the political theorist and American Revolutionary, Thomas Paine. International body How would this work for outer space? We need an international body similar to the International Seabed Authority, which was established by the United Nations Convention on the Law of the Sea, or the International Telecommunications Union, which allocates satellite orbits. **This would provide the stable business and investment environment that entrepreneurs seek by ensuring international law and obligations are met**. This body could license outer space resources and levy a royalty on production, which is part of standard business practice between petroleum and other mining companies and governments here on Earth. In turn, these revenues, or a significant portion thereof, would be deposited in a Space Resource Fund, possibly under the aegis of the World Bank. And every single citizen on Earth, say aged 18 or above, would receive a dividend on a yearly basis as their rightful share as owners of the common province of humankind. Crucially, we are not suggesting redistribution, which has been an obstacle to the International Seabed Authority and the Moon Treaty in the past, but a fair share dividend of wealth that truly belongs to everyone. Our model doesn’t provide a handout, or a welfare cheque, or charity from a trillionaire philanthopist; it pays **every owner in a global commons a share of what is rightfully theirs.** Even tiny dividends by the standards of the world’s wealthy nations would make a difference for some developing world farmers. **If there truly are trillions of dollars out there, then this might be something fundamentally world changing.** We accept that Larry Page and Sir Richard Branson – founding investors and advisors in Planetary Resources – and its founders Eric Anderson and Peter Diamandis, truly want humanity to benefit from outer space, and that they truly believe in corporate social responsibility and a sustainable future. We would encourage them to embrace the idea that the sky really does belong to all of us, as the common “province of all mankind”. By paying rent for the right to exploit resources in space and royalties on production, the same way oil companies pay to exploit oil in the Gulf of Mexico, they’ll be engaging in business as usual. They will have bought the right to make a potentially enormous profit and prove they really are responsible global citizens. And they’d get a citizen’s dividend cheque too.

# Case

#### No uniqueness – there’s no industry for mining asteroids now – the bubble burst

Foust 19 (Jeff. 1/7. Jeff Foust is the editor and publisher of The Space Review, and a senior staff writer with SpaceNews. He also operates the Spacetoday.net web site. “The asteroid mining bubble has burst” <http://www.thespacereview.com/article/3633/1>) 8/27/19 RK

Of all the market being pursued by space startups in the last decade, asteroid mining was perhaps the longest-term, and maybe also the most far-fetched. While space tourism has struggled to get off the ground the business case is clear once companies like Blue Origin and Virgin Galactic start flying—which may finally happen this year. Constellations of small satellites for remote sensing or broadband communications are taking shape now, stimulating demand for new launch vehicles, even if the supply of such vehicles is likely to exceed any reasonable demand forecast. Asteroid mining, though, required the patience to develop technologies to prospect, and then extract, resources like volatiles from asteroids, then find in-space applications for them. “The DSI team provided very innovative solutions to the problem of exploring the solar system at a reasonable cost, and we are eager to see if that can be developed with the help of Bradford technologies,” Fichtenbaum said. Yet those obstacles didn’t stop two companies several years ago from starting up with goals of harvesting resources from asteroids. First came Planetary Resources, which announced plans in 2012 to develop asteroid mining systems , with the backing of prominent business people (see “Planetary Resources believes asteroid mining has come of age”, The Space Review, April 30, 2012.) Nine months later, Deep Space Industries (DSI) announces its own, similar asteroid mining plans (see “Asteroid mining boom or bubble?”, The Space Review, January 28, 2013.) Six years later, the answer to the question posed in that headline is clearly “bubble.” In just two months, both DSI and Planetary Resources, which struggled to raise money and even shifted focus away from asteroid mining, have been acquired by other companies. Their plans to harvest the riches of the solar system are on hold, perhaps indefinitely. On New Year’s Day, Bradford Space announced its acquisition of DSI. Bradford, owned by a US investment group, the American Industrial Acquisition Corporation, but with facilities in Europe, manufactures spacecraft components, including a non-toxic propulsion system called ECAPS.

#### Too many barriers to successful asteroid mining – err neg because the commercial space industry is overly optimistic

Scoles 17 (Sarah. 1/23. Contributing writer at WIRED Science, a contributing editor at Popular Science, and the author of the book ​Making Contact: Jill Tarter and the Search for Extraterrestrial Intelligence. “ASTEROID MINING SOUNDS HARD, RIGHT? YOU DON’T KNOW THE HALF OF IT” <https://www.wired.com/2017/01/asteroid-mining-sounds-hard-right-dont-know-half/>) 8/27/19 RK

