# Space Assets Supplement---Wave Two

## Asats Adv

### ASATs ADV---Arms Race

#### ASAT arms race increases global conflict and renders space unusable.

Talia Blatt, 20 (Talia M. Blatt specializes in East Asian geopolitics and security issues, 5-26-2020, accessed on 7-9-2022, Harvard International Review, "Anti-Satellite Weapons and the Emerging Space Arms Race", https://hir.harvard.edu/anti-satellite-weapons-and-the-emerging-space-arms-race/, HBisevac)

Nevertheless, a space race born from the Cold War continues to **unfold**. While the current space race may not have the same monopoly on the American imagination as the sprint to the moon held during the 1950s and 60s, it deserves our equal attention. We are now witnessing the rapid and increasingly international development of **anti-satellite weapons**. The race for these weapons not only increases the risk of **global conflict**—it could **jeopardize** all future **space exploration**.

What Are Anti-Satellite Weapons (ASATs)?

Difficult to define, ASATs occupy a gray zone in international arms control. On one level, they are exactly what the term suggests: weapons designed to destroy or limit satellites for military purposes, such as undermining the command and control centers of an adversary’s military. ASATs can function in several ways. For example, kinetic energy ASATs (KE-ASATs) destroy satellites by physically colliding with them at high velocities. Drones, ballistic missiles, and explosives detonated near satellites can all function as KE-ASATs.

Conversely, non-kinetic ASATs use any non-physical mechanism to render a satellite inoperative, such as blinding satellites with lasers, launching cyberattacks, or jamming frequencies.

But definitional issues arise because any technology that can physically or non-kinetically damage a satellite can be considered an ASAT weapon. For example, supposedly benign technology aimed at removing defunct satellites or other space junk—known as Active Debris Removal (ADR) technology—can also remove active satellites. With ostensibly civil but covertly military capabilities or functions, many space technologies, including ADR, are put in a category commonly known as “dual-use.” The dual-use nature of space infrastructure makes differentiating between weapon and non-weapon nearly impossible. As a result, regulating ASATs—and many other space-based weapons systems—is extremely difficult.

A Brief History of ASAT Proliferation

The earliest ASAT testing began during the Cold War, when the success of Sputnik I in October of 1957 catalyzed American fears about the Soviet Union’s potential goal of developing nuclear armed satellites capable of circling the globe. In response, the US developed its first ASAT: Bold Orion, an air-launched ballistic missile. The Soviet Union responded with its own ASAT program, developing weapons through the 1960s and 70s known as co-orbitals. Unlike previous KE-ASAT designs, these co-orbitals worked by syncing up with a target satellite’s orbit, then detonating.

The United States responded to Soviet co-orbitals in the 1980s with the ASM-135 weapon, an air-launched KE-ASAT distinguished by its hit-to-kill method. Unlike the Soviet co-orbitals, the hit-to-kill system did not require explosives; it just used the energy generated by the collision between the craft and the satellite, making delivery more stable. In a 1985 demonstration authorized by President Ronald Reagan, an ASM-135 successfully destroyed a defunct satellite.

Roughly 30 years later, China joined the space race. In 2007, China successfully tested a KE-ASAT, destroying an old weather satellite with a ballistic missile. And just last year, India also successfully tested an ASAT in what the Indian government referred to as Mission Shakti.

As of 2018, Russia and China were still developing more advanced non-kinetic ASATs. Russia is specifically developing an ASAT system known as Nudol, which operates in Lower Earth Orbit and can move between orbital paths, threatening more satellites than weapons limited to just one orbital path. So, despite the end of the Cold War era, more and more nations are jumping into a space arms race that is resulting in the rapid proliferation of advanced space weaponry.

The ASAT Appeal

A global fixation on anti-satellite weapons is arguably the logical end result of the main American project of the late 20th and early 21st century: the movement to digital communications. Via the telephone, computers, and eventually the internet, the United States pioneered the use of space-based communications for most civil and military functions. The benefits of satellite-based communications—namely increased efficiency, precision, and volume of information transmitted—are self-evident; however, the US lead in the transition to space-based systems posed a threat: relying on satellites for military use more than any other country created an asymmetric dependency. In other words, an unexpected denial of space-enabled information or capabilities would be more debilitating to the United States than to any other country because no other country is as dependent on satellite communications. In an era of US hegemony, powers like Russia, China, and India are looking for arenas in which they can make the most gains against a conventionally stronger opponent. The space race has an asymmetric nature: the more the United States develops in space, the more it has to lose. Thus, space warfare provides an arena where emerging powers can gain a strategic advantage relative to the US. More broadly, ASATs are also desirable because they can function as conflict deterrents. If a conflict arises, countries may be less likely to escalate if they believe their opponents are capable of essentially blinding their military. Just as two nuclear armed opponents risk mutually assured destruction (MAD), two ASAT armed countries risk mutual impotence. If they both can “turn off” each other’s militaries—or deny access to the satellites upon which their opponent’s conventional and nuclear forces rely—both countries are rendered close to defenseless, a risk they would be extremely reluctant to take.

A Uniquely Dangerous Arms Race

Despite their deterrent functions, ASATs are more likely to provoke or exacerbate conflicts than dampen them, especially given the risk they pose to early warning satellites. These satellites are a crucial element of US ballistic missile defense, capable of detecting missiles immediately after launch and tracking their paths. Suppose a US early warning satellite goes dark, or is shut down. Going dark could signal a glitch, but in a world in which other countries have ASATs, it could also signal the beginning of an attack. Without early warning satellites, the United States is much more susceptible to nuclear missiles. Given the strategy of counterforcing—targeting nuclear silos rather than populous cities to prevent a nuclear counterattack—the Americans might believe their nuclear weapons are imminently at risk. It could be twelve hours before the United States regains satellite function, which is too long to wait to put together a nuclear counterattack. The United States, therefore, might move to mobilize a nuclear attack against Russia or China over what might just be a piece of debris shutting off a satellite. Additionally, accidental warfare, or strategic miscalculation, is uniquely likely in space. It is much easier to hold an adversary’s space systems in jeopardy with destructive ASATs than it is to sustainably defend a system, which is expensive and in some cases not technologically feasible because of limitations on satellite movement. Space is therefore considered offense-dominant; offensive tactics like weapons development are prioritized over defensive measures, such as improving GPS or making satellites more resistant to jamming.

As a result, countries are left with poorly defended space systems and rely on offensive posturing, which increases the risk that their actions are perceived as aggressive and incentivizes rapid, risky counterattacks because militaries cannot rely on their spaced-based systems after first strikes.

There are several hotspots in which ASATs and offensive-dominant systems are particularly relevant. Early warning satellites play a central role in US readiness in the event of a conflict involving North Korea. News of North Korean missile launches comes from these satellites. Given North Korea’s history of nuclear provocations, unflinchingly hostile rhetoric towards the United States and South Korea, and diplomatic opacity, North Korea is always a threatening, unknowable adversary, but recent developments have magnified the risk. With the health of Kim Jong-un potentially in jeopardy, a succession battle or even civil war on the peninsula raises the chances of loose nukes. If the regime is terminal, traditional MAD risk calculus will become moot; with nothing to lose, North Korea would have no reason to hold back its nuclear arsenal. Or China might decide to seize military assets and infrastructure of the regime. If the US does not have its early warning satellites because they have been taken out in an ASAT attack, the US, South Korea, and Japan are all in imminent nuclear peril, while China could be in a position to fundamentally reshape East Asian geopolitics.

The South China Sea is another hotspot in which ASATs could risk escalation. China is developing Anti-Access Area Denial (A2/AD) in the South China Sea, a combination of long range radar with air and maritime defense meant to deny US freedom of navigation in the region. Given the disputed nature of territory in the South China Sea, the United States and its allies do not want China to successfully close off the region.

But the most effective way to break an A2/AD system would be with anti-satellite weapons. ASATs could neutralize the maritime surveillance China relies upon to deny access to the region and guide cruise missiles. Thus, China is extremely wary of US ASAT development: risks to Beijing’s South China Sea strategy are seen as threats to China itself because of territorial sovereignty claims that are deeply important to the regime and have only become more pronounced under President Xi Jinping. If a Chinese satellite went dark, Beijing might perceive it as a US ASAT designed to undermine the A2/AD approach, and escalate with conventional force.

An Even Greater Risk

Many of these conflict scenarios start with the loss of satellite function, which may seem unlikely. But ASATs threaten satellites through more than just **direct attack**. ASAT testing, rather than deployment, risks the **exponential accumulation** of debris, which **endangers satellites** and creates a host of other problems.

KE-ASATs rely on smashing satellites into thousands of pieces, so each test adds **tremendous** **amounts** of space debris. The 2007 Chinese KE-ASAT test alone increased the number of objects in orbit by 20 percent, producing more than two thousand pieces of debris large enough to be tracked and likely thousands more too small to be counted that will remain in orbit for centuries.

Even the **smallest** pieces of debris can do **great damage**; traveling at more than 15,000 miles per hour, they can crash into other debris in a proliferation known as the **Kessler Syndrome**. The situation in space could approach a critical mass in which collision cascading occurs even if all launches were halted, choking orbits with debris until **all satellites** are **destroyed** and spaceflight rendered **impossible**. Compared to the negligible debris created during commercial launches, ASAT tests—especially if the arms race continues to escalate and countries with less developed space programs join with cruder designs—may **accelerate** the debris in space closer and closer to this **critical mass**.

If debris knocks out a satellite, an increasingly likely possibility in a world with ASAT tests, then the aforementioned conflict scenarios become more likely. Conflict aside, ASAT-based debris clouds are terrifying in their own right. Public health, transportation, climate science, and a litany of other crucial infrastructures are dependent on satellites that are now at risk. Satellite GPS is a cornerstone of the modern economy; some pundits believe that the slightest glitch in GPS satellites could shock the stock market and further destabilize an unstable global economy. During the pandemic, satellites are playing a crucial role in geospatial data collection for infectious disease modeling.

Essentially, it is hard to imagine a world without satellites, but that is a possible outcome given that there are no reliable methods of withdrawing debris from space.

Starting Small

There are two conflicting views on how the US could mitigate the worst effects of an ASAT arms race. The first, put forward by Secretary of Defense Donald H. Rumsfeld in 2001, is fairly simple: Space militarization is inevitable, and the United States will have to rely on superior capabilities to prevent conflict—essentially, end the arms race by winning it. This is classic escalation dominance theory: the idea that sustainable deterrence can be created when a nation escalates conflict to a level greater than their adversary can match.

However, the nature of an arms race makes escalatory advantages inherently ephemeral, and the advances Russia and China have made since Rumsfeld’s 2001 report suggest that relying on US space superiority might be a poor strategy. Even if it were possible, attaining escalation dominance would require near constant weapons testing, which produces more debris.

The second viewpoint calls for an end to the arms race not by winning it but by calling it off entirely, through comprehensive space arms control. Such regulations are complicated and have a long history, but could be a more sustainable solution than an endless proliferation of weapons.

The first iteration of arms control in space came in the 1960s. The 1963 Partial Test Ban Treaty (PTBT) banned nuclear weapons tests in outer space, and the more comprehensive 1967 Outer Space Treaty (OST), considered the cornerstone of peaceful space development, prohibited any military activity on celestial bodies including stationing weapons of mass destruction (WMD) in space. Both treaties are still in effect today, but despite additional treaties in recent decades, there are still no international regulations banning weapons other than WMD in space.

The most recent attempt at an ASAT ban was proposed by Russia and China in 2014. A revision of a draft from 2008, the Treaty on Prevention of the Placement of Weapons in Outer Space and of the Threat or Use of Force Against Outer Space Objects (PPWT) was rejected by the United States because it lacked verification and permitted the stockpiling of terrestrial-based ASAT systems. It only banned space-based ASATs, which would enable China and Russia to continue developing ground-launched systems known as direct-ascent ASATs.

The PPWT was an empty solution for an arms race, clearly designed to benefit Russia and China rather than prevent additional weapons development. But a comprehensive agreement that the US, Russia, and China all find satisfactory seems unlikely. The Proposed Prevention of an Arms Race in Space Treaty (PAROS) has been discussed since the 1980s without much progress.

Perhaps a more feasible solution is a limited test ban treaty: an agreement to stop testing debris-producing ASATs. It has precedent—the PTBT successfully prevented the testing of nuclear weapons in space—and could stave off the worst effects of debris accumulation by eliminating debris-producing tests. Additionally, in the long term, a test ban could reduce countries’ confidence in their ASATs; capabilities atrophy without regular testing, meaning countries would be less likely to base their military strategies on ASATs in the event of a conflict.

By banning specific systems, a test ban treaty is not too vague as to be unenforceable like the PPWT, but it could be limited enough to not affect broader space development. Russia and China might find the terms acceptable; after all, debris threatens their satellites too, and they have a reciprocal interest in reining in US weapons development.

It’s hard to conceive of a future for humanity that does not feature space in some capacity. Big businesses are already pursuing space commerce more aggressively, with visions of space colonies and large scale resource extraction. But the continued, unchecked **prolif**eration of **ASATs** could **close off** space **entirely**—and help **induce** a **nuclear war**. Now, more than ever, it remains urgent and imperative that international negotiations reach an arms control treaty.

### ASATs ADV---ASAT Attack Impact

#### Extinction---sparks space arms racing and space conflict.

Lt. Gen. Vijay Kumar Saxena 16. Former Director General of the Corps Army Air Defence, regularly published in a host of Professional Magazines and Journals, NLSIU scholar with qualifications in Human Rights and Child Rights Law. May 2016. “Anti Satellite Weapons: A Likely Future Trajectory.” https://www.vifindia.org/sites/default/files/anti-satellite-weapons-a-likely-future-trajectory.pdf

It is an open secret that all the leading space-faring nations are actively pursuing counter-space capabilities which broadly include Direct Ascent Anti Satellite Missiles, Co-orbital Anti Satellite Systems, Computer Network Operations, Ground Based Satellite Jammers, and Directed Energy weapons.

If we go by the open source, then China seems to be leading the ASAT race with Russia in a close tow. These are capable of directly threatening the US space lifeline in any future conflict. Though many a lamenting voices are being heard on US strategic vulnerabilities, on how the Congressional cuts in space funding is putting US at a strategic disadvantage, this analyst believes that no one is any less. If you nearly control the global open source, you tell less about you than others. However, a discerning mind knows that there is more than what meets the eye. I say this in context of US though some of their SOS cries are viable.

The technology revamping up the ABM capability from the terminal to mid-course interception has come as a shot in the arm for the ASAT capability that has got a quantum range-altitude boost, especially in the category of hit-to-kill ASAT weapons. In fact, all midcourse Ballistic systems have inherent ASAT capabilities.

There has been a self-defeating effort on the part of US to create a duality between the midcourse BMD systems (say SM 3) and the direct ascent Kinetic energy interceptors (like the Chinese SC 19). By calling the former as low-altitude direct ascent interceptor and the later, as kinetic energy weapon . It is like calling the Peter, Pam when both are same. The typical Mine OK yours Not OK syndrome. It doesn't really carry.

The race to acquire ASAT capability is going on unabated. One nation setting a challenging pace and putting the others in a vicious merry-goround.

Are ASATs legal?

Before seeing the legality, let me put the weaponisation and militarisation argument to rest. How does it sound when I say that with all the humdrum at the global level of using the outer space - the ‘province of mankind’ for ‘peaceful purposes’, the same, technically speaking, long stands weaponised, what to talk of its militarisation, that happened ab-initio. That is the truth, as I will unfold in technical terms in due course.

Moreover, putting legality aside, the ASAT tests of the leading spacefaring Nations are going unhindered- Chinese ASAT test in January 2007, 2008, 2013, 2016...US ASAT tests 2008, 2010.. Russians ASAT tests 2010, 2014 ,2015.... The world is crying hoarse over the debris issue causing an EXISTENTIAL THREAT to the common asset of the humanity on which the entire Planet has come to depend LIKE NEVER BEFORE .... Who cares?

Why? The Big Question. Why it is happening unabated? Why nobody can crack a whip. Sample this commentary:-

The OST, 1967 or more formally, ‘The Treaty or Principles Governing the Activities of States in Exploration and Use of Outer Space, including Moon and Other Celestial Bodies’, not only forms the basis for International Space Laws, but also, has the widest acceptability in the world community (as of Sep 2015, 104 countries are a party to the treaty, another 24 have signed but not completed the ratification).8

In its essence, the OST lays down (only relevant portions quoted) the following:-

It bars the States Parties from placing nuclear weapons or any other weapons of mass destruction in the orbit of earth, installing them on Moon or any other celestial body or to otherwise station them in space9.