THE COMMERCIAL SPACE industry pushes a particular brand of optimism. Its urge to inspire manifests as soaring soundtracks to three-minute mission-promo videos, press releases with words like “humanity,” and slick graphics of spacecraft that don’t exist yet but could any day now. In the particular case of asteroid mining, business leaders are selling a future in which materials plucked from space rocks make up for Earth’s shortfalls and support a thriving civilization. Everyone is rich, all are happy, and no one wants for anything. O pioneers! We are them! OK, fine, that’s an exaggeration. But the toned-down version of asteroid mining’s prospects is still hyperreal. "Our vision is to catalyze humanity's growth, both on and off the Earth," says Peter Diamandis, co-founder of mining company Planetary Resources, in a PR video. A graphical spacecraft, presumably future-theirs, flies away from our planet while he speaks. "At the end, the entire human race will be the beneficiary, as we expand our reach beyond the Earth, into the solar system," he continues. But traveling the road to space-based industry will require giant leaps. Like picking the most lucrative asteroids—the ones with lots of water and precious metals—from far afield. And negotiating spacecraft near their complicated gravitational fields. To do that, companies will have to leave the comfy confines of Earth's orbit, where they currently do all their experimenting. In May, Planetary Resources raised $21 million of venture capital for an Earth-observation program called Ceres. Ten small satellites will fly low around the planet, taking twice-daily images of Earth in wavelengths ranging from mid-infrared to visible—images that will “benefit multiple industries including agriculture, oil & gas, water quality, financial intelligence and forestry.” These satellites will, essentially, be prospecting Earth, using the same sensors Planetary Resources has developed to prospect asteroids. The utility, says president and CEO Chris Lewicki, is dual. “We are taking pictures of the Earth and using them not only to understand how our technology works but also to understand more about our planet,” he says. True enough, but it's also about the balance sheet: Earth-facing spacecraft, as all that venture capital suggests, are big money. Which is important for a company that has to continue existing until it can actually mine asteroids. The other big name in the industry, Deep Space Industries, is also in the Earth-observation business, kind of: It sells its spacecraft technologies to other companies, some of whom want to use them to peer down at our planet. Like HawkEye 360, a company that plans to monitor and map radio-wave broadcasts in near real-time. Deep Space Industries is the prime contractor developing and making the satellites that will become HawkEye's Pathfinder prototype. “Earth observation is kind of the hot thing in space right now,” says Meagan Crawford, Deep Space Industries' chief operating officer. “It’s where most of the value is being created.” But unlike Planetary Resources, Deep Space Industries isn’t planning its own world-watching missions, even if they plan to profit from others’. Their personal path to an asteroid is straighter: They hope to launch the prototype Prospector-X this year to see how its propulsion performs, how its avionics stand up to space radiation, and how its optical navigation system fares against obstacles. It will be in Earth orbit, but it’s not on the Earth-observation beat. It’s meant to show that the follow-on Prospector-1 will work—hopefully going to an asteroid by the end of the decade, the same timescale on which Deep Space is also working. “We think the best way to determine what these asteroids are really like is to go touch and feel and interact with one,” Crawford says. Spacecraft shortfalls Becoming a prime prospector of Earth doesn’t quite translate to asteroids, as the two space-body types are quite different. For one, Earth is, like, right here. Asteroids are way out there, moving very fast. And that makes getting to know them hard. The companies need to know about a specific rock's composition before embarking on a mining mission—something they can't accomplish with the same sensors they are deploying in Earth orbit, the same ones they hope to use to get detailed information once they are actually close to an asteroid. Scientific missions specced to learn more about what asteroids are made of, like NASA's newly funded Lucy and Psyche, will help the companies get the knowledge they need to get power. But Crawford admits that "the biggest missing piece for asteroid mining is scientific knowledge of target asteroids." Asteroids’ specifics are still fuzzy. That’s why space agencies keep sending missions like Lucy and Psyche, as well as the already-launched OSIRIS-REx, Dawn, and Hayabusa to them: because we don’t know a super lot about their details, beyond predictive models based on broad categories. “We don’t have a lot of experience with the real characteristics of asteroids,” says Zoe Szajnfarber, who studies the dynamics of technological innovation at George Washington University. What if a company chose a target asteroid based on predictions, only to find, upon arrival, that it holds much less water and platinum than checkbooks and customers hoped? Too bad, so sad. “If you make the choice to go to the one asteroid, that’s where you’re going,” says Szajnfarber. “It’s almost impossible to have enough fuel to change your mind and go to a different one.” Then, once you get there, there’s the problem of gravity. The companies' craft may master constellation- or formation-flying around our planet. But Earth, as globes have suggested for centuries, is basically a sphere. And its mass is pretty evenly distributed. Gravity is basically the same everywhere in a spacecraft’s orbit. Keeping spacecraft in line in such a boring gravitational field is “easy.” But have you seen pictures of asteroids? Those pockmarked potato colonies with weird peaks and valleys have complicated gravity and composition. The companies will have to climb over both these early obstacles before they get to even bigger ones: that part where they have to build robots that can mine and spacecraft that can bring the haul back into humanity’s reach. They can’t do any of it by planetary navel-gazing alone. But they are going to do planetary navel-gazing, whether under their own flags or customers’. That globe-centric system will at least make the companies money, which means they may be able to survive long enough to figure out how to do what they really want to do.

## Space War

#### No miscalc or escalation

James Pavur 19, Professor of Computer Science Department of Computer Science at Oxford University and Ivan Martinovic, DPhil Researcher Cybersecurity Centre for Doctoral Training at Oxford University, “The Cyber-ASAT: On the Impact of Cyber Weapons in Outer Space”, 2019 11th International Conference on Cyber Conflict: Silent Battle T. Minárik, S. Alatalu, S. Biondi, M. Signoretti, I. Tolga, G. Visky (Eds.), <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.

## Resource Wars

#### 1] Ings is about the status quo and admits that there’s a REM shortage which will escalate tensions – the aff removes another way to get REMs from space which generates more scarcity on Earth, directly fueling terrestrial tensions

#### 2] No warrant in the Butters card for why conflict would occur

#### 3] No China war – fears are overblown

* Diplomacy, institutional ties, and economic flows have expanded
* Tensions and criticism occur against a cooperative backdrop
* Far lower military spending than cold war
* Nukes kept at low alert
* Water barriers limit escalation and build in negotiation time because of low force numbers and unclear barriers – can’t conquer anything
* Other countries act as buffers
* Ideologically against conflict

Shifrinson 19 [Joshua Shifrinson is an assistant professor of international relations at Boston University. The ‘new Cold War’ with China is way overblown. Here’s why. February 8, 2019. https://www.washingtonpost.com/news/monkey-cage/wp/2019/02/08/there-isnt-a-new-cold-war-with-china-for-these-4-reasons/?noredirect=on&utm\_term=.f8ca8195c4e4]

Is a new Cold War looming — or already present — between the United States and China? Many analysts argue that a combination of geopolitics, ideology and competing visions of “global order” are driving the two countries toward emulating the Soviet-U.S. rivalry that dominated world politics from 1947 through 1990.

But such concerns are overblown. Here are four big reasons why.

1. The historical backdrops of the two relationships are very different

When the Cold War began, the U.S.-Soviet relationship was fragile and tenuous. Bilateral diplomatic relations were barely a decade old, U.S. intervention in the Russian Revolution was a recent memory, and the Soviet Union had called for the overthrow of capitalist governments into the 1940s. Despite their Grand Alliance against Nazi Germany, the two countries shared few meaningful diplomatic, economic or institutional links.

In 2019, the situation between the United States and China is very different. Since the 1970s, diplomatic interactions, institutional ties and economic flows have all exploded. Although each side has criticized the other for domestic interference (such as U.S. demands for journalist access to Tibet and China’s espionage against U.S. corporations), these issues did not prevent cooperation on a host of other issues. Yes, there were tensions over the past decade, but these occurred against a generally cooperative backdrop.

2. Geography and powers’ nuclear postures suggest East Asia is more stable than Cold War-era Europe

The Cold War was shaped by an intense arms race, nuclear posturing and crises, especially in continental Europe. Given Europe’s political geography, the United States feared a “bolt from the blue” attack would allow the Soviet Union to conquer the continent. Accordingly, the United States prepared to defend Europe with conventional forces, and to deter Soviet aggrandizement using nuclear weapons.

Unsurprisingly, the Soviet Union also feared that the United States might attack and wanted to deter U.S. adventurism. Concerns that the other superpower might use force and that crises could quickly escalate colored Cold War politics.

Today, the United States and China spend proportionally far less on their militaries than the United States and the Soviet Union did. Though an arms race may be emerging, U.S. and Chinese nuclear postures are not nearly as large or threatening: Arsenals remain far below the size and scope witnessed in the Cold War, and are kept at a lower state of alert.

As for geography, East Asia is not primed for tensions akin to those in Cold War Europe. China can threaten to coerce its neighbors, but the water barriers separating China from most of Asia’s strategically important states make outright conquest significantly harder. Of course, as scholars such as Caitlin Talmadge and Avery Goldstein note, crises may still erupt, and each side may face pressures to escalate. Unlike the Cold War, however, U.S.-Chinese confrontations occur at sea with relatively limited forces and without clear territorial boundaries. This suggests there are countervailing factors that may give the two sides room to negotiate — and limit the speed with which a crisis unfolds.

3. The Cold War had just two major powers

The Cold War took place in a bipolar system, with the United States and Soviet Union uniquely powerful, compared with other nations. This dynamic often pushed the United States and the U.S.S.R. toward confrontation and contributed to more or less fixed alliances; moreover, it encouraged efforts to suppress prospective great powers, such as Germany.

In 2019, it’s not at all clear we are back to bipolarity. Analysts remain divided over whether the U.S. unipolar era is waning (or is already over) — and, if so, whether we are heading for a new period of bipolarity, modern-day multipolarity or something else. Regardless, most analysts accept that other countries will play a central role in East Asian security affairs.

Russia, for example, still benefits from legacy military investments, India is developing economically and militarily, and Japan is beginning to build highly capable military forces to complement its still-significant economic might. Even if these nations aren’t as powerful as the United States or China, their presence makes for more fluid diplomatic arrangements and more diffuse security concerns than during the U.S.-Soviet competition. The resulting security dynamics are therefore likely to look very different.

4. Ideology plays less of a role in U.S.-Chinese relations

Many people see the Cold War as an ideological contest between U.S.-backed liberalism and Soviet-backed communism. But that’s not the whole story.

The early 20th century saw liberalism, communism and fascism vie for ideological preeminence. With fascism defeated alongside Nazi Germany, the postwar stage was set for a struggle between communism and liberalism to reinforce the U.S.-Soviet contest. That each ideology claimed universal scope ensured that the ideologies served as rallying cries for Third World conflicts, which were subsequently associated with the U.S.-Soviet struggle.

The respective “ideologies” of the United States and China do not favor this type of contest today. Indeed, analysts calling for a hard-line stance against China have faced difficulties even identifying a coherent Chinese ideological alternative. And while some researchers claim that a nascent ideological contest pitting an “autocratic” China against the “liberal” United States is emerging, this narrative ignores the political contests that shape Chinese politics (and have parallels in U.S. politics). Autocracies and democracies often cooperate. And on one important ideological issue — how they organize their economic lives — China and the United States have both embraced economic growth via trade, the private sector and semi-free markets.

## Debris

#### No miscalc - Lack attribution means they have no one to retaliate against

Schwarzer et al ’19 [Daniela, Eva-Marie McCormack, and Torben Schutz; Director, Editor, and Associate Fellow in the Security, Defense, and Armaments Program at the German Council of Foreign Relations; Deutsche Gesellschaft fur Auswartige Politik, “Technology and Strategy: The Changing Security Environment in Space Demands New Diplomatic and Military Answers,” [https://www.ssoar.info/ssoar/bitstream/handle/document/63288/ssoar-2019-schutz-Technology\_and\_Strategy\_the\_Changing.pdf](https://www.ssoar.info/ssoar/bitstream/handle/document/63288/ssoar-2019-schutz-Technology_and_Strategy_the_Changing.pdf?sequence=1&isAllowed=y&lnkname=ssoar-2019-schutz-Technology_and_Strategy_the_Changing.pdf);]

However, even a (misinterpreted) threat to space assets could start a chain reaction and quickly escalate an incident in space to a wider war. Successful deterrence, therefore, requires situational awareness, attribution capabilities and resilient assets. Especially the latter two are notoriously difficult to achieve in space. While it might be easy to attribute a kinetic attack executed with a missile, the same is not true for ASAT attacks by other satellites, and, especially, not for cyberattacks and electronic warfare measures. Without clear attribution, however, it is difficult to deter any adversary, since he could speculate that an attack cannot be traced back to him – making deterrence and retaliation more difficult. Although cross-domain deterrence, i.e. threatening an actor through potential retaliation attacks on or by other-than-space assets, is always possible, it also amplifies the problems involved in traditional deterrence: A response has to be timely and proportionate, and it should not further expand of the conflict.

#### Even if there is miscalc, no one would escalate – official statements prove

Colby 16 (Elbridge, Senior Fellow at the Center for a New American Security, “From Sanctuary to Battlefield: A Framework for a U.S. Defense and Deterrence Strategy for Space”)SLAIR

But such a threat is of substantially decreasing credibility. In today’s much different context, no one really believes that a limited space attack would necessarily or even plausibly be a prelude to total nuclear war. Would the United States respond with a major strategic strike if China or Russia, in the context of a regional conflict with the United States, struck discriminately at implicated U.S. space assets in the attempt to defang U.S. power projection, all while leaving the broader U.S. space architecture alone? Not only does such a massive response seem unlikely – it would be positively foolish and irresponsible. Furthermore, would other nations regard attacks on assets the United States was actively employing for a local war as off limits to attack? Indeed, any reasonable observer would have to judge that such discriminate attacks on U.S. space assets would not necessarily be illegitimate, as, by the United States’ own admission, it relies greatly on its space architecture for conventional power projection. Moreover, official U.S. statements on how the United States would respond to attacks on its space assets – to the limited extent such statements exist and the degree to which those given are clear – offer no indication it would respond massively to such strikes.53 Perhaps more to the point, senior responsible U.S. officials have telegraphed that the United States would indeed not necessarily respond massively to attacks against its space assets.54 In light of these factors, any U.S. space deterrence strategy that is predicated on an all-or-nothing retaliation to space attacks will become increasingly incredible and thus decreasingly effective – and indeed might even invite an adversary’s challenge in order to puncture or degrade U.S. credibility. In other words, since space assets can increasingly be attacked segmentally and discriminately rather than totally, this means that credibly and effectively deterring such attacks requires a less than total response. Since the threat is more like a rapier than a broadsword, the United States needs rapier-like ripostes of its own. Accordingly, the United States Any U.S. space deterrence strategy that is predicated on an all-or-nothing retaliation to space attacks will become increasingly incredible and thus decreasingly effective. needs a more discriminate deterrent for space. In particular, it needs a flexible deterrent capable of meeting the intensifying challenge of deterring an adversary – and particularly a highly capable potential opponent like China or Russia – from attacking (or attacking to a sufficient degree) those U.S. space assets needed for the United States to effectively and decisively project power and ultimately prevail in a conflict in a distant theater. At the same time, this flexible deterrent must contribute to dissuading such an enemy from striking at the nation’s broader military and civilian space architecture, and in particular those core strategic space assets needed for central deterrence.

### Fracking---1NC

#### Satellite loss shuts down global fracking

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. 99-105

Energy, environment, farming, mining, land use. All of these areas and more are now inextricably linked to satellite data and would be devastated should that flow of data stop.

Environmental Monitoring

Oh how complacent we've become. We take for granted that we will have instant images from space showing a volcanic eruption somewhere in the South Pacific within hours of learning that it happened. When the BP oll spill happened in the Gulf of Mexico in 2010, satellite images were used in conjunction with aircraft and ships to monitor the extent and evolving nature of the spill (Figures 10.1 and 10.2).

The data were also used to direct the ships that were attempting to clean up the spill, to warn fishermen of areas in which it would be dangerous to fish, and to generally monitor the extent of the disaster. This is the type of data we get from space in a field known as remote sensing.

Remote sensing is, well, exactly what its name implies. With it, you gather data, or sense, usually in the form of electromagnetic radiation (light), remotely - that is, you are not physically touching what you are looking at. Satellite remote sensing began shortly after we began launching satellites and many industries are now totally dependent upon having the capability.

We use satellites, like the venerable Landsat series, to study the Earth m unprecedented detail. Since 1972, Landsat satellites have taken millions of high resolution images of the Earth's surface, allowing comprehensive studies of how the land has changed due to human intervention (deforestation, agriculture, settlement, etc.) and natural processes (desertification, floods, etc.).