It exclusively limits the use of Moon and other celestial bodies to peaceful purposes and explicitly prohibits their use for testing of weapons of any kind, conducting military manoeuvres or establishing military bases, installations and fortifications.

It forbids any government from claiming a celestial resource such as Moon or a planet. It forbids natural opportunities of outer space, including Moon and other celestial bodies.

A State Party to the Treaty which has reasons to believe that any activity or an experiment planned by other State Party in outer space including the Moon and other celestial bodies, would cause potentially ‘harmful interference’ with activities on peaceful exploration of outer space including the Moon and other celestial bodies may ‘request consultation’ concerning the activity or experiment.

The above provisions have glaring inadequacies. For instance:

● The treaty does not prohibit the development, placement and testing of conventional weapons in the outer space.

● It does not prohibit a ground based weapon making a direct/ indirect ascent into outer space and killing an orbital body.

● It also does not prohibit a space based weapon (Kinetic Energy or Directed Energy) to kill another satellite or orbital target in outer space or to kill ballistic missiles transiting outer space in the post boost/re-entry phase.

● By implication, military activities in outer space are allowed unless specifically prohibited by any Treaty.

● Also, there are glaring definitional inadequacies in the legalese of the OST. Some examples :-

▪ What constitutes space or a space weapon is not defined.

▪ Accepted demarcation of the boundary between the air space under national sovereignty and outer space has not been defined.

▪ What constitutes ‘peaceful use of space’ (by exclusion, what is not peaceful?) What the US understands it as ‘non aggressive’ while the Russians see it as ‘wholly non-military’ is actually not specifically accepted/defined.

▪ What constitutes ‘harmful interference’; is shrouded in ambiguity.

The Treaty, adopted through the UN process, is non-binding and devoid of any enforcement mechanism. Responsibility towards discharge is only ‘assumed’.

In fact, under the garb of ‘peaceful use’ and ‘scientific research for peaceful purposes’, as enshrined in the OST, US, China and Russia have put a perfectly legal cover over their hectic development of space technologies capable of military applications.

Judging against the above loopholes, the ASAT tests of China, US and Russia would appear to be perfectly legal. That is however not the whole truth as the same could be faulted under Article IX of OST, as also, under Liability Convention.

This is how Article IX of OST mandates the State Parties to conduct activities in outer space, including the Moon and other celestial bodies, with due regard to the corresponding interests of all other State Parties to the Treaty.

It forbids them from conducting such activities which would cause ‘harmful interference’ with activities of other State.

State Parties are also to avoid harmful contamination and adverse changes in the environment of the Earth resulting from the introduction of ‘extra-terrestrial matter’ (in outer space)10.

A Sample Case.. Let’s talk about one sample case--the Chinese ASAT test of 2007 which as I said, has been classified as the highest manmade debris generation event in the history so far11. Sample this:-

➢ As of September 2010, the US Space Surveillance Network (SSN) has picked a total of 3037 pieces of debris greater than 10 cms, 97% of which have remained in the orbit12.

➢ Scientists estimate about 1,50,000 debris particles in altitudes between 200-4000 kms, 79% of which will remain in orbit for 100 years13.

➢ The debris has spread throughout the entire orbit resulting in a cloud of debris around earth. This is the largest debris cloud ever generated by a single event in the orbit.

➢ As of January 2007, there were 2864 active or inactive satellites in LEO out of which 1899 pass through the region now affected by Chinese debris.

➢ In April 2011, debris of the Chinese test passed close to the ‘International Space Station14.

➢ In January 2013, a Russian nano satellite [Ball Lens in The Space (BLITS)] was destroyed by the debris15.

The Illegality Continues. The illegality of the Chinese ASAT lays bare not only in the gross violation of Article IX of the OST, but also, a potential threat to the space assets of other State Parties for decades ahead. Similar is the story of US and Russian ASAT tests.

Liability Convention. Also, under the Liability Convention 1972 (The Convention on International Liability for Damage Caused by Space Objects), a State Party is responsible for all the objects launched from its territory into space and is full liable for the damage that may arise from that object. The damage (done/likely) from the Chinese ASAT must also therefore rest equally on their shoulders.

Other Legalese Also Ambiguous. While the other space laws like the Rescue Agreement 1968, the Registration Convention 1975, the Moon Agreement 1979 and International Space Laws governing disbursement of finite GEO slots by the International Telecommunication Union (ITU) are all full of crippling inadequacies, the space constraints prohibit the author from a detailed commentary on each one of the above.

A Revisit. Though mentioned in passing earlier, lets revisit the technicalities in militarisation/weaponisation from the point of view of a legal argument.

Militarization. As per the definition, militarization of space simply implies the placement and deployment of weapons and military technology in the outer space. By this definition, the Space was militarized ever since the earliest communication satellites were launched, since that implied the deployment of military communication technology in the Space. Today, militaries all over the world rely on satellites for command, control, communication, monitoring, early warning and navigation with GPS. Peaceful uses of outer space thus include military uses. This includes even those satellites which are not at all peaceful such as using satellites to divert bombing raids or to orchestrate a ‘prompt global strike’ with a view to control any situation or to defeat any adversary across the range of military operations. With more than 90% of all satellites dedicated to military use, truly speaking militarisation of outer space occurred with the first satellite16.

Weaponisation. Talking of Weaponisation, the same is generally understood to mean the placement in orbit of space-based devices that have a destructive capability. What about millions of pieces of space debris created by the deliberate acts of the countries (ASAT tests) which have tremendous destruction capability for the space assets of other countries? What about the ongoing cutting-edge research on the ‘kinetic kill’ or ‘Directed Energy kill weapons’ placed in space orbits, ready to take on incoming ballistic missiles in their post-boost phase, when these missiles are transiting the outer space. These dual use weapons, taking on a Ballistic Missile could as well take on the space assets? The bottom line is that the weaponisation of outer space is now a reality. In fact the same is fast fuelling the global arms race17.

The examination of the above legalities thus brings out the following :-

 The current regime of Space Laws have glaring inadequacies, both in the ambivalence and ambiguities of the legalese, as well as, the nonspecificity of the rules-of-the-road.

 Though the ASAT tests by China, US Russia and others have been executed, these are not only illegal in terms of the OST 1967, but also, the same have created a near permanent existential threat to the space assets of other nations.

 While militarization of outer space happened with the first satellite the outer space is fast being weaponised leading to a crippling and self-defeating arms race in the future18

And now the bottom-line:

● Technically, the ASAT tests are illegal.

● Notwithstanding, these are likely to continue unabated.

● In the coming years, ASATs are poised to grow, caught in a dubious and self-destructive arms race.

● As future technology makes more and more countries to afford and launch satellites, worldwide satellite vulnerability to ASATs will continue to grow.

● Ever increasing space debris has reached a tipping point. This growing monster is plunging the space assets of the planet in a crippling existential threat. ( this is a vertical demanding separate analysis)

Like someone said:-

World War III in space?

It is closer than you think......

### ASATs ADV---Attacks Cascade

#### Attacks cascade and prompts first strike motives.

James Black, 18 (James Black is a senior analyst in the defense, security and infrastructure group at RAND, 3-12-2018, accessed on 7-8-2022, Defense News, “Our reliance on space tech means we should prepare for the worst”, <https://www.defensenews.com/space/2018/03/12/our-reliance-on-space-tech-means-we-should-prepare-for-the-worst/>, HBisevac) \*\*edited for ableist & gendered language\*\*

The first successful launch by SpaceX of its new Falcon Heavy rocket, the most powerful rocket in operation today, offered a tantalizing glimpse into the future of space — one done with a touch of typical flair from SpaceX’s billionaire owner Elon Musk, who sent his old red Tesla sports car into orbit as the rocket’s first payload. More impressive still, from a technical perspective, is that two of the Falcon Heavy’s boosters simultaneously landed back at Cape Canaveral, ready for refurbishment and reuse.

However, this breakthrough raises a number of questions about how prepared global society is to deal with the **growing reliance** on space-enabled connectivity, technology and services. These support a diverse array of political, military and economic activities — many of which modern life on Earth relies upon and which the public often takes for granted. Governments, militaries and commercial organizations could take steps now to better understand and mitigate the risks associated with digital society’s increasing reliance on space.

Space is one of the fastest-growing sectors in the global economy, worth $329 billion in 2016 and estimated to double to around $640 billion by 2030. While SpaceX and other companies are looking to create and exploit new markets through the application of novel technologies, such as space manufacturing, mining or tourism, Earthbound societies remain increasingly reliant on a host of more mature space services and technologies for basic functions.

These underpin a **dizzying array** of activities across **diverse sectors**, including **defense maritime** and **border security**, **crisis management**, and **transport**. For example, GPS satellites not only allow for safe navigation in the air, on land and at sea, but also underpin financial transactions and the protocols that keep data parcels in sync across the internet and other networks. Without these, Internet speeds could slow, access to the cloud could deteriorate, and control systems for energy grids, water and transportation could begin to fail.

The potential for **cascading failures** across the **myriad systems** reliant on space mean that the effects of any disruption could manifest themselves in **unexpected places**. When a single U.S. communications satellite broke down in 1998, it was not only television and messaging systems that failed. Credit card systems stopped processing payments, weather radars went blind and frustrated drivers found themselves unable to fuel their vehicles as automatic petrol station pumps seized up.

Perhaps most alarmingly, satellites are also an **essential part** of “national technical means of verification” used by nuclear-armed nations to build trust around **arms control agreements** through **mutual surveillance**. Any nation which suddenly found itself ~~blind~~ [**sightless**] in space might be pushed to **escalate** any military standoff through a “**first strike**” for fear it might not detect any missile launches against its territory.

Similarly worrying are the limits of organizational and societal preparedness to deal with the aftermath of a major disruption of essential space-dependent services. Governments warn that such disruption is becoming increasingly likely in the face of new threats and challenges.

Satellite systems are increasingly threatened by **hostile state** and **nonstate actors**, including through dazzling, jamming, kinetic impacts and cyber means. The European Commission has also warned that ground control stations are often vulnerable to terrorists or cyberattacks. However, perhaps the greatest fear is that any attack could provoke a chain reaction of collisions that renders entire orbits useless, known as the Kessler syndrome.

Faced with this growing panoply of risks to space infrastructure, a **concerted response** is needed to boost the resilience of global society to natural or ~~man-made~~ [people-made] disruption of space-dependent services. Many of the protective measures apply to both, even if threats posed by solar flares cannot be deterred or negotiated away. In 2012, Multinational Experiment 7 united 17 nations, various civilian agencies and NATO in calls for a holistic framework to managing potential space confrontation: dissuading aggression before, defending satellites during and maximizing the resilience of both space systems to recover after an attack.

### ASATs ADV---Catch All

#### Satellite take-outs embolden enemies and ensures retaliation---now is key.

Tory Bruno, 6-22 (Tory Bruno is the President and CEO of United Launch Alliance, 6-22-2022, accessed on 7-9-2022, SpaceNews, “Deterring Aggression in Space”, <https://spacenews.com/op-ed-deterring-aggression-in-space/>, HBisevac)

To keep peace on Earth, we must keep peace in space.

The time has come for America to confront the reality that space has been weaponized by our adversaries. Space has long been a peaceful environment for research and commerce on Earth with conditions that deny tyrants the luxury of concealment, the advantage of surprise, and establishes parity on the battlefield.

But all of this has changed.

**China** and **Russia** have carefully studied how the United States is **uniquely advantaged** by, and **dependent** upon, space. For the last 20 years, they have invested heavily in developing **anti-sat**ellite **weapons**, deploying them here on Earth and in orbit.

There’s a purpose for this — to **enable aggression** on Earth by **denying** America and ~~her~~ allies the **advantages** of space. Allies fight as one force, in communication, aware of the enemy’s disposition, and maximizing our impact through coordinated action. Space gives us that. Russia and China know it. Taking space out of our reach would **greatly disadvantage** us, emboldening these **authoritarian** governments to act with **coercion** and **violence** to achieve their **regional** and **global objectives**.

We must deter aggression through a **system of capabilities** and norms that **inspire restraint** in our adversaries. There is no simple, single, and quick solution to this problem. It must be viewed within the classical context of nation-state deterrence in a peer environment. This means understanding the motivation for aggression, choosing a deterrent strategy, and fielding **credible**, obvious **capabilities**, with a dash of hesitancy inducing uncertainty.

Fundamentally, a nation attacks to achieve a beneficial change in the status quo. Our mission, as a peacekeeper, is to discourage hostile and destructive action.

To do this there are two approaches. One, a nation can allow the adversary the ability to attack, do harm, and achieve the benefit sought. However, to deter this action, we would need to make it clear that we would respond with an overwhelmingly destructive retaliatory cost that far outweighs any potential perceived benefit. This approach is known as the artificial imposition of a reciprocal cost, nuclear deterrence being the classic example.

Alternatively, a nation can seek to **render** any practical attack **ineffective**. In an environment where aggression will stimulate **severe consequences**, an adversary is **discouraged** from acting when **no conceivable attack** can succeed. This is clearly the **correct approach** for deterring aggression in space for several reasons.

An attack in space would not immediately threaten U.S. territory or involve the loss of life. A retaliation on Earth, however, would likely do so, making it morally ambiguous, and likely inspiring wide disapproval. A retaliation in space, meanwhile, would risk **fowling** the **global orbital commons**, potentially doing more harm to all involved than the adversary’s initial attack. We must instead seek the means to render attacks upon our space assets ineffective.

There are three legs to accomplishing this goal. We must make our assets **more resilient**, able to absorb attacks and damage without immediately collapsing. We must also be prepared to rapidly replace critical satellites faster than the attacker can exploit their destruction, and finally, we must deny aggressors easy and unfettered access to our satellites while on orbit.

We can improve resiliency by several means. Firstly, by distributing functions across multiple spacecraft where possible. Next, we should network distributed satellites whenever practical. This ensures that capabilities degrade slowly as individual satellites are destroyed, creating a system that absorbs attacks while continuing to fight. Thirdly, it would complicate the aggressor’s task if our satellites had more ability to maneuver away from threats. Last, but not least, protecting satellites from hostile cyberattacks will ensure they can continue to function, denying this easy attack vector.

Unfortunately, not all space functions can be distributed, networked, or proliferated. To safeguard these critical assets, we should deny the attacker access to them. Today, China and Russia are free to observe our launches and spacecraft with largely unfettered access to approach and attack them. Denying this easy targeting and access is critical.

We must also expect that an adversary will succeed in disabling or destroying some of our limited **critical assets** as well as clusters of contiguous proliferated low Earth orbit (pLEO) satellites, thus opening temporary **windows of action**. We can counter this strategy by replacing these with assets stored on the ground or in orbit before adversaries exploit their loss.

There is **significant concern** today about our adversaries’ lead in developing, deploying, and improving anti-satellite weapons. This challenge has led some to pursue strategies that seek to match or catch up to potential adversaries as quickly as possible.

### ASATs ADV---Escalates

#### Non-kinetic attacks prompt miscalc and escalate into conventional warfare.

John Arquilla & Andrew Szarejko, 21 (John Arquilla is an American analyst and academic of international relations and Andrew Szarejko is a Donald R. Beall defense fellow in the Defense Analysis Department at the Naval Postgraduate School, 12-22-2021, accessed on 5-29-2022, War on the Rocks, “Accidents and Escalation in a Cyber Age”, <https://warontherocks.com/2021/12/accidents-and-escalation-in-a-cyber-age/>, HBisevac)

Sometimes wars, from small ones to big ones, start with **accidents**. In early American history, for example, accidents associated with good-faith errors and unauthorized acts of violence precipitated several conflicts between the United States and Native American groups. On a larger scale, Scott Sagan has argued that the 18th-century Seven Years’ War was sparked by a false warning of French invasion and that the Japanese invasion of Manchuria in 1931 was an unauthorized attack orchestrated by army officers against the expressed wishes of the civilian government. The potential for these sorts of accidents — human or technical errors and unauthorized actions — to induce **subsequent escalation** has produced much diplomatic effort to mitigate the risks of stumbling into armed conflict. There are hotlines, summits, “open skies” agreements, confidence-building measures, and more. Yet today the risk of accidents **producing escalation** **persists**, especially where states see a **first-mover advantage** and fear the consequences of **underreacting** more than the risks of over-reacting.