The best way to understand how useful Landsat and similar data can be to governments at all levels is best illustrated by looking at 14then and now" photographs. For example, Africa's Lake Chad has been shrinking for 40 years, as the desert has encroached on this once plentiful inland freshwater lake. Forty years ago, there were about 15,000 square miles of water within the lake. Now, it is less than 500 square miles (Figure 10.3) [1].

And what is the practical side of this particular bit of information?

Governments use this type of satellite imagery to avoid human tragedy. Hundreds of thousands of people, if not millions, depend upon the waters of Lake Chad for agriculture, industry, and personal hygiene. With the lake going dry, how has this impacted on their livelihoods, their families, and their very lives?

The European Space Agency (ESA) is freely providing satellite data to developing countries as they search for new sources of drinking water. For example, ESA assessed data obtained from space over Nigeria to find over 90 new freshwater sources within that country. After ground teams visited the new sites, all were confirmed to contain fresh water. This was no accident. These were satellites with sensors developed for just such purposes in mind [2].

Desertification is but one example of changing climates affecting people's everyday lives. What about more direct observations of our impact on the planet? Figures 10.4 and 10.5 show the scarring of the Earth's surface as a result of surface mining in West Virginia. This is not a polemic against mining; rather, it is an observation that we can use satellite imagery to monitor such mining and be mindful of its impact on the environment.

Other than taking pictures of surface features, like lakes and open pit mines, how are satellites monitoring the Earth's changing climate? In just about every way, by: monitoring global land, sea, and atmospheric temperatures; measuring yearly average rainfall amounts just about everywhere on the globe; measuring glaciation rates; measuring sea surface heights; and more. Remote sensing is more than taking pictures of the Earth in the visible part of the spectrum. We can learn a great deal from looking at part of the spectrum that our eyes cannot see - but our instruments can.

Shown in Figure 10.6 is a composite image of the Earth's surface showing the average land-surface temperature at night. The data came from two NASA satellites, Terra and Aqua, as they orbit the Earth in a polar orbit. (This means that they circle the Earth from top to bottom, passing over both the North and South Poles with each complete orbit.) Terra's orbit is such that it passes from the north to the south across the equator in the morning; Aqua passes south to north over the equator in the afternoon. Taken together, they observe the Earth's surface in its entirety every two days. Data sets such as this exist for just about any day of the year and can show either night-time lows or daytime highs.

By looking in different parts of the spectrum, like the infrared light discussed above, we can make observations as described in Table 10.1.

Pollution Monitoring

As emerging countries industrialize, they also become polluters. Many of these countries are not exactly forthright about releasing air-pollution details to the media, so much of our awareness of the rising pollution there is anecdotal - typically m the form of stories told by people who have visited these countries and seen the extreme pollution at first hand. This, by the way, is not exactly scientific.

Using satellites, and not relying on either the governments in question or second-hand stories, we can accurately assess the pollution levels there and elsewhere. Using satellite images to measure the amount of light absorbed or blocked by fine particulates in the atmosphere, otherwise known as air pollution, you can determine not only what the airborne pollutant might be, but also its size. And, by looking at the overall light blockage, an accurate estimate of the amount of pollution in the air can also be made. Recent studies show that many of these countries are covered in a pollution cloud that countries in the developed world would deem extremely harmful. And how do we know this with scientific certainty? From satellite measurements.

Energy Production

The recent boom in the production of shale oil in the United States and elsewhere is due in large part to the identification and geolocation of promising geologic formations for test drilling and fracking. "Fracking" is a somewhat new term that comes from the phrase "hydraulic fracturing". In fracking, massive amounts of previously unusable reservoirs of oil and natural gas are released for capture, sale, and transport from deposits deep within the Earth - many located at least a mile below the surface. In the United States alone, there may be as much as 750 trillion cubic feet of natural gas within shale deposits releasable by fracking [3]. How do energy companies know where to look for these deposits? In large part, by analyzing satellite imagery.

According to Science Daily (26 February 2009), a new map of the Earth's gravitational field based on satellite measurements makes it much less resource intensive to find new oil deposits. The map will be particularly useful as the ice melts in the oil-rich Arctic regions. The easy-to-find oilfields have already been found. To fuel the growing world economy, those harder-to-find deposits must be located and tapped - which is why satellite imagery is so important. Take away this and other satellite-dependent techniques of oil and gas exploration and the world economy will feel the impact through higher oil and natural gas prices.

#### Fracking makes extinction inevitable---try-or die to shut it off

Rev. Mac Legerton 18, Co-Founder and Executive Director of the Center for Community Action, Member of the Board of Directors of the NC Climate Solutions Coalition, Member of the Board of Directors of the Windcall Institute, “Will The U.S. Blaze A Trail To Mass Extinction?”, APPPL News, 1/15/2018, https://www.apppl.org/news/will-the-u-s-blaze-a-trail-to-mass-extinction/

As an elder, I now realize that there is even a greater threat to humanity and life on Earth than nuclear war—though, unlike a nuclear exchange, this threat is a slow-motion catastrophe. Can you guess what it is? Here’s a clue: it is something with which most people don’t have a personal relationship. Tragically, some persons remain in total denial of its validity, much less its present danger. And that’s the problem – that’s why this threat needs to be more seriously addressed on the local, state, national, and international level.

What is it? It’s the slow-motion but rapidly growing catastrophe of climate change. There’s now good news amidst this seemingly overwhelming challenge. But the answer may surprise you. Today we know what is the #1 preventable cause of climate change. It’s not coal, it’s not nuclear, and it’s not oil and gasoline. It’s actually the use of the very fuel that is touted as being cleaner, greener, and cheaper than all the rest. This fuel is called “Natural Gas”.

Let’s start with its name – “Natural Gas”. What is “natural gas”? There’s actually nothing “natural” about it when it is forcibly extracted from the ground through hydraulic fracturing, commonly known as “fracking”. When something is forcibly ruptured from deep within the earth with the use of toxic chemicals, the last name you would use for it is “natural”.

Fracking disrupts the geologic fault lines causing earthquakes, uses millions of gallons of fresh water that becomes permanently poisoned by unknown, cancer-producing chemicals added to it, creates air pollution during the drilling process, increases the risk of injury and explosions, raises major health risks to both people and place in close proximity to it, and changes the nature of both neighborhoods and landscapes. Fracking also leaves a massive carbon footprint of drilling wells as deep as 8,000 feet and then drilling horizontally over 10,000 feet; On top of all this, it leaks major amounts of gas into the environment.

So, what is this gas? It is 90-95% methane gas which is a hydrocarbon compound made up of one carbon atom and four hydrogen atoms (CH4). It releases carbon into the atmosphere and produces carbon dioxide (C02) just like coal does when it is burned. Methane is not its trace element–it is its undisputed compound of this fossil fuel product. If a compound is 90-95% of a product, it makes sense to call it by that name. Doesn’t it? Well, actually not if you want people to believe and think that it is something that it is not. It is un-natural methane gas produced under massive and highly toxic pressure and hazardous conditions.

Now that we know what this gas is, what does it do to the atmosphere and climate that is so dangerous? This hydrocarbon has properties that block the radiation of heat from Earth’s surface 100 times more effectively than CO2 (released from burning coal) during its first 10 years of release and 86 times more effectively in its first 20 years. Because of the climate emergency underway, the first 10 or 20 years matter most.

When utility companies and the larger fossil fuel companies state that they are committed to lowering carbon emissions, this just isn’t true. They are radically escalating the most dangerous and worst of all fossil fuels in relation to its impact on the climate. Now the industry wants to expand production of methane gas all over the world by calling it “the most environmentally friendly fossil fuel”and a “bridge fuel” that we can safely use until we transition to 100% renewable energy sources.

Why would a major business industry want to call its product by another name? Perhaps for the same reason that the tobacco industry did not like the term “coffin nails” or “cancer sticks” for cigarettes. Honestly, there’s a striking similarity between what are called cigarettes and natural gas. When both were produced and named, their harm was not fully known. Once the industries promoting them learned of their significant harm, they did everything they could to hide this knowledge from the public. They even hired scientists to deny their dangers. The tobacco industry was eventually sued, the truth was acknowledged, and billions of dollars were paid out in the tobacco settlement.

This same scenario that occurred with the tobacco industry needs to occur with methane gas and the fossil fuel industry. The major difference in these two scenarios is that that this fossil fuel product doesn’t just threaten the lives of individuals who voluntarily breathe it in – it threatens the lives of not only every human being, but also all life on the planet. The outcome of this scenario needs to be a moratorium and eventual end to all use of methane gas as an energy source. For the sake of all of us, our communities, and world, the sooner the better. This abomination is different. There is no time to waste.

### Afghanistan---1NC

#### Satellites drive poppy eradication

Xiangyu Liu 18, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences and University of Chinese Academy of Sciences, et al., “Opium Poppy Detection Using Deep Learning”, Remote Sensing, Volume 10, Number 12, https://www.mdpi.com/2072-4292/10/12/1886/htm

5. Conclusions

Using satellite remote sensing has become a mainstream approach for monitoring poppy cultivation. However, identifying the location of poppy parcels and mapping their spatial distribution are of great practical significance for local governments making and implementing eradication plans. In order to obtain the specific location coordinates of poppy parcels, we used deep learning-based object detection to detect the location of target poppy parcels in remote sensing images and obtain a spatial distribution map of the poppy growing area. We also compared and analyzed the model performance in different situations using verification areas in Phongsali. It was found that for the region in Phongsali, our method can not only detect poppy parcel locations with a higher precision and recall (95% and 85%, respectively), it also performs well on other types of satellite images and at other spatial resolutions. Compared to existing monitoring methods, our work has three unique points: (1) it can obtain the specific location coordinates of poppy parcels by automatic feature extraction from training data; (2) it provides a quantitative analysis of prediction performance for different parameters; and (3) it performs well on satellite images of different types and varying spatial resolution. In future work, our detection method will be utilized to monitor poppy parcels in different areas, and more experiments will be conducted to verify the applicability of our model to other types of satellite images.

### Drug Trafficking---1NC

#### Satellite data ratchets up drug eradication efforts

Kieron Monks 14, Writer for CNN, The Guardian, and Prospect Magazine, BA from the University of Nottingham, “Spy Satellites Fighting Crime From Space”, CNN, 8/12/2014, https://www.cnn.com/2014/08/11/tech/innovation/spy-satellites-fighting-crime-from-space/index.html

The Alayed case is one of several pilot schemes the company is running with police forces and security agencies. A key focus is on organized crime, trafficking and smuggling. The satellites have been put to work on the illegal fishing industry, worth up to $23 billion a year, tracking ships to witness crimes in real time.

"We can identify a specific ship and monitor its behaviour from port to port. We can see if it meets another vessel in a strange way and offloads cargo, or fishes in water it's not allowed to," says Hilton.

In addition to improved resolution, SA Catapult is benefiting from a steady increase in the number of Earth observation satellites, with launches set to double over the next decade, making more data available as well as bringing down the cost. This progress is also enabling the growth of rivals such as U.S. firm Digital Globe, while the Asian market is also expanding.

Some experts believe space surveillance could become industry standard. "The technologies that Catapult is developing will have broad application not only for national and international police organizations but also for anyone working in international security," said Patricia Lewis, research director of International Security at think tank Chatham House. Drug trafficking and arms reduction treaties are among the priority applications, says Lewis.

Read this: Robot furniture builds itself

It will soon be cost effective for police forces to buy their own satellites, predicts Ray Purdy, expert on satellites and the law at University College London. Purdy has been able to monitor criminal activity -- such as large-scale illegal waste disposal -- through satellite surveillance, which would have allowed police to cheaply and easily strengthen existing cases.

"I've gone back and looked at crimes after a prosecution and in some cases you can see illegal activity a year before, which could have allowed a greater conviction," he said. "In other cases we found people resumed criminal activity immediately after they were prosecuted."

#### That backfires, destabilizing Latin America

Barney Lerten 19, Reporter for KTVZ News, “Computer Model: Big Cocaine Busts Backfire Big-Time”, KTVZ News 21, 4/3/2019, https://www.ktvz.com/news/osu-computer-model-big-cocaine-busts-backfire-big-time/1065357402

Efforts to curtail the flow of cocaine into the United States from South America have made drug trafficking operations more widespread and harder to eradicate, according to new research published this week in Proceedings of the National Academy of Sciences.

The National Science Foundation supported the study, which included an Oregon State University geographer and was led by Nicholas Magliocca from University of Alabama. The collaboration also included researchers from The Ohio State University, Northern Arizona University, Arizona State University, Texas State University-San Marcos, the University of Wyoming and the U.S. Fish and Wildlife Service.

“It really is surprising how the model matches our observations,” said David Wrathall of OSU’s College of Earth, Ocean and Atmospheric Sciences. “Our team consists of researchers who worked in different parts of Central America during the 2000s and witnessed a massive surge of drugs into the region that coincided with a reinvigoration of the war on drugs. We asked ourselves: did drug interdiction push drug traffickers into these places?”

The findings are important because after five decades, the United States’ war on drugs has yet to prove itself effective or cost-efficient for dealing with cocaine trafficking, the researchers note. The study comes at a time of increased attention on Central American migrants fleeing drug-related violence in their home countries.

The scientists developed a computer model named NarcoLogic that shows how drug traffickers respond to interdiction strategies and tactics. It differs from previous approaches because it models local- and network-level trafficking dynamics at the same time.

Interdiction efforts are linked to the spread and fragmentation of trafficking routes – a phenomenon known as the “balloon and cockroach effect.” When interdiction efforts are focused in one location, drug traffickers simply relocate.

“Between 1996 and 2017, the Western Hemisphere transit zone grew from 2 million to 7 million square miles, making it more difficult and costly for law enforcement to track and disrupt trafficking networks,” Wrathall said. “But as trafficking spread, it triggered a host of smuggling-related collateral damages: violence, corruption, proliferation of weapons, and extensive and rapid environmental destruction, which has been the focus of my work.”