The rising **salience** of **cyber warfare** contributes dangerously to the traditional set of concerns about the **onset** of **armed conflict**. Now, in addition to wars waged with bombs and bullets, militaries have become **highly dependent** upon the security of the ***bits*** and ***bytes*** that **empower** their “sensing and shooting” **capabilities**. And the link between incidents starting in cyberspace and ending up in battlespaces on land, at sea, and in the aerospace environment is getting the attention of policymakers. So much so that, as President Joe Biden noted that “we’re going to end up, if we end up in a war — a real shooting war with a major power — it’s going to be a consequence of a cyber breach of great consequence.”

Some have argued that cyber operations are actually unlikely to prompt military escalation, but we would argue that this possibility ought to receive policymaking attention to reduce its probability. There remains **much uncertainty** about the **frequency** and **severity** of cyber accidents that are **occurring now** and that will **arise** in the **future**. This uncertainty extends to whether any given cyber accident will spark military escalation. But a growing body of evidence, beginning with the Moonlight Maze cyber intrusions into military systems in the late 1990s and other serious events that have continued to this day, make clear that potential **adversaries** are testing out **virtual ways** to **disrupt physical operations**.

What sorts of accidents might occur in cyberspace, and how might they prompt military escalation? We have three basic categories in mind. First, there are human actions in cyberspace that could provoke escalation. These include human errors, such as mistaken perceptions. During the Cuban Missile Crisis, for example, a U.S. destroyer’s use of training depth charges to target a Soviet submarine very nearly led the submarine’s captain to launch a nuclear torpedo because he reportedly believed a war might have already started. The difficulties of ascertaining intent and attributing responsibility for actions in cyberspace may produce similar human errors. Alternatively, **intentional actions** not **authorized** by any proper authority would fit this category. Non-state-affiliated **hackers**, for example, could individually or collectively target or unintentionally affect **highly sensitive systems** such as those related to critical infrastructure, conventional military systems, or nuclear command-and-control processes. Similarly, state-linked **cyber proxies** could engage in such actions of their **own volition** and have their actions **incorrectly attributed** to their state sponsor.

As a case in point, in 2001 through 2002, Gary **McKinnon**, a Briton whose autism played a central role in his legal defenses after he was caught, hacked into U.S. military systems in a purported effort to uncover information about unidentified flying objects he believed the U.S. government was hiding. This hack kept about **2,000 military computers offline** for **days**, caused alarm in the Pentagon — American air defenses and the Atlantic Fleet’s logistics had been compromised — and led to questions about who was targeting the United States and who ought to face retribution. The prosecutor in charge of the effort to extradite him from the United Kingdom described the incident as “the biggest military computer hack of all time.” Needless to say, had this occurred during a major international crisis — and had the United States failed to sufficiently harden those military networks despite being in a crisis — the consequences could have been **dire**.

Our second category of concerns is about **technical errors** that could lead to military escalation. During the Cold War, for example, there were occasions on which the United States and the Soviet Union each thought the **other** had begun a **nuclear attack**. In the American case, a war-scenario training tape was mistakenly inserted and played at a strategic command. On the Soviet side, a computer malfunction reported that five American missiles were heading toward the Soviet Union. Fortunately, those involved in both cases waited long enough before retaliating to ascertain that their identification of an incoming attack was mistaken, but there is **no guarantee** that such events will always **resolve** so well. That we are all still here speaks to the caution that nuclear weapons can induce. In the case of escalation to conventional military action from cyber operations, however, those involved may be **less cautious**.

The third category of potential problems consists of intentional cyber operations that may have **unintended consequences**. Due to the **complexity** and **interconnectedness** of advanced information systems, any offensive cyber operation engenders **uncertainty** as to the effects it will cause. Thus, to the extent that human and/or technical errors could be the source of such effects, it is worth considering them here. One could imagine, for example, that either Israeli or Iranian cyber operations targeting the other in their current “virtual conflict” might yield greater consequences than the attacker intended. In an **already tense**, volatile situation, such a perceived escalation, **even if unintended**, might prompt an armed, “**kinetic**” response.

## SSA Adv

### SSA ADV---AT: Governance Turn

#### Space weapon deployment doesn’t cause an arms race or increase chance of war

Lopez 12 [LAURA DELGADO LO´ PEZ, Institute for Global Environmental Strategies, Arlington, Virginia. Astropolitics. "Predicting an Arms Race in Space: Problematic Assumptions for Space Arms Control." https://www.tandfonline.com/doi/full/10.1080/14777622.2012.647391]

The previous discussion demonstrates that although a globalized space arms race could follow U.S. deployment of space weapons, it is also plausible and more likely that it may not happen at all. As Mueller states: ‘‘In the end, most of the inevitability arguments are weak.’’62 The assumptions discussed here break the argument into a series of debatable maxims that other scholars have also considered. Hays, for instance, counters the inevitability argument by pointing out that previous ASAT tests did not have this purported destabilizing effect, to which we can add that even after the Chinese ASAT test, neither Russia nor the United States, who would be both capable and more politically likely to launch space weapons, moved forward in that direction.63 Although some may draw attention to the recent wake-up calls in order to underline a sense of urgency, one should also recall that when it seemed truly inevitable before, it did not happen either. In his detailed account of military space developments from 1945 to 1984, Paul Stares described how superpowers’ assessment of the value of space weapons shifted, with a ‘‘hiatus in testing’’ reflecting the attractiveness of satellites as military targets.64 In this changed landscape, Stares also assumed the inevitability argument, claiming that ‘‘the chances of space remaining a ‘sanctuary’ [absence of weapons] into the 21st century appear today to be remote.’’65 Perhaps the conditions are more conducive now, but the important point to be reiterated is that the outcome is not inevitable, and that any such prediction must be undertaken with caution.

One of the most prominent theorists to propose an alternate picture and pair it with an aggressive pro-space weapons stance is Everett Dolman. In his Astropolitik theory, Dolman summarizes the steps that the United States must take to assume control of space, particularly through withdrawal from the current space regime.66 This move, he argues, would benefit not only the United States, but also the rest of the world, since having a democracy controlling space is a catalyst for peace.67 Elsewhere, he writes: ‘‘Only a liberal world hegemon would be able to practice the restraint necessary to maintain its preponderant balance of hegemonic power without resorting to an attempt at empire.’’68 Accordingly, he believes that this strategy would be ‘‘perceived correctly as an attempt at continuing U.S. hegemony,’’69 but that other countries, correctly assessing U.S. leadership in space, would not seek to deploy their own systems. Having the ability to prevent the stationing of foreign weapons systems in space, he writes, ‘‘makes the possibility of large-scale space war and a military space race less likely, not more.’’70 In fact, he says, ‘‘to suggest that the inevitable result is a space arms competition is the worst kind of mirror-imaging.’’71 Dolman argues that the weaponization of space by the United States would ‘‘decrease the likelihood of an arms race by shifting spending away from conventional weapons systems,’’ which would reduce U.S. capabilities in territorial occupation and would thus be perceived as less threatening to other countries.72

#### No arms race---US vulnerability is a more likely cause of adversary deployment

Lambakis 1 [Dr. Steven Lambakis is a national security and international affairs analyst specializing in space power and policy studies. Dr. Lambakis serves as the Editor-in-Chief of Comparative Strategy, a leading international journal of global affairs and strategic studies whose readership includes key policymakers, academics, and other leaders. Dr. Lambakis was educated in the fields of international politics, with special emphasis on arms control and intelligence issues, American government, and U.S. foreign policy at Northern Illinois University in DeKalb, Illinois (B.A., 1982) and the Catholic University of America in Washington D.C. (M.A., 1984, and Ph.D., 1990). Space Weapons: Refuting the Critics. February 1, 2001. https://www.hoover.org/research/space-weapons-refuting-critics]

One may ask, just because the United States unilaterally refrains from developing antisatellite weapons or space-based lasers, why do we assume that other countries will pause right alongside Washington? After all, not all innovations in war stem from provocation. While weapons developed and deployed by rival states surely influence decision making, it is unlikely that states procure weapons systems primarily to achieve a balance in arsenals. Some states certainly may strive to have what we have, but they also will strive to acquire and master those weapons that meet their unique security requirements.

Washington’s very reliance on satellites for security, moreover, would appear to be a more plausible motivation behind any hostile state’s desire to acquire satellite countermeasures. While China might wish to integrate ASATs into its arsenal to offset Washington’s deployment of ASATs as part of a deterrence strategy ("you hit one of mine, I’ll hit one of yours"), Beijing is likely to be more inclined to acquire satellite countermeasures independently of what Washington does in order to degrade U.S. space advantages, which may be used to support Taiwan.

To argue that states must follow Washington and deploy space weapons out of self-interest is to ignore the fact that self-interest has many faces. In the end, foreign officials must weigh personal, national, and party priorities and strategic requirements, understand political tradeoffs, and assess whether the national treasury and domestic resources could support plans to "match" U.S. weapons. Haiti’s security needs will not match those of Serbia, Iran’s will not match Canada’s, and India’s will not match those of the United States. Space control weapons, one must conclude, would not fit very well in the defense strategies of many nations. Foreign leaders, in other words, are not automatons. Between action and reaction always lies choice.

### SSA ADV---Data Sharing Good

#### Data sharing is required---allows allied collaboration and info-sharing which caps conflicts.

Christopher Newman & Matthew Zellner, 21 (Christopher Newman is Professor of Space Law and Policy at Northumbria University, Matthew Zellner is a PhD student and speech-language pathology clinical fellow in the Early Intervention Research Group, December 2021, accessed on 7-5-2022, Legal Gazette, Issue 42, “‘Heavens Open’ - The Need for Increased Data from Space and Creating a Duty to Share that Data”, <https://www.act.nato.int/application/files/5716/4032/2170/legal_gazette_42.pdf>, HBisevac) SSA = Space Situational Awareness, SST = Space Surveillance & Tracking

This growing **dependence** on space, coupled with the increased awareness of the **vulnerability** of **space hardware**, has been heightened by the dramatic upsurge in the number of active satellites, particularly in Low Earth Orbit (LEO)6. All of this has led to an increased focus on the space surveillance and tracking capabilities to monitor both the passage of traffic in the Earth orbital environment and to better understand and identify behaviour in space operations that can escalate tensions between countries7.

This discussion will advocate not only for openness and transparency in the handling and dissemination of this data about space, but also that there should be an obligation to provide such **openness** and **transparency**. Such an approach is both vital to ensure a complete picture of **busy orbital paths** and is **strategically desirable**. In addition to the Space Situational Awareness (SSA) sharing agreement programme that is already in place8 and the provisions of space-track.org, States need to provide as much information about the orbital environment as possible, and this will include increasing investment in space surveillance and tracking (SST) capacity.

Increasing the amount and **availability** of data will allow the United States and its allies to demonstrate **openness** and **collaboration**. It will also be possible to use this freely available information to **shine a light** on behaviours that cause **international tension** and **threaten** the **stability** of the space environment. It is not within the purview of this discussion to advocate specific solutions - that is a much more extensive discussion9. Nor will it seek to engage in a technical critique of existing provision for monitoring the Earth's orbit. It is the core principle and the fundamental legality underpinning the sharing of information that will be assessed.

This article will outline some of the definitional issues that can obfuscate discussions on tracking space objects. The inquiry will then examine the extant legal position as to the requirements for sharing information about space objects. Following on from this will be a critique of the current strategic position regarding the opaque aspects of data and information sharing. The work will conclude by advancing the creation of an overarching regime underpinned by data sharing that provides for transparency of activity, greater provenance in the quality of data and ways in which such a regime can embed security and positive behaviour at its heart.

Understanding Space Situational Awareness

Throughout this discussion, several discrete functions regarding the monitoring of the orbit of the Earth will be examined. A fundamental starting point is the term Space Situational Awareness (SSA) itself, the umbrella term for the pursuit of a complete understanding of the orbital environment. SSA aims to **characterize** the **space environment** and activities in space10. In order to conduct the monitoring of the orbital environment and the behaviour of the various actors, a range of dedicated SST sensors (e.g., radar, optical, laser ranging) acquire data on objects (e.g., active and non-active satellites, debris, fragmentations, re-entries), which are then processed as part of a catalogue.11 Satellites operate in **different orbits**, and those orbits have other observational requirements; this means that data collection from a **variety** of sensors is **required**12.

In essence, however, the first and most fundamental aspect of SSA is acquiring **as much data** as possible, from the different orbital planes, and from **as many sources** as possible. As stated above, it is not the purpose of this discussion to critique the current technical arrangements for surveilling the orbital environment. It would, however, be remiss not to point out that the dramatic increase in the number of space objects being placed in orbit needs to be accompanied by an equally dramatic rise in SST capacity if the datasharing provisions advocated herein are to enjoy their full potential.

The acquisition of data from space is, however, only part of the process. For the data to be of use, the tracking and sensing information mentioned above needs to be analysed and combined with information about the naturally occurring space environment - such as ambient space weather conditions to produce warnings and collision avoidance advice13. At present, the United States is recognised as having a hegemonic position regarding both the physical hardware and the dedicated resources for operating SSA. While the US’s notion of domain situational awareness can be traced back to World War II airspace,14 and the “first formalized effort to catalogue satellites” occurred in the late 1950’s,15 the modern genesis of today’s construct was the establishment in 1979 of the United States Space Defense Operations Centre to “command and control the space surveillance network.”16 It was founded amidst the recognized needs to facilitate space surveillance, protect space systems used for battle management, communications and intelligence, and prevent hostile uses of space by adversaries.17

While the United States’ focus on space surveillance understandably waned after the fall of the Soviet Union and spiked in the aftermath of China’s 2007 destructive anti-satellite missile test18, the notion of external sharing of SSA data can be traced to the 2004 National Defense Authorization Act, which authorized the Department of Defence’s creation of a “pilot program for the provision of satellite tracking support to entities outside the United States Government.19 This was codified into an evolving statute,20 and laid the groundwork for today’s robust SSA sharing program.

A few years later, the program received additional impetus by then President Barack Obama’s 2010 National Space Policy21. In the stated interest of preserving the space environment and encouraging the responsible use of space, it directed the development and maintenance of SSA using commercial, civil, and national security sources, the pursuit of debris mitigation and removal measures, and collaboration;

“… [with] industry and foreign nations to maintain and improve space object databases; pursue common international data standards and data integrity measures; and provide services and disseminate orbital tracking information to commercial and international entities, including predictions of space object conjunction.”22

These objectives have been restated in later policy documents, including 2018’s Space Policy Directive-323 and 2020’s National Space Policy.24 Currently, the United States through its Department of Defense has more than 100 SSA Sharing Agreements with foreign governments, universities, and commercial satellite operators, whereby Agreement holders receive specialized “space information such as conjunction assessment, launches, deorbits, and re-entry assistance.”25 The stated purpose of the program is to “foster openness, predictability of space operations, and transparency in space activities.”26 The Department of Defense tracks more than 23,000 objects on-orbit and disseminates the information through the public facing Space-track.org website.27 Agreement holders share and receive additional detailed information, while any member of the public can create a free account and obtain satellite catalogue, positional, decay, and re-entry data.28

The information on space-track.org is freely accessible. Participation and data sharing in the program is, however, on a voluntary basis. There are no international treaties or other agreements which mandate the provision of information. Similarly, there is no legal duty to provide additional information. The delivery of information through this voluntary mechanism is rooted in pragmatism and an attempt to provide a basic level of service. The significant increase in active satellites, particularly smaller satellites acting under shared control in large constellations, means that the current provisions for both gathering and sharing SSA information may well be shown up as inadequate. This discussion will now go on to examine whether there is any legal duty that could be relied upon to mandate an increase in SST capacity and the subsequent sharing of any information gained as a result.

The current legal framework: **No duty to share data**?