#### Nuclear war

Dr. Andrew F. Krepinevich 14, Jr., President of the Center for Strategic and Budgetary Assessments, M.P.A. and Ph.D. from Harvard University, and Eric Lindsey, Analyst at the Center for Strategic and Budgetary Assessments, M.A. in Strategic Studies and International Economics from the Johns Hopkins School of Advanced International Studies (SAIS), “Hemispheric Defense in the 21st Century”, 1/9/2014, https://csbaonline.org/research/publications/hemispheric-defense-in-the-21st-century

As the previous chapter demonstrates, for the past two hundred years the principal cause of concern for U.S. defense policymakers and planners thinking about Latin America has been the prospect that great powers outside the Western Hemisphere could exploit the military weakness and internal security challenges of the states within it to threaten U.S. security. While there is reason for optimism about the future of Latin America,58 there is also cause for concern. The region faces enduring obstacles to economic59 and political development60 as well as signi􀂿cant internal security challenges. As General John Kelly, the commander of U.S. Southern Command (SOUTHCOM)61 noted in his March 2013 posture statement before Congress, Latin America: 􀀾I􀁀s a region of enormous promise and exciting opportunities, but it is also one of persistent challenges and complex threats. It is a region of relative peace, low likelihood of interstate con􀃀icts, and overall economic growth, yet is also home to corrosive criminal violence, permissive environments for illicit activities, and episodic political and social protests.62 The instability and non-traditional security challenges that General Kelly cites provide potential opportunities for the United States’ major rivals to (borrowing a term from Monroe’s declaration) “interpose” themselves into the region and, by so doing, threaten regional stability and U.S. security. Two discernible trends suggest that current and prospective Eurasian rivals could seek to exploit regional conditions and dynamics in ways that could impose immense costs on the United States and divert its attention from more distant theaters overseas. The first trend is a return to a heightened level of competition among the “great powers” following two decades of U.S. dominance. The second trend concerns the growing cost of projecting power by traditional military means due to the proliferation of “anti-access/area-denial” (A2/AD) capabilities in general, and precision-guided munitions (PGMs) in particular. These trends suggest that, despite a possible decline in relative U.S. power, external forces will continue to 􀂿nd it beyond their means to threaten the hemisphere through traditional forms of power projection. Far more likely is a return of a competition similar to that which the United States engaged in with the Soviet Union during the Cold War. During that period both powers sought to avoid direct con􀃀ict with the other, given the risks of escalation to nuclear con􀃀ict. Instead each focused primarily on gaining an advantage over the other through the employment of client states and non-state groups as proxies. Proxies were employed for reasons other than avoiding a direct clash, such as gaining positional advantage (e.g., enabling the sponsor to establish bases in its country, as the Soviets did in Cuba). Proxies were also employed as a means of diverting a rival’s attention from what was considered the key region of the competition and to impose disproportionate costs on a rival (e.g., Moscow’s support of 􀀱orth Vietnam as a means of drawing o􀌆 U.S. resources from Europe). This chapter outlines trends in the Western Hemisphere security environment that outside powers may seek to exploit to advance their objectives in ways that threaten regional stability and U.S. security. This is followed by a discussion of how these external powers might proceed to do so. Seeds of Instability Crime, Illicit Networks, and Under-Governed Areas Latin America has a long history of banditry, smuggling, and organized crime. As in the case of Pancho Villa and the 1916-1917 Punitive Expedition, these activities have occasionally risen to a level at which they in􀃀uence U.S. national security calculations. Rarely, however, have these activities been as pervasive and destabilizing as they are today. Although a wide variety of illicit activity occurs in Latin America, criminal organizations conducting drug tra􀌇cking are the dominant forces in the Latin American underworld today, accounting for roughly 􀀇􀀗0 billion per year63 of an estimated 􀀇100 billion in annual illicit trade.6􀀗 Since the Colombian cartels were dismantled in the 1990s, this lucrative trade has been dominated by powerful Mexican cartels whose operations extend across the length and breadth of Mexico, as well as up the supply chain into the cocaine-producing regions of the Andean Ridge and through their wholesale and retail drug distribution networks across the United States.65 The cartels, along with countless smaller criminal organizations, comprise what the head of SOUTHCOM has described as, 􀀾a􀁀n interconnected system of arteries that traverse the entire Western Hemisphere, stretching across the Atlantic and Paci􀂿c, through the Caribbean, and up and down 􀀱orth, South, and Central America . . . 􀀾a􀁀 vast system of illicit pathways 􀀾that is used􀁀 to move tons of drugs, thousands of people, and countless weapons into and out of the United States, Europe, and Africa with an e􀌇ciency, payload, and gross pro􀂿t any global transportation company would envy.66 That being said, the drug tra􀌇cking underworld is by no means a monolithic entity or cooperative alliance. Rather, it is a fractious and brutally competitive business in which rival entities are constantly and literally 􀂿ghting to maximize their share of the drug trade and for control of the critical transshipment points, or plazas, through which it 􀃀ows. To attack their competitor’s operations and protect their own operations from rivals and the Mexican government’s crackdown that began in 2006, the cartels have built up larger, better armed, and more ruthless forces of hired gunmen known as sicarios. Using the billions of dollars generated by their illicit activities, they have acquired weapons and equipment formerly reserved for state armies or state-sponsored insurgent groups, including body armor, assault ri􀃀es, machine guns, grenades, landmines, anti-tank rockets, mortars, car bombs, armored vehicles, helicopters, transport planes, and—perhaps most remarkably—long-range submersibles.67 The cartels’ pro􀂿ts have also enabled them to hire former police and military personnel, including members of several countries’ elite special operations units68 and, in several cases, active and former members of the U.S. military.69 These personnel bring with them—and can provide to the cartels—a level of training and tactical pro􀂿ciency that can be equal or superior to those of the government forces they face. As a result of this pro􀂿ciency and the military-grade weapons possessed by the cartels, more than 2,500 Mexican police o􀌇cers and 200 military personnel were killed in confrontations with organized crime forces between 2008 and 2012 along with tens of thousands of civilians.70 In the poorer states of Central America, state security forces operate at an even greater disadvantage.71 While their paramilitary forces enable the cartels to dominate entire cities and large remote areas through force and intimidation, they are not the only tool available. The cartels also leverage their immense wealth to buy the silence or support of police and government o􀌇cials who are often presented with a choice between plata o plomo—“silver or lead.” According to the head of the Mexican Federal Police, around 2010 the cartels were spending an estimated 􀀇100 million each month on bribes to police.72 By buying o􀌆 o􀌇cials—and torturing or killing those who cannot be corrupted—the cartels have greatly undermined the e􀌆ectiveness of national government forces in general and local police in particular. This, in turn, has undermined the con􀂿dence of the population in their government’s willingness and ability to protect them. Through these means and methods the cartels have gained a substantial degree of de facto control over many urban and rural areas across Mexico, including major cities and large swathes of territory along the U.S.-Mexico border. In many of these crime-ridden areas the loss of con􀂿dence in the government and police has prompted the formation of vigilante militias, presenting an additional challenge to government control.73 Meanwhile, in the “northern triangle” of Central America (the area comprising Guatemala, Honduras, and El Salvador through which the cartels transship almost all cocaine bound for Mexico and the United States) the situation is even more dire. Approximately 90 percent of crimes in this area go unpunished, while in Guatemala roughly half the country’s territory is e􀌆ectively under drug tra􀌇ckers’ control.7􀀗 Further south, similar pockets of lawlessness exist in coca-growing areas in Colombia, Venezuela, Ecuador, Peru, and Bolivia. In Colombia and along its borders with Venezuela, Ecuador, and Peru, much of the coca-growing territory remains under the control of the Revolutionary Armed Forces of Colombia, or FARC. A guerrilla organization founded in the 1960s as a Marxist-Leninist revolutionary movement dedicated to the overthrow of the Colombian government, the FARC embraced coca growing in the 1990s as a means of funding its operations and has subsequently evolved into a hybrid mix of left-wing insurgent group and pro􀂿t-driven cartel.76 This hybrid nature has facilitated cooperation between the FARC and ideological sympathizers like the Bolivarian Alliance, Hezbollah, Al Qaeda in the Islamic Maghreb, and other extremist groups77 as well as with purely criminal organizations like the Mexican cartels. Although the FARC has been greatly weakened over the past decade and no longer poses the existential threat to the Colombian government that it once did, it remains 􀂿rmly in control of large tracts of coca-producing jungle, mostly straddling the borders between Colombia and FARC supporters Venezuela and Ecuador. In summary, organized crime elements have exploited under-governed areas to establish zones under their de facto control. In so doing they pose a signi􀂿cant and growing threat to regional security in general and U.S. interests in particular. As SOUTHCOM commander General Kelly recently observed: 􀀾T􀁀he proximity of the U.S. homeland to criminally governed spaces is a vulnerability with direct implications for U.S. national security. I am also troubled by the signi􀂿cant criminal capabilities that are available 􀀾within them􀁀 to anyone—for a price. Transnational criminal organizations have access to key facilitators who specialize in document forgery, trade-based money laundering, weapons procurement, and human smuggling, including the smuggling of special interest aliens. This criminal expertise and the ability to move people, products, and funds are skills that can be exploited by a variety of malign actors, including terrorists.78 Hezbollah and the Bolivarian Alliance Hezbollah in Latin America 􀀱on-state entities recognized by the U.S. as terrorist organizations also operate in the region, most notably Lebanon-based Hezbollah, an Iranian client group. Hezbollah maintains an active presence in the tri-border area (TBA) of South America— the nexus of Argentina, Brazil, and Paraguay—stretching back to the 1980s. The TBA has traditionally been under-governed and is known by some as “the United 􀀱ations of crime.”79 Eight syndicate groups facilitate this activity in South America’s so-called “Southern Cone,” overseeing legitimate businesses along with a wide range of illegal activities to include money laundering, drug and arms traf- 􀂿cking, identity theft and false identi􀂿cation documents, counterfeiting currency and intellectual property, and smuggling. 􀀱ot surprisingly they are linked to organized crime and to non-state insurgent and terrorist groups, such as the FARC.80 Estimates are that over 􀀇12 billion in illicit transactions are conducted per year, a sum exceeding Paraguay’s entire GDP by a substantial amount.81 Hezbollah achieved notoriety in the region in 1992 when it bombed the Israeli embassy in Argentina. This was followed with the bombing of the AMIA Jewish community center in Buenos Aires two years later. Like many other terrorist organizations, as Hezbollah expanded it established relationships with drug cartels82 that it supports in a variety of ways. For example, the cartels have enlisted Hezbollah, known for its tunnel construction along the Israeli border, for help in improving their tunnels along the U.S.-Mexican border. In 2008, Hezbollah helped broker a deal in which one of Mexico’s major drug cartels, Sinaloa, sent members to Iran for weapons and explosives training via Venezuela using Venezuelan travel documents. 83 As the locus of the drug trade and other illegal cartel activities moved north into Central America and Mexico, Hezbollah has sought to move with it with mixed success. In October 2011, Hezbollah was linked to the e􀌆orts of an Iranian-American to conspire with Iranian agents to assassinate the Saudi ambassador to the United States. The plot involved members of the Los Zetas Mexican drug cartel.8􀀗 The would-be assassin, Mansour Arbabsiar, had established contact with his cousin, a Quds Force85 handler, Gen. Gholam Shakuri. The plot is believed by some to be part of a wider campaign by the Quds Force and Hezbollah to embark on a campaign of violence extending beyond the Middle East to other Western targets, including those in the United States.86 In early September 2012, Mexican authorities arrested three men suspected of operating a Hezbollah cell in the Yucatan area and Central America, including a dual U.S.-Lebanese citizen linked to a U.S.-based Hezbollah money laundering operation. 87A few months later, in December 2012, Wassim el Abd Fadel, a suspected Hezbollah member with Paraguayan citizenship, was arrested in Paraguay. Fadel was charged with human and drug tra􀌇cking and money laundering. Fadel reportedly deposited the proceeds of his criminal activities—ranging from 􀀇50-200,000 per transaction—into Turkish and Syrian bank accounts linked to Hezbollah. In summary, Hezbollah has become a 􀂿xture in Central and Latin America, expanding both its activities and in􀃀uence over time. It has developed links with the increasingly powerful organized crime groups in the region, particularly the narco cartels, along with radical insurgent groups such as the FARC and states like Venezuela who are hostile to the United States and its regional partners. Hezbollah’s principal objectives appear to be undermining U.S. in􀃀uence in the region, imposing costs on the United States, and generating revenue to sustain its operations in Latin America and elsewhere in the world. These objectives are shared by Iran, Hezbollah’s main state sponsor. The Bolivarian Alliance As noted above, geographic, economic, and cultural factors have traditionally helped to prevent the emergence in Latin America of any real military rival to the United States. Although there are no traditional military threats in the region, there are indigenous states whose actions, policies, and rhetoric challenge regional stability and U.S. security. Over the past decade, several states have come together to form the Bolivarian Alliance of the Americas (ALBA), an organization of left-leaning Latin American regimes whose overarching purpose is to promote radical populism and socialism, foster regional integration, and reduce what they perceive as Washington’s “imperialist” influence in the region.89 Since its founding by Hugo Chavez of Venezuela and Fidel Castro of Cuba in December 200􀀗, the Bolivarian Alliance has expanded to include Antigua and Barbuda, Bolivia, Dominica, Ecuador, 􀀱icaragua, and Saint Vincent and the Grenadines. Although the members of the Bolivarian Alliance are militarily weak and pose almost no traditional military threat to the United States or its allies in the region,90 they challenge American interests in the region in other ways. First, they espouse an anti-American narrative that finds substantial support in the region and consistently oppose U.S. efforts to foster cooperation and regional economic integration.91 Second, in their efforts to undermine the government of Colombia, which they consider to be a U.S. puppet, ALBA states provide support and sanctuaries within their borders to coca growers, drug traffickers, other criminal organizations, and the FARC.92 Links to Hezbollah have also been detected.93 Perhaps of greatest concern, they have aligned themselves closely with Iran, inviting it and Syria to participate as “observer states” in the alliance. Other worrisome ALBA activities involve lifting visa requirements for Iranian citizens and hosting large numbers of Iranian diplomats and commercial exchange members that some observers believe to be Iranian intelligence and paramilitary Quds Force operatives.9􀀗 By hosting and cooperating with both foreign agents and violent non-state actors, the ALBA states have come to function as critical nodes in a network of groups hostile to the United States. A Coming Era of Proxy Wars in the Western Hemisphere? History shows that Washington has often emphasized an indirect approach to meeting challenges to its security in Latin America. Yet the United States has not shied away from more direct, traditional uses of force when interests and circumstances dictated, as demonstrated over the past half century by U.S. invasions of the Dominican Republic (1965), Grenada (1983), and Panama (1989) and the occupation of Haiti (199􀀗).Yet several trends seem likely to raise the cost of such operations, perhaps to prohibitive levels. Foremost among these trends is the diffusion of precision-guided weaponry to state and non-state entities. 