In order to establish the extent of the duty on nations to share information, it is first necessary to explore the legal framework that governs international activity in outer space. The primary instrument of international law which regulates national activity in outer space is The Treaty on Principles Governing the Activities of States in the Exploration Use of Outer Space, including the Moon and Other Celestial Bodies, known colloquially as the **O**uter **S**pace **T**reaty (OST)29. This is a universal treaty opened for signature in 1967. As with other international treaties30, the OST does not provide the granular detail or 'rules of the road' for actions in space. Instead, it contains several foundational principles which shape how Nation-States should conduct space activity. The OST grants certain freedoms relating to these activities, which it then regulates by specific limitations.31 Throughout the Treaty are woven **aspirational notions** that led the countries to create such a binding instrument. These concerns are clearly articulated in the preamble to the Treaty and highlight the need for space activity to be for peaceful purposes and benefit all nations.

The OST does not have any specific mention of a duty upon States to track their space objects, much less to share information about this tracking. This is, perhaps, not surprising, as the Treaty was a product of the Cold War race to the Moon and drafted at a time when there were only two nations, the USA and USSR, launching a few objects into space.32 The resulting Treaty that emerged was as much a security treaty as anything else,33 with the prohibition of placement of nuclear weapons in space under Article IV attracting most of the headlines at the time.34 Nonetheless, to ensure the two superpowers did not look to restrict access of other countries, Article I of the Treaty provides that all States are granted the right to engage in scientific investigation in space and use or explore space.

### SSA ADV---Arctic---1AC

#### Russia and China are priming the Arctic now---lack of integrated domain awareness capacity causes unrestrained competition and miscommunication---that escalates.

Sandra Erwin, 5-12 (Sandra Erwin writes about military space programs, policy, technology and the industry that supports this sector, 5-12-2022, accessed on 7-9-2022, SpaceNews, “Melting Arctic ice opens new front in strategic power competition”, <https://spacenews.com/melting-arctic-ice-opens-new-front-in-strategic-power-competition/>, HBisevac)

There are now concerns that as Russia becomes more isolated following its invasion of Ukraine, it could take a more **aggressive posture** in the **Arctic**. Russia’s eastern border is only 90 kilometers across the Bering Strait from the coast of Alaska.

VanHerck noted that 25 percent of Russia’s **g**ross **d**omestic **p**roduct comes from oil, minerals and other **natural resources** extracted in the Arctic. “So they absolutely have a **vested interest** in the Arctic, and they also want to ensure that it is **secure** for their efforts.”

Over the past several years, Russia has revitalized a dozen or so military installations in the Arctic that had sat dormant after the Cold War, said VanHerck. “Not only are they placing defensive capabilities that they state are obviously for defensive purposes, they are putting offensive capabilities into the Arctic,” he said, including missiles that could strike North America.

Russia formed the Northern Fleet Joint Strategic Command in December 2014 to coordinate efforts in the Arctic. Since then, DoD said in its strategy document, Russia has gradually strengthened its presence by creating new Arctic units, refurbishing old airfields and infrastructure, and establishing military bases along its Arctic coastline.

Russia also has been working to establish a network of air defense and coastal missile systems, early warning radars and rescue centers, the DoD strategy said. In February 2021, Russia launched the Arktika-M satellite to monitor the climate and environment in the region.

The United States is also watching China’s moves in the Arctic. “China calls itself a **near-Arctic nation** and wants to be **influential** in the Arctic as well,” said VanHerck.

Concerning U.S. capabilities, “I would assess that we’re in the game plan development,” he told the House Armed Services Committee. “We’re not able to have the persistence that I need to compete day-to-day in the Arctic.”

Another looming concern for DoD is how climate change could impact U.S. military infrastructure in the Arctic. The issue was investigated recently by the department’s inspector general, who concluded in a report last month that DoD will need to invest billions of dollars to make military installations in the Arctic and sub-Arctic more resilient to climate change.

The IG evaluated Thule Air Base in Greenland and DoD’s five military bases in Alaska.

“Officials from all six installations identified current climate and energy challenges, such as cracked runways, sunken foundations, and multiple power outages,” said the IG report. At most of these installations, the “day-to-day focus was on reacting to immediate problems or reducing risk to existing hazards, rather than planning for future hazards.”

The report said some construction projects at Army, Air Force and Space Force installations are already being funded to support increased Arctic operations.

MORE SITUATIONAL AWARENESS

There is a **huge need** in the Arctic for **reliable surveillance** and **communications** systems because **miscommunications** could trigger **unintended conflict**, Lt. Gen. S. Clinton Hinote, deputy chief of staff for Air Force Futures, said at a Wilson Center panel discussion.

“**Awareness** about what is going on in the Arctic is a **key part** of **preserving peace**,” he said.

For example, in military wargames, the “avenues of approaches over the Arctic” for enemy missiles or bombers are a major concern. “The Arctic is the **shortest route** between our competitors and us.”

The U.S. Air Force has operated in the Arctic for decades, Hinote said. “But our use of the Arctic as a strategic buffer is **eroding** for all the reasons that have been talked about, especially climate change, and especially with some of the activities that we see Russia and China engaging in.”

As the Arctic melts, “competition for **resources** and **influence** in the region will **increase**,” he said.

Hinote said the U.S. Air Force in recent years has intercepted and warned away a growing number of Russian military planes flying near the edge of Alaska’s restricted airspace. These security concerns “drove our focus on the Arctic and the release of a strategy.”

Wargames organized by the U.S. military and allies typically have focused on “countering great powers specifically in Europe and in the Asia Pacific,” Hinote said. “And one of the things that we felt like we did not understand as well was how that competition would spill over into the Arctic.”

Live military exercises like NATO’s Cold Response, NORAD’s Operation Noble Defender, and Northern Command’s Arctic Edge are helping the U.S. and allies “understand the nature of the competition,” he said. The submarine-focused Ice Exercise (ICEX) has been held since the 1960s, making it the longest-running Arctic exercise.

To bolster the U.S. posture in the Arctic, the Air Force is stationing 54 F-35 advanced fighter aircraft at Eielson Air Force Base, Alaska.

“Alaska is an incredibly well-positioned base of operations for defending the northern approaches to the United States, and this is why so many of the intercepts that happen when an adversary’s aircraft is coming from the north are done with assets that are stationed in Alaska,” Hinote said.

The Department of the Air Force’s Arctic strategy also recommends greater use of space assets to support military and homeland defense efforts.

“Space capabilities are **tailor-made** to support a region where there is **sparse ground infrastructure**,” Lt. Gen. William Liquori, deputy chief of space operations for strategy, plans and programs for the U.S. Space Force, said at the Wilson Center panel.

“The satellite command-and-control capabilities that we have at Thule, those are there because military operations are going to happen in the Arctic,” said Liquori. “And that means we’re going to need to have satellite coverage in the Arctic.”

To fill gaps in satellite communications coverage over the Arctic, the Air Force worked out a deal with the Norwegian Space Agency subsidiary Space Norway to launch two U.S. military communications payloads on Norwegian satellites. The payloads, developed by Northrop Grumman, will be integrated into the Arctic Satellite Broadband Mission satellites, projected to launch on a SpaceX rocket in 2023.

Any **Arctic strategy** has to consider the **importance** of the **space domain**, said Mir Sadat, a nonresident fellow at the Atlantic Council’s Scowcroft Center for Strategy and Security.

The United States is not doing enough to “prepare for the **new frontier**.” In contrast, Russia and China, by increasing their activities in the region, are positioning to one day take advantage of shorter sea lanes, Sadat said. A key goal for China and Russia is to “reach global markets or military targets faster and much more cheaply,” he said.

Satellites to watch what Russia and others are doing on the ground is another **critical capability** that the United States might need to **expand**, said Scott Herman, CEO of Cognitive Space.

The company participated in the recent Arctic Edge 2022 exercise as a military contractor, orchestrating collection opportunities across commercial satellite operators.

Today, many commercial remote-sensing constellations can’t support Arctic activities because they can’t reach those high latitudes, said Herman. But if the Arctic becomes a geopolitical flashpoint, “you may see some adjustments to some of the satellite constellation plans to make sure they’ve got sufficient northern exposure.”

In its strategy, the Department of the Air Force said there is a need for “domain awareness through new technologies ranging from over the horizon radar to space assets.”

FEARS OF ‘MISCOMMUNICATION’

Michael Sfraga, chair and distinguished fellow of the Wilson Center’s Polar Institute, said an imminent war in the Arctic is unlikely.

“I think that’s a low probability,” said Sfraga, who is based in Alaska. But he believes the risk will increase as countries step up activities.

“The **higher probability**, unfortunately, is a **miscommunication**: An exercise gone wrong, a missile fired by mistake, Russian bombers are escorted out of our airspace and there’s a miscommunication between pilots,” he said.

Russia’s invasion of Ukraine now casts things in a different light, he added. “No one thought something like Ukraine would actually happen. If anybody would have told you 20 years ago that China would have built islands in the South China Sea and claimed that territory, I would have said that seems pretty far-fetched.” The lesson for the United States is to remain “vigilant and diligent.”

It’s well known that Russia derives a significant portion of its GDP from natural resource development in the Arctic, Sfraga said. It’s also continuing to expand its military presence and capabilities in the region. “China, which sometimes forgets that it’s not actually an Arctic state, is doing everything it can to establish its own influence in Arctic governance and economic development.”

“While there’s no imminent threat of conflict in the Arctic, the **increasing activity** and **proximity** of these aggressive powers requires the U.S. to maintain situational awareness and operational capacity,” he said.

The United States has to be better prepared to operate in the Arctic, Sfraga said, and noted that satellite-based services are **sorely needed** in the area.

“Satellite communications, imagery, all of those things are very important to our national and civil security, search and rescue,” he said. “**There’s just limited capacity**.”

“**Presence equals influence**,” he said. “Showing potential adversaries that you can actually conduct operations and protect your **own interests** in a landscape like the Arctic serves as a **deterrent** and is incredibly important.”

#### Risks of tensions are increasing---small hiccups cascade.

AT: EU CP

Berk Vindevogel 4-12. MSc student International Politics at Ghent University, Research Intern at the Egmont Institute. “The Arctic, a new front for great power conflict?.” Egmont Policy Brief 273, Egmont Institute. 4-12-2022. https://www.egmontinstitute.be/the-arctic-a-new-front-for-great-power-conflict/ //EM edited for grammar.

THE STRATEGIC INTERESTS OF THE GREAT POWERS

Optimists would see the opportunities for cooperation. History, however, tells us how great powers have always been protective of vital trade routes and in competition for natural resources, the sinews and lifeblood of societies. Why would this be any different in the Arctic? Since all great powers have certain strategic interests in the Arctic, now that it has become more accessible, the risk of tensions increases.

Russia is by nature an Arctic power: the Northern part of the country is located within the Arctic circle. Their presence signals continuity rather than change. However, in recent years, there has been an increase in their military presence within the region. The revival of military bases, the expansion and modernization of Russia’s Northern fleet, the introduction of the first combat-ready icebreaker and the adaptation of military technology and personnel to Arctic conditions are only the most significant actions of the Kremlin. This military presence serves several purposes, such as protecting economic infrastructure, conducting search-and-rescue missions, etc. In terms of security, the melting of Arctic ice is improving accessibility, but for Russia this also means that their natural buffer is diminishing. Not only that, but the increase of other states’ interests sets off alarm bells in Moscow. Large parts of the Arctic, together with the Northern Sea Route and natural resources, are theirs, in their eyes, and they would like to keep it that way.3

China, through a scientific narrative, has been able to establish itself in the region, where they have significant economic and strategic interests, even though they are located more than 1,500 km away from the Arctic. This distance also means that their security interests are less pronounced. Nevertheless, there are some. Other than more general interests, such as scientific research, economic possibilities, and increased reach they would have, Beijing has its own military interests, such as intelligence and improved capabilities. There are Russian and US nuclear strategic submarines and missile launch facilities present in the region, providing first- and second-strike capability. China knows this, but because of their military absence they are mostly blindsided in their Arctic intelligence. An increased presence would rectify this and increase security, or at least the feeling of it, on the mainland.4 Intelligence does not extinguish the threat or risk, but diminishes the uncertainty surrounding it. Concerning improved capabilities, the dual use of scientific expeditions needs to be taken into consideration. Data collection provides the possibility for the Chinese military to adapt to Arctic conditions. All this collection of information slowly removes the Chinese veil of ignorance concerning the Arctic.

Lastly, the US, although having territory in the Arctic, only recently revived its policies toward the region, under Biden. This resurrection, considering the US aspiration to stay the primus inter pares, is necessary in the face of rising Russian and Chinese presence, because that in itself is a problem.5 An added security risk is that US Arctic capabilities have been absent in recent years, due to the domestic political polarization, which is unacceptable for the superpower. Militarily however, the US still reigns, which still provides several advantages in relation to Russia and China. Adding to this is the fact that the US is building a new fleet of icebreakers to replace the previous, now outdated ones.

Regarding the EU, its military incapability and foreign policy indecisiveness is negative for its great power status. Thus, any future military influence would mostly be indirectly manifested through NATO. However, not fully located within the Arctic (which is still better than China), the EU does have significant strategic interests within the Arctic. The new shipping routes, climate change, and the promotion of sustainability all hit close to home. Furthermore, the fact that some EU Member States (Denmark, Finland, and Sweden) also have territory within the Arctic means that it is both subject to foreign as well as domestic politics. Therefore, European influence on Arctic politics is substantial. The EU has proven time and time again that it is a capable global security provider, and it is also willing to pursue this role on the Arctic stage, which it has shown in recent years.

HOW LIKELY IS POLITICAL CONFLICT IN THE ARCTIC?

A first aspect, when answering this question, is that both Russia and NATO are conducting unprecedented military exercises within the Arctic, which give rise to political tensions. They are of course within their full right to do so. From Russia’s side, Umka-2021, saw three nuclear submarines popping up through Arctic ice for the first time, carrying forty-eight ballistic missiles. In addition, a pair of MIG-31 aircraft soared through the skies and exercised air-to-air refuelling.6 As already stated, Russia’s presence is to be expected, which does detract from the significance of this exercise.

On the NATO side there is the exercise Cold Response 2022. This Norwegian-led exercise focuses on air and sea defenses, which are essential for an Arctic military presence and is a way of improving general Arctic competence within the alliance. The relevance of this operation can be seen in the impressive participation.7 Furthermore, the US has invested heavily in military equipment for Arctic operations. Both sides have already heavily criticized their counterparts, and Moscow considers the NATO exercise a serious threat as it seeks to remain the only military power in the Arctic.

Second, combined with these military exercises, the strategic interests of the great powers and the rise in economic activity heighten the risks of small hiccups or political conflict between states. Incidents like accidental collisions are becoming more likely. The Arctic is getting crowded. Great powers historically pursue their own interests on their own terms. Cooperation can be of help, but every great power wants to outline the goals of this cooperation, which can prove conflictual. The increased presence of the Arctic in National Security Strategies signals that interest in the Arctic will only rise.

Third, several senior officials have already expressed their concerns for future political tensions in the Arctic. In recent years Russian minister of defense Shoigu noted the rising strategic and economic attraction of other powers to the Arctic, potentially culminating in conflict.8 Even Javier Solana, former High Representative for the Common Foreign and Security Policy of the European Union, saw the Arctic as a place where tensions could be exacerbated, and instability heightened.9 Lastly, Michael Rühle, Head of the Climate and Energy security section at NATO, notices the rise of political tensions surrounding the Arctic.10 These references show the anxiety that lives inside policymakers’ minds.

Finally, there is an aggressive rhetoric upheld by Moscow in the way they treat the Arctic, which can also be noticed today in the Ukrainian war. Although the circumstances differ substantially, Moscow is becoming more and more offensive in the way it relates to other Arctic countries. Manifestations of this are the sea and airspace incursion conducted in the Scandinavian countries. Next to that, the planting of a Russian flag in 2007 on the seabed of the Arctic Ocean illustrates they claim more than what is assigned to them.11 Just as with Ukraine, they see the increased presence of the West as a threat to “Mother Russia” itself, leading to a self-defense rhetoric, even though every Arctic state stays within its territory. Thus, Cold Response 2022 is perceived by Russia as menacing. The invasion of Ukraine has proven they are ready to act on this rhetoric.