92 The Second Lebanon War as “Precursor” War A precursor of this trend can be seen in the Second Lebanon War between Israel and Hezbollah.95 During the con􀃀ict, which lasted less than 􀂿ve weeks, irregular Hezbollah forces held their own against the highly regarded Israeli Defense Force (IDF), demonstrating what is now possible for non-state entities to accomplish given the proliferation of militarily-relevant advanced technologies. Hezbollah’s militia engaged IDF armor columns with salvos of advanced, man-portable, antitank guided missiles and other e􀌆ective anti-armor weapons (e.g. rocket-propelled grenades (RPGs) with anti-armor warheads) in great numbers. When the IDF employed its ground forces in southern Lebanon, its armored forces su􀌆ered severe losses; out of the four hundred tanks involved in the 􀂿ghting in southern Lebanon, forty-eight were hit and forty damaged.96 Hezbollah’s defensive line was also well equipped with latest-generation thermal and low-/ no-light enhanced illumination imaging systems, while frontline units were connected to each other and higher command elements via a proprietary, 􀂿ber-optic based communications network, making collection of communications tra􀌇c by Israeli intelligence extremely di􀌇cult. Perhaps most important, Hezbollah possessed thousands of short- and medium- range rockets, often skillfully hidden below ground or in bunkers that made detection from overhead surveillance platforms nearly impossible. During the brief con􀃀ict Hezbollah’s forces 􀂿red some four thousand unguided rockets of various types that hit Israel. Hezbollah’s rocket inventory enabled its forces to attack targets throughout the northern half of Israel. Over nine hundred rockets hit near or on buildings, civilian infrastructure, and industrial plants. Some two thousand homes were destroyed, and over 􀂿fty Israelis died with several thousand more injured. The casualties would undoubtedly been greater if between 100,000 and 250,000 Israeli civilians had not 􀃀ed their homes. Haifa, Israel’s major seaport had to be shut down, as did its oil re􀂿nery.97 Hezbollah also employed several unmanned aerial vehicles for surveillance of Israel, as well as C-802 anti-ship cruise missiles used to attack and damage an Israeli corvette. 98 The G-RAMM Battlefield The brief war between Israel and Hezbollah suggests that future irregular forces may be well-equipped with enhanced communications, extended-range surveillance capabilities, and precision-guided rockets, artillery, mortars and missiles (G-RAMM) 99 able to hit targets with high accuracy at ranges measured from the tens of kilometers perhaps up to a hundred kilometers or more. In projecting power against enemies equipped in this manner and employing these kinds of tactics U.S. forces—as well as other conventional forces— will find themselves operating in a far more lethal battlefield than those in either of the Gulf wars or in stability operations in Afghanistan and Iraq. Moreover, currently constituted conventional forces typically depend on large fixed infrastructure (e.g., military bases, logistics depots, ports, airfields, railheads, bridges) to deploy themselves and sustain combat operations. These transportation and support hubs also serve as the nodes through which internal commerce and foreign trade moves within a country. This key, fixed infrastructure will almost certainly prove far more difficult to defend against irregular forces armed with G-RAMM weaponry. Indeed, had Hezbollah’s “RAMM” inventory had only a small fraction of G-RAMM munitions, say 10-20 percent, it would have been able to in􀃀ict far greater damage than it did historically to Israeli population centers, key government facilities, military installations, and essential commercial assets such as ports, air􀂿elds, and industrial complexes. An irregular enemy force armed with G-RAMM capabilities in substantial numbers could seriously threaten Latin American governments as well as any U.S. (or external great power) forces and support elements attempting a traditional intervention operation. Implications for the U.S. and Other Major Powers The preceding narrative suggests that the combat potential of irregular forces is likely to increase dramatically in the coming years. As this occurs, the cost of operating conventional forces—especially ground forces—and defending key military support infrastructure is likely to rise substantially. Given these considerations the United States and other major powers external to the Western Hemisphere will have strong incentives to avoid the use of conventional forms of military power, particularly large ground forces, in favor of employing irregular proxy forces to advance their interests. Moreover, the high cost and questionable bene􀂿t of the campaigns in Afghanistan and Iraq are likely to create strong domestic opposition in the United States to such operations for some time to come. This must be added to the United States’ greatly diminished 􀂿scal standing that has led to large cuts in planned investments in defense. These factors suggest that Washington will be much less likely to engage in direct military action in Latin America in the coming years than historically has been the case. At the same time, rivals of the United States like China and Russia may be incentivized by these trends, as well as the United States’ overwhelming military dominance in the Western Hemisphere, to avoid the direct use of force to expand their in􀃀uence in Latin America. Instead, like some of the Bolivarian Alliance members, they appear likely to follow the path taken by the Soviet Union during the Cold War and Iran today: supporting non-state proxies to impose disproportionate costs on the United States and to distract Washington’s resources and attention from other parts of the world. This is not to say that Beijing, Moscow, and Tehran would eschew future opportunities to establish bases in Latin America. As in the past, such bases can support efforts to accomplish several important objectives. They can, for example, further insulate a Latin American regime from the threat of direct U.S. military intervention, since Washington would have to account for the possibility that the conflict would lead to a direct confrontation with a more capable and potentially nuclear-armed power.100 Bases in the hemisphere can also enable external powers to conduct military assistance activities, such as training, more easily. Electronic surveillance of the United States and Latin American states could be accomplished more cheaply and e􀌆ectively from forward positions. Finally, certain kinds of military capabilities, such as long-range ballistic missiles and attack submarines, could be pro􀂿tably stationed in Latin America by powers external to that region, particularly if they intended to create the option of initiating con􀃀ict at some future date. These reasons, among others, have made preventing an extra-hemispheric power from establishing bases in Latin America an enduring U.S. priority. Players in a Latin American Great Game Given current trends, several powers external to the region may, either now or over the coming decade, have both the motive and the means to employ both state and non-state proxies in Latin American to achieve their interests. Principal among them is Iran, which is already engaged in supporting proxies against the United States and its partners in the Middle East and has long been developing proxies in Latin America. Additionally, there are reasons to think that China and Russia may be interested in cultivating and supporting Latin American proxies as well.