How is Russia’s invasion in Ukraine linked with political tensions in the Arctic? A first, recurring aspect, is that Russia’s actions regarding Ukraine have undermined their standing and confidence internationally and have once again damaged cooperative relations for the Arctic, since the other seven members have decided to “pause” the work of the Arctic Council.12 This is 2014 all over again for cooperation in the Arctic, but on a significantly larger scale. Beyond the reputational damage states suffer if they would cooperate with Russia in these times, there is a great loss of trust. Keeping in mind that most interests align, apart from the military-strategic, this is disadvantageous to all stakeholders. Adding insult to injury, Russia currently holds the presidency of the Arctic Council, putting extra stress on further cooperation. Seeing that the Arctic becomes ever more relevant these are unfavorable times for Arctic governance.

If cooperation weakens, there is more room for miscommunication and even miscalculation, which is far worse. With the Arctic receiving more attention and the Northern Sea Route opening the way for large-scale seaborne transport, the increased traffic improves the risk of incidents. Next to that there are recurring airspace incursions from Russia. This could potentially spark misinterpretation since the diplomats are currently not talking to each other. After 2014 military leaders in the Arctic had already stopped talking.13 Today, this has gone one step further by stopping the work of the Arctic Council – an unprecedentedly strong move by the other seven members.

Furthermore, the invasion of Ukraine is a confirmation of the worries surrounding Russia in the Arctic. There are concerns that Russia would push for buffer zones within the Arctic, or that they would be on high alert for any foreign action in “their” territory, maybe even cutting off the Northern Sea Route, which would only increase the risk of armed conflict. If they went as far as to wage war in Ukraine, who is to say that they will not do so at their Arctic borders? This risk has also pushed both Finland and Sweden closer to NATO, which is counterproductive to Moscow, and has also ramped up discussions on the modernization of defense systems in the Arctic within the US and Canada.14 The military future and the potential for armed conflict in the Arctic remains uncertain, but political tensions have definitely increased.

CONCLUSION

To end on a more positive note, it is safe to say that all states present in the Arctic have a high interest in avoiding any form of conflict. However, we cannot ignore the largescale military build-up, increased interest in the region, and the possible risks this brings. Next to that, the Russian invasion of Ukraine only adds fuel to the Arctic fire. This means that all great powers, when deciding on an Arctic strategy, now must take each other’s position into close consideration, but also the possibility of future conflict, be it political or military. The EU and NATO have only recently, officially accepted the geopolitical nature of the Arctic. It is therefore disappointing to see that the Strategic Compass greatly undervalues the strategic relevance of the Arctic for the EU’s security. Nevertheless, both organizations need to stand tall against the backdrop of the invasion of Ukraine, Russia’s increased military presence, and China’s increased interest. Meanwhile, the Arctic remains a very underexposed area in public and academic debate, but with the way things are going, this is likely to change.

#### Increased abilities prevents war.

Forsyth, 18 [Michael, Col. U.S. Army; chief of staff of the Alaskan NORAD; director of the U.S. Army School of Command Preparation at Fort Leavenworth, Kansas; graduate of the U.S. Army War College; master’s degrees from the U.S. Army School of Advanced Military Studies and Louisiana State University, January/February 2018, “Why Alaska and the Arctic are Critical to the National Security of the United States”, <https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/January-February-2018/Why-Alaska-and-the-Arctic-are-Critical-to-the-National-Security-of-the-United-States/>, BP]

Over the past five years, Russia has moved aggressively to build its Arctic military capabilities, apparently in an effort to secure its claims and interests in the region.1 Increasingly, human activity is occurring in the Arctic as the sea ice recedes and economic opportunity opens to nations via new shipping lanes. Characteristically, in any geographical area, with the rise in human activity there is also the corresponding possibility that friction will occur as people compete to exploit the natural resources and corresponding economic possibilities. Such friction—and potential conflict—in the Arctic is highly likely at some point unless preparations are made to mitigate it. Alaska makes the United States an Arctic nation, and its location places the state and country at the center of this fast-evolving region.2 Thus, Alaska is critical to the national security of the United States; however, we are not, as a nation, keeping pace with the rapidly changing security situation in the Arctic. Lagging here could also have an enormous impact on our economy. To change this dynamic, there are several things that the U.S. military can do to ensure the future security of the region. Alaska’s Geostrategic Importance “Alaska is the most strategic place on earth,” stated Brig. Gen. Billy Mitchell in testimony before Congress in 1935.3 The reason for this bold statement is that Alaska is the closest U.S. location to the center of the Northern Hemisphere (see figure 1). The state is singularly closer to many national capitals in the hemisphere than most points in the lower forty-eight states. This makes Alaska the perfect power projection platform for the United States from a military standpoint. Further, because Alaska sits astride the Bering Strait chokepoint and the Great Circle Routes between North America and Asia as can be seen in figure 2, it is critical to our economic and national security.4 The air lanes and sea lanes of the Great Circle Routes are heavily trafficked by shipping companies because they shorten the distance between the two continents, saving time and money for shippers. Consequently, the city of Anchorage and Alaska are at the center of existing commercial shipping lanes between East and West. Anchorage, at roughly the halfway point between the major commerce centers of North America and Asia, is an important hub for such international corporations as Federal Express and DHL.5 Moreover, many nations such as China and Russia are routinely making use of these routes for their economic benefit. However, while Alaska is critical to intercontinental shipping now, emerging routes due to shrinking ice impediments could raise the state’s economic stature to even greater heights. The retreat of ice coverage in the Arctic Ocean has opened up the potential for shipping along the Northern Sea Route and the fabled Northwest Passage (see figure 3).6 The Northern Sea Route parallels Russia’s Arctic coastline, as much of it is within the country’s exclusive economic zone. In the past few years, shipping along this route has increased, topping out with seventy-one passages in 2013.7 Moving goods along this route cuts off thousands of miles, saving money on fuel costs and insurance (since there are no pirates along this route).8 Moreover, Russia is facilitating passages through the use of its large icebreaker fleet, making her an indispensable player in shipping through the High North while profiting from such transit by charging fees for services akin to a toll.9 Thus, the emerging Northwest Passage has recently become a possibility for shippers. For centuries, explorers and adventurers sought a route from Europe to Asia across Canada’s High North. Most of these individuals failed in this attempt, but now the dream is nearing reality. In 2017, the luxury cruise liner Crystal Serenity made a trip through the Northwest Passage starting from Seward, Alaska, and terminating in New York City.10 While much of the Northwest Passage remains difficult to navigate due to remaining heavy ice pack, continued ice retreat could make this route feasible in the future. Alaska’s position on the east side of the Bering Strait places the state in a central position on the choke point of both routes. However, with increasing human activity, it is inevitable that disagreements among nations making claims in the area will arise as competition heats up. Again, Alaska’s location thrusts her to the forefront of strategic calculations that the United States must make to deal with emerging geopolitical and geoeconomic circumstances. Incidentally, what makes the Great Circle Route good for shipping also makes it the preferred route for the employment of missiles aimed at North America. As previously noted, this route shortens the distance between the two continents. Just as shippers prefer the route because the reduced distance saves time and money, the same principle of distance holds true for ballistic missiles. Potential adversaries could fire weapons along this trajectory to close the distance more quickly while lessening the potential for early warning to their attacks. Thus, Alaska’s location makes the state a critical component of the nation’s ballistic missile defense system. Arctic Natural Resources In addition to the great potential for shipping through the Arctic, there is considerable capacity for economic expansion based on the abundant natural resources in the region. There are across the entire Arctic oil, gas, coal, rare-earth metals, and fisheries. It is estimated that 13 percent of the undiscovered oil and 30 percent of the gas worldwide is in the region, along with a host of other resources.11 As a result, Arctic nations are very interested in tapping into these to facilitate economic growth and generate revenue. The retreat of sea ice and glacial melt is making these resources more accessible to Arctic and interested near-Arctic nations like China. The desire to obtain this mineral and energy wealth is stimulating competition among these countries. All of the Arctic nations have made claims beyond their exclusive economic zones on the outer continental shelf so that they have exclusive right to exploit these resources (see figure 4). Claims are made under the auspices of the United Nations (UN), which then adjudicates them according to the UN Convention on the Law of the Sea. The problem is that many of these claims overlap, complicating the UN’s ability to judge in a manner satisfactory to all the claimants. This in turn gives rise to friction among the nations as they increasingly confront each other. Herein lies the potential for conflict in the Arctic region, which has heretofore been known for regional cooperation and peace. Sources of Conflict The obvious source for possible conflict is the increasing human contact and the claims put forth by the various Arctic nations. One nation making such claims in the Arctic region has made a concerted effort to assert or expand its sovereignty in other areas of the globe recently; that nation is Russia. The Russian Federation already derives 20 percent of its gross domestic product from economic activity in the Arctic, and its claims would expand its reach to make further economic growth possible.12 Over the past five-plus years, Russia has systematically embarked on a program to establish new or refurbish abandoned military bases in the Arctic (see figure 4). The reasons for this effort include providing protection to the emerging Northern Sea Route and securing its economic interests. As already noted, the Northern Sea Route has the potential to provide great benefit to Russia through direct trade or the facilitation of trade between Asia and Europe. Further, should Russia win its claims on the outer continental shelf, it will control vast areas and resources to its benefit.13 Thus, refurbishment and expansion of new bases is an effort to secure what Russians believe is theirs. However, this gives rise to the strong possibility of conflict if other nations do not accept Russian claims. A reason for concern that Russia may press its claims even if the UN decides against it is based upon recent developments in other regions. As we have seen over the past four years, Russia has aggressively pressed forward with territorial claims in its “near abroad” at the expense of Russia’s neighbors.14 Russia annexed Crimea from Ukraine in a brazen land grab. Later, under the pretense of protecting ethnic Russians, it fomented a war with Ukraine to seize territory on its western border with Ukraine. Most recently, Russia has intervened in Syria on behalf of Bashar al-Assad’s government to prop that regime up to ensure its survival as well as to enable Russia to gain access to new locations in Syria from which to stage both Russian air and sea power in the Mediterranean Sea and Middle East. This raises the question, Would Russia move in a similarly aggressive manner to establish military hegemony and control over much of the Arctic? Mitigating the Risk of Conflict Since, the Arctic region is so self-evidently important to the United States both economically and militarily, we must assert ourselves to ensure that the region remains peaceful and is of benefit to all nations as part of the global commons. So, what can the U.S. military do to ensure this outcome? First, we must ensure that we maintain and sustain a credible force in Alaska. Much recent discussion by senior political and military leaders has centered on cutting force structure in Alaska.15 In particular, the Army has considered drawing down the airborne brigade combat team posted at Joint Base Elmendorf-Richardson. This would send the wrong message to potential adversaries that the United States is not committed to protecting either its own interests and claims, or Arctic security in general. This might encourage aggressive actions on the part of nations, most prominently Russia, seeking to seize and exploit opportunities within the Arctic region. Second, U.S. forces must exercise frequently and visibly to demonstrate our capability to secure our interests in the Arctic. Such exercises should include joint forces and incorporate combined operations with Arctic partners. By conducting joint and combined exercises, we send a message to potential adversaries that we intend to secure our interests and those of our partners in the austere environment of the Arctic. Moreover, combined exercises demonstrate the interoperability of our forces with partner nations for a deterrent effect. Third, U.S. military forces have to regain Arctic skills to enhance deterrence in the region. There is much work to be done. Over a decade of war focused on counterinsurgency in the desert environment of the Middle East and central Asia has left forces in Alaska with atrophied Arctic survival and tactical skills and antiquated equipment. Further, a major winter exercise in the Arctic targeted at the operational level of war has not occurred in several years. To have a credible deterrence to any nation’s design for expansion in the Arctic, the United States has to systematically rebuild and demonstrate its Arctic skills and refurbish or field new equipment to give U.S. forces in Alaska a robust capability to challenge aggressors. Fourth, U.S. forces in the Arctic require technological and equipment modernization. In the same way that Arctic skills have atrophied over the past decade-plus, so also has the equipment available to the force become either obsolete or difficult to maintain due to age. For example, early-warning defense radar systems require modernization as software becomes out of date and the purpose for which they were designed has evolved. Additionally, ground mobility suffers from an aged system that is difficult to maintain, making it a challenge to move ground forces in deep snow or mud. The M973 Small Unit Support Vehicle (SUSV) is not viable since it is no longer a program of record, and a material solution is required to enable greater mobility for ground forces in the Arctic. These are just two examples of equipping needs among many. The bottom line is that U.S. forces will require investment in materiel that facilitates operating in the tough conditions of the Arctic. This is essential to demonstrate our commitment to security in the region. Finally, in conjunction with rebuilding Arctic forces’ equipment and effectiveness, commanders in Alaska need the authority to conduct military-to-military consultations with counterparts around the region. We maintain this with most Arctic nations through Alaskan Command’s security cooperation line of effort. However, in 2013, all consultations with Russia were curtailed. Lack of regular contact with Russia continues to be a strategic gap that, with increased competition as well as the already tense relations that prevail between the two nations, could lead to misunderstandings and miscalculations between the United States and Russia and potentially result in needless conflict. Regular consultation with Russia needs to be restored. The ability of commanders from U.S. Army Alaska and Alaskan Command to consult with counterparts in Russia would go far to reduce tension and assure clear communication between the two nations. This simple step could go a long way toward ensuring peace in the Arctic. Conclusion The U.S. position in the Arctic because of Alaska is of enormous strategic significance. The United States has vital interests in the Arctic region that are unfortunately often overlooked because turbulence in other areas of the world often draw more attention. In time, these interests will come to be seen as both critical and vital to our own long-term economic interests as well as security. Consequently, there is a need to ensure our interests in the Arctic are sufficiently secured to ensure resolutions to territorial and resource claims remain peaceful. To effect protection of our interests, the United States has to assert leadership using critical elements of national power, including the military. We must rebuild long-ignored Arctic military capabilities to provide a credible deterrent to any nation that may want to expand its territory outside of recognized international norms to exploit the tremendous resources of the Arctic. As human activity continues to increase in the Arctic, it will become more and more important for the United States to demonstrate its strength in the region. Failure to do so could allow the friction of human interaction to grow into needless regional confrontation with global implications. This is preventable with a commitment to leadership and peace in the region that stems from sufficient investment and preparation.

#### Otherwise, it goes nuclear.

Michael T. Klare 20, professor emeritus of peace and world-security studies at Hampshire College and senior visiting fellow at the Arms Control Association in Washington, DC, “How Rising Temperatures Increase the Likelihood of Nuclear War,” Real Leaders, 01/24/2020, https://real-leaders.com/how-rising-temperatures-increase-the-likelihood-of-nuclear-war/

In the Arctic, global warming is producing a wholly different sort of peril: geopolitical competition and conflict made possible by the melting of the polar ice cap. Before long, the Arctic ice cap is expected to disappear in summertime and to shrink noticeably in the winter, making the region more attractive for resource extraction. According to the US Geological Survey, an estimated 30 percent of the world’s remaining undiscovered natural gas is above the Arctic Circle; vast reserves of iron ore, uranium, and rare earth minerals are also thought to be buried there. These resources, along with the appeal of faster commercial shipping routes linking Europe and Asia, have induced all the major powers, including China, to establish or expand operations in the region. Russia has rehabilitated numerous Arctic bases abandoned after the Cold War and built others; the United States has done likewise, modernizing its radar installation at Thule in Greenland, reoccupying an airfield at Keflavík in Iceland, and establishing bases in northern Norway.

Increased economic and military competition in the Arctic has significant nuclear implications, as numerous weapons are deployed there and geography lends it a key role in many nuclear scenarios. Most of Russia’s missile-carrying submarines are based near Murmansk, on the Barents Sea (an offshoot of the Arctic Ocean), and many of its nuclear-armed bombers are also at bases in the region to take advantage of the short polar route to North America. As a counterweight, the Pentagon has deployed additional subs and antisubmarine aircraft near the Barents Sea and interceptor aircraft in Alaska, followed by further measures by Moscow. “I do not want to stoke any fears here,” Russian President Vladimir Putin declared in June 2017, “but experts are aware that US nuclear submarines remain on duty in northern Norway…. We must protect [Russia’s] shore accordingly.”

On the other side of the equation, an intensifying arms race will block progress against climate change by siphoning resources needed for a global energy transition and by poisoning the relations among the great powers, impeding joint efforts to slow the warming.

With the signing of the Paris Agreement, it appeared that the great powers might unite in a global effort to slash greenhouse gas emissions quickly enough to avoid catastrophe, but those hopes have since receded. At the time, Obama emphasized that limiting global warming would require nations to work together in an environment of trust and peaceful cooperation. Instead of leading the global transition to a postcarbon energy system, however, the major powers are spending massively to enhance their military capabilities and engaging in conflict-provoking behaviors.

Since fiscal year 2016, the annual budget of the US Department of Defense has risen from $580 billion to $738 billion in fiscal year 2020. When the budget increases for each fiscal year since 2016 are combined, the United States will have spent an additional $380 billion on military programs by the end of this fiscal year—more than enough to jump-start the transition to a carbon-​free economy. If the Pentagon budget rises as planned to $747 billion in fiscal year 2024, a total of $989 billion in additional spending will have been devoted to military operations and procurement over this period, leaving precious little money for a Green New Deal or any other scheme for systemic decarbonization.

Meanwhile, policy-makers in Washington, Beijing, and Moscow increasingly regard one another as implacable and dangerous adversaries. “As China and Russia seek to expand their global influence,” then–Director of National Intelligence Dan Coats informed Congress in a January 2019 report, “they are eroding once well-established security norms and increasing the risk of regional conflicts.” Chinese and Russian officials have been making similar statements about the United States. Secondary powers like India, Pakistan, and Turkey are also assuming increasingly militaristic postures, facilitating the potential spread of nuclear weapons and exacerbating regional tensions. In this environment, it is almost impossible to imagine future climate negotiations at which the great powers agree on concrete measures for a rapid transition to a clean energy economy.

In a world constantly poised for nuclear war while facing widespread state decay from climate disruption, these twin threats would intermingle and intensify each other. Climate-​related resource stresses and disputes would increase the level of global discord and the risk of nuclear escalation; the nuclear arms race would poison relations between states and make a global energy transition impossible.

### SSA ADV---Arctic---SSA Key

#### SSA is key---adversarial operations are ramping up now, but awareness mitigates threats.

OneWeb, 21 (OneWeb, 6-21-2021, accessed on 7-9-2022, “Polar Potential: empowering connectivity across the Arctic”, <https://assets.staging.oneweb.build/s3fs-public/assets/documents/Arctic-Empowering-Connectivity-of-Armed-Forces-and-Emergency-Responders.pdf>, HBisevac)

Problem: Disrupted Connectivity in the Arctic

In the new era of great power competition, the Arctic nations and observer states are already competing to assert their influence across the region.

Reliable, **resilient connectivity** is **critical** to any military operation in a region known for its **remote nature**, harsh climate, and atmospheric phenomena.

As the US NORTHCOM suggests: “Improving our **domain awareness**, communications systems, and our ability to conduct and sustain multi-domain operations in the High North are all **important priorities**”.

Specifically, the Arctic’s extreme topography prevents the laying of fibre networks by terrestrial communications providers while the region’s high latitude means armed forces can often find it more difficult to link ground user terminals with Geostationary (GEO) Global Navigation Satellite System (GNSS) satellites sitting over the Equator and Mid Earth Orbit (MEO) satellites which reach no higher than +/- 52 degrees latitude.

Armed force also suffer from high levels in latency - a significant challenge for units seeking to maintain the tactical advantage over near peer adversaries operating throughout the region.

Additional challenges faced by armed forces operating in the Arctic include atmospheric interference from solar and magnetic events which can degrade high frequency (HF) signals.

Over the course of 2020/21, armed forces from across the Arctic Nations continue to conduct joint exercise across the region, often aimed at overcoming such restrictions in connectivity. Examples include the US DoD-led Arctic Edge; ICEX; and Northern Edge exercises which provided invaluable experience in terms of the planning and execution of multi-domain operations in the region.

High capability, near peer adversaries including the People’s Republic of China (PRC) and Russian Federation also continue to be **highly active** in the Arctic.

Russian Armed Forces, for example, have conducted amphibious landings on the **Chukotka** (Chukchi) **Peninsula**, close to Alaska, in addition to anti-submarine warfare operations and the launch of anti-ship cruise missiles within the US Exclusive Economic Zone.

Similar training programmes have been conducted on Alexandra Land with Russian airborne forces inserted by parachute to clear and hold ground with the support of layered air assets including strategic bombers.

As an Arctic Observer state, the PRC is also emerging as an **increasingly** **important stakeholder** in the region, declaring itself a “near-Arctic state”. The PRC’s strategy includes building bilateral relationships with Arctic Nations in addition to the establishment of space-based capabilities including the ‘Arctic Environment Satellite and Numerical Weather Forecasting Project’ which in the future could support the command and control of ground and maritime forces in the area.

“The escalation of Russian activity and Chinese ambitions in the region demonstrates the **strategic importance** of the Arctic. Competition will only increase as sea ice diminishes and competition for resources expands,” the US Northern Command (NORTHCOM) understands.

NATO members in the Arctic are also **acutely aware** of Russian and Chinese interests in the region. In response, NATO members continue to position themselves to **increase** their **own** **footprints** in the Arctic.

### SSA ADV---Arctic---RCA

#### could probably be used for something…

Tim Reilly, 22 (Tim Reilly, Scott Polar Research Institute, University of Cambridge, 5-16-2022, accessed on 7-10-2022, Financial Times, “Letter: Nato must consider risks of Arctic expansion”, <https://www.ft.com/content/d02c83a0-e50c-452f-9fb2-a1fc023e2036>, HBisevac)

And the threat is not solely from Russia in this region. It is increasingly from Sino-Russian Arctic collaboration, including the strategic convergence in space (thus the de facto importance of the high latitude location of the Arctic).

The latter aspect is challenging the terrestrial sovereignty and governance of the Arctic Council, the region’s intergovernmental forum, using space-based Big Data, artificial intelligence, social media and the Internet of Things (IoT), controlled by low-orbiting Chinese (and some, Russian) satellites.

Expanding Nato into the Eurasian Arctic is a task of **biblical proportions** in terms of geographic scale, budgets and alliances. At the very least the west needs to first define the geographical meaning of the word “Arctic”, identifying the real protagonists (Russia, China or both), and the nature of the “threat” whether economic, military or governance

The Arctic is the first **geographical manifestation** of **Sino-Russian regionalism**. Nato is only one of the statecraft tools needed to counter it in the 21st-century Arctic.

### SSA ADV---Arctic---I/L

#### Expanding domain awareness through NATO countries spreads to the Artic effectively deterring conflict and avoiding miscalculation.

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Significance of the Arctic

The Arctic is the cold and remote wasteland north of the 66.3° north latitude, commonly referred to as the Arctic Circle.1 The United Nations Convention on the Law of the Sea defines the Arctic Five, the nations with an Arctic coastal area and an exclusive economic zone (EEZ) extending into the region.2 They include Russia, Canada, Denmark (Greenland), Norway, and the US (Alaska).3 Iceland, Sweden, and Finland are also considered Arctic nations but do not have an Arctic coastal area. These eight nations constitute the members of the Arctic Council and have special interests in the Arctic.4 The region’s considerable economic value in oil and gas resources, fisheries, and minerals make it of interest to many nations beyond the Arctic Council.5

These resources have long been unavailable for exploitation due to ice coverage, but their growing accessibility brought on by climate change is making the Arctic even more valuable. Surveys estimate that 13 percent of the world’s undiscovered oil reserves and 30 percent of undiscovered gas reserves reside in the Arctic.6 Until recently, the Arctic’s minerals, oil, and natural gas liquids have been inaccessible due to harsh conditions. However, the declining Arctic ice has opened up access to areas where these resources are located, and more extensive sea areas for fisheries are now reachable.7 Also, the retreating ice opens up previously closed sea lines of communication.

The Northwest Passage and the Northern Sea Route are open for more extended periods, transporting merchandise from the Pacific to the Atlantic free from piracy activity and faster than the traditional routes through the Suez or Panama Canal.8 At the same time, the increasing availability of resources presents several problems.9 Although most disagreements regarding maritime boundaries have been resolved peacefully, a more “complicated disagreement involves the North Pole itself.”10 Canada, Denmark (Greenland), and Russia claim ownership of the Lomonosov Ridge, an underwater ridgeline that extends well into the central Arctic.11 The issue is unsettled and a possible source of conflict—but it has been solely a diplomatic one.12 Naturally, as Arctic nations, Russia and the US are interested in the Arctic region due to its resources and vital strategic points. The increased potential for economic gain and military-strategic advantage has made the Arctic an arena for strategic competition and has led to an increased military, civil, and commercial presence from both nations. In particular, Russia has “gradually reintroduced army, navy and air force elements into the region,” expanding its military footprint in the Arctic.13

Russia is the only nation in the Arctic Council that is not a NATO member or partner.14 Russia has the largest Arctic population, with more than 2 million citizens living north of the Arctic Circle.15 Russia also generates 22–30 percent of its gross national product (GNP) from the Arctic.16 Because of the melting ice and changing Arctic environment, Russia is “optimistic about the potential for Siberia and the Russian Far East” to significantly boost the nation’s economy.17 Energy projects and faster shipping between Asia and Europe because of the Northern Sea Route will increase the need for supporting ports and infrastructure. Building and maintaining this infrastructure will be a potentially positive economic revenue for the nation.18 The economic potential has intensified Russia's interest in protecting its Arctic assets through a heightened military presence. Signs of this interest include Russia’s reopening of abandoned military installations and more “incursions by Russian aircraft and submarines into or close to other [nations’] Arctic spaces.”19 The planting of a Russian metal flag under the ice at the North Pole by a Russian submarine crew in 2007 shows that a greater military presence may have a secondary purpose.20 President Putin has demonstrated a will to use illegal aggression and violate international law to seize territory in Europe.21 Russia may intend to contest the economically and strategically important region and likely make claims for ownership and economic rights in the Arctic that extend beyond the 200-nautical-mile EEZ. Similarly, China has shown increased interest in the Arctic region.

An exciting aspect of the Arctic and strategic competition is China’s claim to be a near-Arctic state.22 China’s 2018 Arctic strategy outlines a “Polar Silk Road economic plan.”23 China sees the shorter distance from China to Europe through the Northern Route as a possible “economic boom.”24 It has also invested heavily in energy projects in Russia and does not hide its desire to access Arctic natural resources.25 China’s investments in ports, airports, research stations, and satellite ground stations are reasons to raise concerns about its intentions in the “autonomous territory” of the Arctic.26 China is also developing a “constellation of twentyfour polar observation satellites.”27 The first satellite, launched in September 2019, has already delivered over 2,500 pictures covering the Arctic and Antarctic.28 China’s increased activity and interest in the Arctic confirms the Arctic as a new ground for strategic competition between Russia, China, and the US.

The Arctic has risen as a new arena for strategic competition and a region of increased interest for other stakeholders with economic motives. The unfortunate consequences of its environmental changes are a potential increase in natural resource exploitation and new transportation lines. This new paradigm affects commercial, civil, and military operations and has increased the strategic value of all Arctic and near Arctic countries.

The corresponding threats to the area are significant. In fragile regions like the Arctic, an accident from oil drilling or shipping would have dire consequences. Continued environmental change might also impact the wildlife and fisheries in the area, and further research and surveillance are critical. A conflict in the area leading to the use of arms may have the same effects. The vast amount of international waters and disputed rights to resources may lead to conflicts between Arctic nations and other stakeholders claiming their rights to exploit the region. Increased activity has “fueled a demand for communication, navigation, and surveillance infrastructures.”29 In the 2013 National Strategy for the Arctic Region, President Barack Obama recognized the Arctic as “an amazing place” where climate changes represent emerging opportunities and “very real challenges.”30 These challenges are multifaceted, and many of them fall under the purview of the Department of Defense.

Artic Strategies

US Artic Strategy

Since the US bought Alaska from Russia in 1867, it has been an Arctic nation and is currently one of the Arctic Five and a member of the Arctic Council.31 In Alaska, permafrost dominates the northern third of the state, making regular settlements challenging.32 Less than 68,000 Americans live in the Arctic, and Alaska produces only 0.3 percent of the US GNP.33 Mineral production in Alaska constitutes about four percent of US mineral production.34 Nevertheless, the Arctic is vital to US geostrategic interests.35 As the Arctic as a “geostrategic buffer is eroding” and strategic competition in the area is increasing, the US needs a comprehensive US military strategy for the region.36

The DOD’s 2019 Arctic strategy expands on the complex security environment in the region. It recognizes the security threat emerging from increasing access to resources, an uncertain strategic environment, and the fragile but still enduring cooperation in the region.37 The DOD established three main objectives for the Arctic: defend the homeland, compete when necessary to maintain favorable regional balances of power, and ensure common domains remain free and open.38 The DOD acknowledges the Arctic as an increasingly vital region due to strategic competition and greater access to the region and its resources. This focus gives the Air and Space Forces a direction for an Arctic strategy.

The Department of the Air Force views the Arctic as “residing at the intersection between the U.S. homeland and two critical theaters, IndoPacific and Europe, [thus making] the Arctic . . . an increasingly vital region for U.S. national security interests.”39 The Air Force’s Arctic Strategy also recognizes the “Arctic as a region of strategic opportunity for the Air and Space Forces, Joint Force, allies, and partners.”40 The strategy builds around four lines of effort: maintaining vigilance through command, control, communications, intelligence, surveillance, and reconnaissance (C3ISR); projecting power through bases in Alaska and Greenland; cooperating with allies and Arctic partners; and finally, preparing through training, research, and development.41 Allied and partner cooperation is emphasized throughout the strategy. The strategy recognizes space as a solution for the challenges in the demanding Arctic operating environment. The Space Force must overcome the region’s unique orbital and electro-magnetic obstacles that negatively affect all communication and navigational signals.42

Norway’s Arctic Strategy

As one of the eight nations in the Arctic Council and one of the five nations with an Arctic coastline, Norway has extensive interests in the Arctic. Approximately 10 percent of its population—a greater proportion than any other Arctic country—or half a million Norwegians live north of the Arctic Circle.43 Key industries in North Norway such as fisheries, aquaculture, and tourism depend on natural resources.44 It is estimated that more than half of Norway’s undiscovered oil resources are in the Arctic region.45 The Norwegian political vision for North Norway and the Arctic region is economic, environmental, and social sustainability.46 Arctic policy goals focus on international cooperation and international legal order to achieve peace, stability, predictability, value creation, and ecosystem-based management.47 The five priority areas in the Arctic strategy are international cooperation, knowledge development, infrastructure, environmental protection and emergency preparedness, and business development.48 These priorities are essential for the development in the Arctic region and coincide with US policy and strategy for the region. Due to the Gulf Stream, Norway is ice-free in the summer and has no permafrost. Without the Gulf Stream, the average temperature in Norway would be 10 to 15 degrees Celsius colder.49 Although the latitude is similar to Alaska’s, Norway’s climate is friendlier to human activity.

NATO’s Arctic Strategy

NATO also understands the Arctic’s strategic importance, particularly in light of environmental changes, but has failed to develop an Arctic strategy that incorporates the Arctic’s unique challenges. The rapidity of change “suggests the Arctic is likely to be one of the twenty-first century’s most contested areas.”50 The current strategic concept of NATO is “active engagement, modern defense.”51 Collective defense, crisis management, and cooperative security are core tasks, and deterrence “remains a core element” of NATO’s strategy.52 In developing an Arctic strategy (excepting the operational plan), “NATO lags significantly behind” Russia and China.53 An increased Russian military presence and Russia’s enhanced weapons available for anti-access and area denial (A2/AD) in the gap from Greenland to Iceland to the United Kingdom (GIUK) and northbound represent a major strategic problem for some of the alliance’s Arctic members.54 Unfortunately, not all NATO nations, and not even all NATO Arctic nations, have the same viewpoint.55 An intensified focus on the Arctic from the US and Norway may shift NATO’s focus toward the north. However, currently, there is no NATO Arctic strategy other than deterrence and cooperative security.

The Significance of Space as the Solution

The obvious solution to the unique infrastructure challenges in the Arctic is space.56 Commercial satellite services can support the need for increased communications, surveillance, and understanding of events in the region while also increasing cooperation between nations and partners. The use of space assets and space-based infrastructure is not without challenges. However, by “optimizing existing and future space-based infrastructure, using low Earth, geosynchronous, and highly elliptical orbits, the United States can work cooperatively with other Arctic nations to build situational awareness, enhance operations, and strengthen a common rule-based order.”57 Continued research and information sharing in a region formerly neglected due to the harsh environment should be the preferred measure to solve these issues.

Space Strategies

US Space Strategy

The 2020 National Space Policy of the United States of America declares that “the United States will continue to use space for the nation’s security and our allies,” continuing the high focus on allied cooperation, involvement, and protection from the US Arctic strategy.58 Among the many goals of the policy, “lead, encourage, and expand international cooperation,” and “preserve and expand United States leadership . . . [working] with likeminded international and private partners” also confirm this focus on allied and partner cooperation.59 The policy explicitly calls for assured access to space; enhanced positioning, navigation, and timing (PNT); and the development of space professionals as foundational activities.60 Furthermore, the policy defines national security guidelines. In addition to recognizing space as a war-fighting domain, it emphasizes “robust space domain awareness of all activities in space with the ability to characterize and attribute potentially threatening behavior” as an essential tool.61 The policy focuses on “advanced technologies, capabilities, and concepts that anticipate and rapidly respond to changes in the threat environment and improve timeliness and quality of intelligence and data to support operations.” It also tries to “integrate cybersecurity into space operations and capabilities” and “collaborate with allies and partners actively engaging in space security and intelligence operations . . . for the exchange of relevant space and space-related information.”62 Additionally, this policy instructs the secretary of defense (SecDef ) to defend the US and its allies, protect freedom of navigation, defend space assets while supporting joint operations, and use space to deter conflict and defeat aggression. Other SecDef responsibilities include providing affordable and timely space access; developing rapid launch options; detecting threatening space behavior; conducting strategic space posture reviews; and developing, acquiring, and operating space intelligence capability to support joint operations.63 Allied cooperation and defense are vital to accomplishing these tasks. Likewise, the 2020 Defense Space Strategy emphasizes allied cooperation.

The Defense Space Strategy defines the objectives of “maintain[ing] space superiority; provid[ing] space support to national, joint, and combined operations; and ensur[ing] space stability.64 The space strategy defines some lines of effort: “build a comprehensive military advantage in space; integrate military spacepower into national, joint, and combined operations; shape the strategic environment; [and] cooperate with allies, partners, industry, and other U.S. Government departments and agencies.”65 Some specific objectives are to improve intelligence and command and control capabilities; develop capabilities to counter the hostile use of space; integrate allies into plans; and expand cooperative research, development, and acquisition with allies and partners.66 As with much of US military strategy, the document focuses on strategic competition with China. But the strategy also recognizes Russia as a threat. As the Arctic nation with the most citizens north of the Arctic Circle, Russia is also a threat to US security in the Arctic region extending into space.67

The Department of the Air Force Arctic Strategy notes that satellite communications and data links are major C3ISR improvements in the area while recognizing that space assets “reduce the need for a physical footprint in the demanding Arctic operation environment.”68 Another high-focus topic in the strategy is “all-domain awareness” and the accompanying challenges of “unique orbital mechanics” and “electromagnetic obstacles” in the region.69 The strategy also emphasizes allied cooperation, the development of new technology to “ensure access to and freedom to operate in space,” and the need to use space capabilities to “mitigate and predict environmental disturbances unique to the Arctic Region.”70 Norway’s space strategy, like that of the US, emphasizes international cooperation.

Norway’s Space Strategy

Although Norway is not a large nation in geographical terms or population, it is an essential and experienced space nation. Situated as it is in the High North, Norway is an Arctic nation. It is a technologically developed nation that emphasizes research and development in many space-related areas.71 Norway’s space strategy, last updated in 2019, presents four goals for Norwegian space operations. These are promoting profitable businesses, growth, and employment; ensuring crucial needs for society and the population; ensuring adequate security for an essential space infrastructure; and securing Norwegian foreign policy, security, and defense policy activities and operations in space.72 Prioritizing the user’s end needs leads to multisector solutions requiring cooperation between government agencies, commercial interests, and international entities.73 International cooperation is a key focus area for environmental surveillance, security and preparedness, research and education, and military use of space.74 Bilateral agreements and commercial cooperation will enhance the Norwegian military’s capacities.75

Norway’s ambition to be the “NATO in the North” creates responsibilities to develop space-based services in the Arctic, an area of high strategic significance for Norway.76 At the same time, Norway has ambitions of being independent in critical security sector services.77 Due to its global dependence on space infrastructure, Norway’s territory in the Arctic (e.g., Svalbard and Bjoernoeya) and Antarctic (e.g., Queen Maud’s Land) increases its geostrategic significance.78 As the Kongsberg Satellites Services’ station SvalSat on Svalbard exemplifies, these areas are favorable for ground stations.79 Norway will work in multilateral and bilateral processes to ensure Norwegian and allied security and freedom to use space.80 Traditionally, the US and Norway have cooperated on space activities. One recent example is the Rimfax radar developed in Norway and carried by the Perseverance rover on Mars.81

The Norwegian Armed Forces Space Department was established in 2016 to integrate ’the space activities of Norway’s armed forces in an operational domain.82 The department will strengthen the strategic development, coordination, and leadership of military space operations.83 The new long-term plan for the armed forces through 2024 confirms the military focus on space operations. Maritime surveillance, communications, command and control, space domain awareness (SDA), and cooperation with allies and commercial actors are focus areas.84 There is a broad understanding of space as a war-fighting domain and the need for including space in strategy development.85 SDA is a capacity relevant for NATO contribution and a prioritized national focus area and therefore aligns with NATO’s strategy.86

NATO’s Space Strategy

NATO established space as a new operational domain in 2019 when alliance members adopted NATO’s space policy.87 In October 2020, the NATO Space Centre at Allied Air Command in Ramstein, Germany, was established. The center will coordinate allied space activities, support NATO missions and operations such as communications and satellite imagery, and protect allied space systems.88 NATO will not put weapons in space but will procure all products from NATO allies.89 The alliance will not become an autonomous space actor.90 Some essential military space functions to be provided to NATO include SDA, satellite imagery, PNT, and communications.91 NATO’s demand for space support aligns with US and Norwegian strategic focus areas regarding space assets and support in the Arctic.

Topics of Cooperation

The US and Norway may have different goals and motivations for their Arctic and space strategy efforts. These differences are natural since the US is a great power while Norway is a smaller nation with political and cultural ties to the US and Russia. Norway’s neighbor brings strategic competition to Norway’s doorstep, strengthening relations between Norway and the US. Although the two countries may have separate reasons for their interest in the Arctic and their strategy rationales may differ, their activities to achieve these goals often align. The coinciding lines of effort and focus areas for the two nations establish common grounds for cooperation.

First and foremost, cooperation is the common ground for the described policies and strategies, and it is the foundation for all other topics discussed in this article. Norway and the US have already established a unique cooperative relationship in some of these areas. Nevertheless, better cooperation and awareness of the potential advantages of joining forces may lead to even greater gains for both nations. Not limited to just the Arctic region, SDA is one of the most critical areas where both countries can cooperate. The following table summarizes lines of effort and strategies for the US, Norway, and NATO. \*\*\*TABLE OMITTED\*\*\*Space domain awareness is a primary strategic goal for the two nations and NATO. Norway’s GLOBUS radars, located in Vardo in northeastern Norway, have provided space situational awareness for Norway, the US, and NATO since 2001.92 The system will be further improved after completion of the Globus III radar, a joint project of US Air Force Space Command and the Norwegian Intelligence Service.93 The system is planned to be operational in 2022.94 The radar site’s primary missions are surveilling, tracking, and categorizing objects in space; surveilling Norwegian interest areas in the north; and collecting research and development information.95

This cooperation and joint effort exemplify how Norway, a relatively small military space nation, can contribute to the space domain to benefit all NATO nations. Norway’s geographic position and relatively mild climate make the operation possible within the Arctic region. With the Arctic becoming the new area of competition and congestion, Norway is positioned to become a critical player in the arena.96 Like space domain awareness, communication is an essential area of cooperation.

Communications

Secure, reliable communication in the Arctic is vital for any operation— military, civilian, or commercial. Communication between units operating in the Arctic area and back to their command organizations is essential for command and control. US and Norwegian armed forces need broadband network and voice capability. In a remote area like the Arctic, where “fiber optic infrastructure is scarce or nonexistent,” communication via satellites is the only viable solution.97 An increased US presence and a sustained presence from Norwegian forces—all with the same communication, command, and control demands—make satellite communication a perfect example of another area of needed cooperation between nations and between government and civilian actors.

Communications services in the Arctic are provided mainly by satellites in geostationary Earth orbit (GEO), with a limited coverage above 75°- 80° north.98 Fixed users may have broadband service up to 80° north, but the very small aperture terminals (VSAT) only cover up to 75° north.99 Iridium NEXT’s low Earth orbit (LEO) satellite constellation is the only mobile satellite service provider with proper coverage in the polar region.100 Like Kepler and Argos, a few other companies provide LEO connectivity, but none provide near-real-time broadband service.101 Communications in the Arctic area need improving to meet the increased requirements for the allied military presence there.

The US and Norway are already working together to upgrade communications. They are involving government and commercial entities and combining international, cross-sector, and dual-use cooperation. For example, InMarsat plans to launch two satellites in a highly elliptical orbit (HEO) in 2022.102 They will provide continuous high-speed mobile broadband coverage above 65° north and work in conjunction with Inmarsat’s 13 GEO satellites.103 The Norwegian Defense Department will share the cost with the US Air Force and Inmarsat.104 The satellites will be available for merchant fleets, fishing vessels, and other commercial actors and provide tactical and strategic communication for government customers.105 They will improve broadband coverage for US and Norwegian military forces in the area but may not deliver a satisfactory amount of data transfer in the event of a conflict.

Norway’s ambition of being independent in providing critical services for security issues combined with its emphasis on international and bilateral agreements shows the desire for government- or allied-controlled assets. Although Inmarsat is a UK-based company, future commercial sales or changes in the company structures might threaten the Norwegian military forces’ access to the service or render null the possibility of secure and classified communications. China and Russia are investing in and buying European companies. Recently, a Russian-controlled company attempted to buy a Norwegian Rolls Royce engine maker.106 However, the Norwegian government has temporarily stopped the sale due to security issues.107 To depend solely on a commercial actor reduces the service’s reliability in times of crisis, making increased governmental cooperation even more critical. A government controlled and operated tactical and strategic initiative is needed to cover the US’s and Norway’s increased demand for high-speed communications in the Arctic. The planned ViaSat Link 16–capable LEO satellite is an example of a system under US and Norwegian government control.108 Bringing Link 16 from a line-of-sight to beyond-line-of-sight system would improve the situational awareness for all on the tactical, operational, and strategic levels of a conflict.109 As an Arctic nation, Norway should invest in this constellation to ensure a speedy development to achieve timely and secure communications in the Arctic for all Norwegian and allied forces. Norway is well positioned for cooperation regarding uplink and downlink through already established capabilities and can bring this capability into the cooperative effort. Intelligence, surveillance, and reconnaissance (ISR) is another area of cooperation that should be emphasized and increased.

Intelligence, Surveillance, and Reconnaissance

Space is integral to ISR operations because it is the vehicle for the provision of any usable situational awareness in the Arctic region. The Arctic’s properties—large, dark, and remote with unhospitable weather— make conducting ISR operations from space the preferred and most likely the only viable solution. As Norway’s space strategy states, environmental surveillance is critical. Understanding the Arctic environment and determining how and when it will change is a precursor to avoiding potential conflict. Dual-use assets for environmental surveillance have a military potential as well.

Norway has a long history of maritime surveillance of the sea in the Norwegian area of interest. Through NorSat-1 and NorSat-2, the Norwegian Coastal Administration uses the Automatic Identification System (AIS) that all ships above 300 gross tons have been required to have since 2010.110 The new NorSat-3 enhances AIS surveillance with an experimental navigation radar detector (NRD).111 The NorSat satellites are in sun-synchronous orbits and also have additional scientific purposes such as surveillance of solar radiation and space weather.112 They thus provide cross-sectorial (commerce and defense sector) and dual-use (surveillance and scientific) capabilities. These satellites, combined with the coastal radars in Norway, are a vital surveillance source for Russian military ac- tivity in the Barents area. Satellites in polar LEO orbit will help track ships in Norway’s exclusive economic zone and detect ships operating in the Arctic region.

Norway is also developing new, exciting technological solutions that could improve ISR capabilities environmentally and militarily. At the Norwegian University of Science and Technology in Trondheim, a team of students and professors is working on a satellite with a hyperspectral camera, an intelligent onboard processing computer, and robotics.113 The onboard camera can be slewed and provides images of small areas of interest.114 The Norwegian company Kongsberg Satellite Service (KSAT) has contracted with the university to provide ground support that will enable the satellite to download images. Also, short revisit times due to its LEO orbit will allow the satellite to detect algae that is dangerous to salmon farming companies. The satellite’s information can be transferred to “unmanned vehicles that can investigate the areas of interest further.”115 This technology could be developed and proved helpful in detecting images other than underwater algae, particularly submarines. Norway is close to the Kola Peninsula and Kola Bay, the Russian Northern Fleet’s home base.116 An ISR satellite combined with an unmanned aerial system deploying active sonar and confirming the satellite’s findings will give the US, Norway, and NATO greater situational awareness. In addition to environmental surveillance, increased weather surveillance and forecasts are needed.

Any party with interest in the Arctic must consider the punishing weather conditions that can affect the safety of humans and machines. The US Space Force (USSF) is “considering future investments to improve weather monitoring in the Arctic.”117 Climate change, not only in the Arctic, requires “more timely and more precise data.”118 Norway’s interest in research on environmental changes and improved weather forecasting aligns with the DOD and USSF’s need for an updated weather satellite program, especially in the Arctic. By working cooperatively, the US and Norway stand to gain in everything from technology research to the employment of new space assets. Improved sensors reduce cost and improve capabilities. Polar weather satellites with an up-down link every 90 minutes via SvalSat—and distributed via high-speed broadband satellite— would make weather data available to many users, including commercial traffic and decision-makers in both countries.

Understanding the magnitude and speed of environmental changes in the Arctic is essential for resource conservation and situational awareness of potential strategic impacts. According to SpaceNews, a USSF spokes- person confirmed that the Space Force “does not operate and is not developing capabilities specifically to monitor climate change.”119 Although continued work with NASA and the National Oceanic Atmospheric Administration (NOAA) should be a focus area, cooperation between the US and Norway on environmental surveillance will benefit the intelligence and research communities and departments of commerce (fish and oil industry). It will also improve security for both nations and their allies, especially NATO. Besides enhanced ISR, the Arctic region needs enhanced PNT accuracy.

Position, Navigation, and Timing

Greater activity in the Arctic demands a heightened military presence in areal and naval assets. Thus, fully developed and accurate navigation systems are required to avoid accidents and ensure accurate data for situational awareness and weapons deployment, if needed. The high angles from a satellite in a global navigation satellite system—such as the Global Positioning System or Galileo for the Arctic user—limit the user’s accuracy, especially in the vertical axis.120 The satellite-based augmentation system (SBAS) is constrained by atmospheric and topography challenges.121

One solution is to launch SBAS satellites in polar highly elliptical or low Earth orbits.122 Another is to develop a medium Earth orbit constellation.123 A dual-use system with future communications satellites used as SBAS assets represents the third option. Accurate, secure navigation and timing will be just as significant in the Arctic region as in the more populated areas between 65° south and 65° north as the number of cruise ships, commercial carriers, fishing vessels, oil rigs, and other commercial users increases. Therefore, it is in the interest of not only the US Space Force, DOD, and Norwegian Armed Forces to enhance PNT in the area but also that of the US Department of Commerce, Norwegian Department of Commerce and Fisheries, coast guards, and justice departments. The development of new technologies to enhance the accuracy of PNT in the region is, therefore, one area of future cooperation for the US and Norway. Launch capability is another important line of effort for both nations.

Launch Capability

Available, credible launch capability is one of Norway’s national focus areas and a focus area in the US space policy. Andøya Space will establish a launch site for small satellites to polar orbit.124 The first launch is planned for the first half of 2022.125 The launch capability will be up to 1.5 metric tons to polar LEO or sun-synchronous orbit, and the Rocket Factory and Isar Aerospace will supply the initial launch vehicles.126 Inclination will be from 87.4 to 108 degrees, and the remote area of Andoeya provides for significant impact and dispersion areas in the Norwegian Sea.127 The Norwegian government owns a large part of the company, which will be under governmental control in case of a conflict. Norway’s launch capability will potentially extend to its allies, both bilateral and NATO, in the Arctic region. Andøya Spaceport will supplement the US government’s existing launch capabilities. In addition to upstream space operations in launch capabilities, Norway can also provide downstream capabilities worldwide.

With Norway’s geographic placement and relatively mild climate compared to the latitude, building and operating ground radars for SDA in the polar region is easier and more friendly to human existence than in Alaska, Canada, or Greenland. The world’s largest ground station is SvalSat, operated by KSAT.128 Located on Svalbard, an island to the north of the Norwegian mainland, it is “ideally situated at a high enough latitude to see every polar-orbiting satellite from all 14 daily transits.”129 Because the Norwegian government owns 50 percent of KSAT through Space Norway, SvelSat represents a reliable asset in times of conflict.130 KSAT has 25 ground stations located throughout the world, including the Norwegian mainland.131 A global network combined with a cybersecurity focus makes global downloading of payloads and uploading of software for satellite management possible from the company’s offices in Tromsoe in northern Norway.132 Stronger military cooperation with the civilian side of the operation, as described in the Norwegian government’s space strategy, will further improve data and cybersecurity for a military-grade system.

Education, Research, and Development

Norway has a long history as a space nation. Kristian Birkeland, a Norwegian scientist, completed his famous terrella experiment in 1896 in which he made artificial Northern Lights, known as the aurora borealis. This achievement marked the beginning of modern space operations in Norway.133 The Andøya Rocket Range launched its first scientific rocket in 1962 and has since launched over a thousand rockets. Norway has several institutions for space-related education, from satellite technology to space physics. In cooperation with the University of Oslo (UiO), the Norwegian military research institute Forsvarets forskningsinstitutt (FFI) developed the Rimfax radar for the Perseverence rover.134 Norway is a member of the European Space Agency, and the Norwegian space industry consists of around 40 companies.135 Several Norwegian companies have further developed technology used offshore and in areas from medical science to space technology, and Norwegian technology and knowledge of space and space operations are world class.136 Space is also a highlighted interest in the Norwegian national strategy.

Suggested Combined Arctic Space Strategy

A future US and Norwegian combined Arctic space strategy should focus on three primary efforts. The first is closing the Arctic infrastructure gap. The US and Norway need to recognize the increased strategic significance of the Arctic region. Its remoteness and harsh conditions underline the need for space operations to provide C3ISR to achieve security for both nations’ interests. Gen John Raymond, chief of space operations for the USSF, states that the Department of the Air Force Arctic Strategy is “a really important strategy for space” as the US wants to “deter conflict from occurring both in space and through the Arctic.”137 As most US and Norwegian strategy documents indicate and some space and military experts argue, there is a need for cooperation between Arctic partners to “increase vigilance in this increasingly vital region.”138 Therefore, an Arctic space strategy must continue on this track. US and Norwegian armed forces should expand their cooperation to ensure cost sharing and shared benefits from education, research, development, and geographic position to close the gap in necessary infrastructure in the region.

Dual-use assets reduce government spending, and profitable commercial companies increase a nation’s economic power. Commercial companies like SpaceX conduct technological developments to make space operations cheaper, better, and more available. The drawback of the commercial space industry is the lack of governmental control in a conflict. Therefore, allied governments must deal exclusively with companies from the involved nations and have transparent contracts and ownership control. China’s One Belt, One Road initiative and Russian corporations’ predatory buy-ups of European companies emphasize this point. Space capabilities controlled by companies from an adversary nation are not desirable in case of a conflict.

As a small nation with limited human resources available for a considerable and credible conventional force, Norway should continue its strategy of NATO contributions. C3ISR space assets are a sought-after capacity for NATO, especially in the Arctic area where Russia and China are increasing their presence. Therefore, Norway needs to continue developing its focus on technological development within space, cyber, and artificial intelligence. Technological development will bring new commercial opportunities and be a backup industry for oil and gas production, rendering Norway’s economy powerless and vulnerable. Norway’s geographic position in the Arctic—with less harsh conditions than Canada, Alaska, or Greenland—makes it an indispensable choice for US bilateral collaboration and NATO partner cooperation. Its geographic position also makes Norway dependent on the Arctic region and therefore equally as interested as the US in Arctic security. With less access to livable areas in the Arctic region, the US will benefit from such cooperation. Continued closing of the infrastructure gap can and should be done in conjunction with allies and partners.

The second main effort is improved SDA in the polar area. Space as the solution for the US and Norwegian Arctic challenges is not exclusive to these nations. China and Russia have shown military and commercial interest in the region and have increased their space capability in polar orbits. Increased SDA is therefore as important as increased ISR capabilities. Since Chinese and Russian intentions in the Arctic are unknown, their objectives in space in the polar region are an area of concern for the US, Norway, and NATO allies. A robust and dependable SDA system in the polar region must therefore be another critical area of cooperation— and one that nations’ strategy documents should emphasize. Nevertheless, the most important field of cooperation does not lie in technical solutions and assets but in the exchange and increase of knowledge and usage of the capabilities.

#### That sparks conflicts---Russia’s second strike capabilities and melting ice make it increasingly difficult to keep conflict low level.

Jasmine Owens, 20 (Jasmine Owens, Lead Organizer and Policy Coordinator, Physicians for Social Responsibility, 8-26-2020, accessed on 7-10-2022, The Center for Climate & Security, “Emerging Threat: As the Arctic Melts, Russian Plans to Militarize Could Create a Nuclear Hotspot”, <https://climateandsecurity.org/2020/08/emerging-threat-as-the-arctic-melts-russian-plans-to-militarize-could-create-a-nuclear-hotspot/>, HBisevac)

New opportunities are arising for various countries as **climate change** **devastates** the **Arctic**. However, **Russia** has already begun to stake its claim by **increasing** its **military presence** in the region.

The Arctic is experiencing momentous transformations as climate change **wreaks havoc** in the region. It is warming at **twice the rate** than the rest of the world. This is creating a **positive feedback loop**: as the temperatures rise in the Arctic, the sea ice that used to reflect sunlight back into the atmosphere is melting more, which causes the darker ocean water or land to absorb more light and thus increases the temperatures in the region. Due to the rising temperatures, the Arctic is predicted to be completely ice-free during the summer by 2050, even if significant international action is taken now to reduce carbon emissions. There is also a major concern that over time, the Arctic will lose all ability to produce ice, leaving it ice-free year-round.

Russia & Climate Change

However, the effects of climate change in the region are not limited to the Arctic. Russia has been warming at a rate of 2.5 times faster than the entire planet since the mid-1970’s. Large parts of Russia are- and will continue to be- greatly impacted by climate change.

On 4 June 2020, Russian President Vladimir Putin declared a state of emergency in northern Siberia after more than 20,000 tons of diesel leaked into the Ambarnaya River nearby Norilsk city. The oil spill occurred after the collapse of a fuel tank at the Norilsk Nickel site due to melting permafrost. This oil spill is one of the largest spills in Russian history. It is expected to take at least 10 years for the local ecosystem to recover.

Recently, intense wildfires have been ravaging Siberia, burning through an area larger than the size of Greece. The wildfires are expected to exacerbate the effects of climate change in the area.

A special report released by the National Intelligence Council concluded that although Russia has already begun feeling the effects of climate change, by 2030, the effects will be magnified. The study outlined the various ways that climate change will impact Russia’s energy, water and agricultural resources, as well as the consequences for migration and the intensification of existing socioeconomic and sociopolitical issues.

The responses to the ever-increasing consequences of climate change by Russian leaders have been mixed. The Russian government released a low carbon development plan in March that made promises to cut some emissions, but not enough under the Paris Agreement.

Yet top Russian leaders, including President Putin, have expressed that these effects brought about by climate change can actually be good for Russia. Already, the Russian government is planning to “use the advantages of climate change” to take advantage of polar hydrocarbon reserves that have been made available due to melting sea ice.

An extensive report published by the Center for Strategic and International Studies detailed how Russia plans to utilize the melting of the Arctic to **further** its own **national security interests**. According to the report, there are three overarching goals of Russia’s military presence in the Arctic: to boost **defense** along its **northern border**, especially as interest in the Arctic begins to rise due to ice melt and potential new passageways; to protect its **economic future**; and, to establish a **stage** upon which it can **project power**.

Arctic Territory & Russia’s Nuclear Posture

The main issue lies with the fact that Russia views the **N**orthern **S**ea **R**oute (NSR), its maritime passage, as a domestic passageway, while other countries see it as an international passageway. As Russia increases its control over the area, tensions will surely rise as other countries seek to use the passageway as well. China has already expressed interest, creating plans for a “**Polar Silk Road**” once the Arctic becomes ice free.

Tensions may also escalate due to the **NSR’s proximity** to Russia’s **nuclear arsenal**. Parts of Russia’s nuclear arsenal and **second-strike capabilities** are stationed in the **Arctic**. These are under control of the Northern Fleet, which provides protection for Russia’s nuclear and non-nuclear military assets in the Arctic.

Russia is already increasing its presence in the region in accordance with the assertion that the NSR is Russian territory. It has conducted tests for new Arctic-based hypersonic cruise missiles and nuclear-powered underwater drones. This has been a cause for concern, especially for the United States, which worries about the presence of these new technologies in the region given the cold relationship between the United States and Russia.

Russia also possesses almost 40 icebreakers with more on the way, making it the largest fleet of icebreakers in the world. These fleets not only protect Russia’s coastline but also serve as a scientific platform and monitor commerce throughout the NSR.

Additionally, Russia has given its nuclear agency Rosatom partial control over the Northern Sea Route (NSR) in the Arctic, and limited traffic from foreign warships without proper notification protocols.

As Russia increases its **military** and **nuclear presence** in the Arctic, it will become **increasingly difficult** for other countries to utilize the region **without conflict arising**. It is important to watch this region as climate change persists, to see how Russian actions in the name of national security will influence broader international security.

#### Arctic warming has made the risk of conflict increase.

Michael Yue, 22 (Michael Yue is a writer for IRR, Graduate Student from Santa Clara University, 4-17-2022, accessed on 7-10-2022, International Relations Review, “How the Conflict in the Arctic is Heating Up”, <https://www.irreview.org/articles/how-the-conflict-in-the-arctic-is-heating-up>, HBisevac)

Although climate change is a primary issue in the Arctic Circle, the changes it has wrought in the region have **simultaneously** created new **benefits** and new areas of **conflict** for the countries surrounding the North Pole. The Arctic is warming **twice as fast** as the rest of the world, but sea ice melting has seen three major powers scrambling to take advantage of the new space. The U.S. and Russia are taking advantage of the new sea routes, while Canada is preparing in the event of a new front against Russia across the Arctic Ocean. Countries are going ahead with plans in the Arctic in fear of new avenues for conflict and creating threats to international security.

One direct concern for **NATO nations** is the possibility of **conflict** with **Russia** over **control** of the Arctic Circle. Normally, the Arctic Council, a coalition of the eight countries that border the Arctic Ocean, meets twice a year to cooperate on issues such as sustainable development and environmental protection. However, seven of the eight countries announced a “pause” in council relations due to Russia’s invasion of Ukraine. Russia chairs the council until the end of this year, a duty that rotates between countries. While Russia promised to use its time as chair to focus on sustainable development, most of its efforts have focused on restoring and rebuilding Russia’s military defenses in the country’s northern territories.

### SSA ADV---Arctic---UQ

#### Redlines are close now---China is developing global power projection and economic investments prove.

Jana Robinson, 20 (Dr. Jana Robinson is the Managing Director of the Prague Security Studies Institute and serves as PSSI’s Space Security Program Director, September 2020, accessed on 7-9-2022, Joint Air Power Competence Centre, The Journal of the JPACC, vol. 30, “Arctic Space Challenge for NATO Emerging from China’s Economic and Financial Assertiveness”, <https://www.japcc.org/articles/arctic-space-challenge-for-nato-emerging-from-chinas-economic-and-financial-assertiveness/>, HBisevac)

Geopolitics in the Arctic

Canada, Denmark/Greenland, Norway, Russia, and the United States (US) border the Arctic Ocean. These countries, together with Finland, Iceland and Sweden form the so-called Arctic Council, a consultative body that has governed, together with the United Nations (UN) Convention of the Law of the Sea, activities in the Arctic. This Council, established in 1996, according to its own admission, cannot implement or enforce its guidelines, assessments or recommendations. That responsibility belongs to each individual Arctic State.1 This is also evident from the pursuit of raw national interests in this strategic, and now more accessible, region. Over the past decade, two developments have, arguably, shaped the **Arctic geopolitics** to the **greatest degree**: the **increasing assertiveness** of **Russia** and the **growing presence** of **China**.

Although a non-Arctic state, China has sought to position itself as a stakeholder in the region. China’s research and scientific expeditions in the Arctic go back to the 1990s. In the past decade its interests there have expanded, encompassing exploration, commercial, shipping, and space activities. Beyond its observer role on the Arctic Council, it has established a narrative beneficial to its interests, including declaring itself a ‘near-Arctic state’.2

In its first Arctic policy of 2018, Beijing points to the Arctic’s economic and investment potential, proclaiming its desire to build a ‘**Polar Silk Road**’ integrated into its larger **B**elt and **R**oad **I**nitiative (BRI) and to ensure its freedom to operate in the region.3 Part of its initial foothold may be the largest Chinese investment in the region to date – the Yamal LNG project with Russia

China has worked toward building bilateral relationships and provided substantial capital investment in the Arctic Council countries. Its approach has been to use soft power projection, such as emphasizing sustainability, environmental protection and scientific research. Despite this benign-sounding narrative, Norway5, Sweden, the US, and a number of other countries believe that China’s expansive interest in this region is strategic and military. Among the concerns are undue political influence and/or uncontrolled transfers/theft of sensitive data and technologies.

Chinese Space Activities in the Arctic

China’s **space activities** in the region have been **expanding**. In December 2018, the relatively new **M**inistry of **N**atural **R**esources (MNR), which now oversees the Chinese Arctic and Antarctic Administration (CAA), launched the ‘Arctic Environment Satellite and Numerical Weather Forecasting Project’. According to MNR, it is to assist China’s role in the governance of the Arctic and in the building of the **Polar Silk Road**.6

Expanding the global footprint of the space ground infrastructure supports China’s influence and **global power projection** as space systems are critically dependent upon its ground segment to provide command and control of the satellites, and also serve as a gateway for **mission data** such as communications, intelligence, and other data.

Below is a description of Chinese transactions in the Arctic that demonstrate this effort, beyond the scope of their publicly declared vision. China currently has its stations in Kiruna (Sweden)7, Karholl (Iceland)8, Ny-Ålesund (Svalbard)9, and Longyearbyen (Svalbard)10, and plans to establish ones in Finland (Sodankyla)11 and Greenland (Nuuk)12.

Sweden

The China Remote Sensing Satellite North Polar Ground Station (CNPGS) in Kiruna, Sweden (some 200 km north of the Arctic Circle) is run by the Institute of Remote Sensing and Digital Earth (RADI) of the Chinese Academy of Sciences (CAS) and began operations in 2017. Located at the Esrange Space Center, operated by the state-owned Swedish Space Corporation (SSC), it is the first Chinese overseas Earth observation satellite data receive station. CAS declared CNPGS in Kiruna13 to be an important part of China’s Gaofen project (launched in 2010) – a global EO satellite network to be completed in 2020.14

Concerns have been raised about its potential dual-use purpose. In January 2019, the Swedish Ministry of Defence’s Defence Research Agency (FOI) publicly expressed a concern that the ostensibly civilian cooperation with China could, in fact, be controlled by the PLA and used to supplement military surveillance of the Arctic region with implications for Sweden’s national security.15 SSC also hosts China’s ground facilities in Australia16 and Chile17.

Iceland

The China-Iceland Arctic Science Observatory (CIAO) in Karholl, Iceland, is jointly operated by Polar Research Institute of China (PRIC) and the Icelandic Centre for Research (Rannis). The project was launched in 2012, based on a Memorandum of Understanding (MoU) between PRIC and Rannis, land was acquired in 2014 and construction began in 2016. The land is owned by a non-profit Aurora Observatory (AO), which would indicate that China changed its approach after the unsuccessful bid in 2011 by Chinese businessman Huang Nubo to acquire land in Iceland and in Svalbard in 2014. Originally it was envisioned that the station will serve to observe auroras, but China proposed in 2017 to upgrade the facility to also enable other types of research.18 The facility, not far from the Icelandic port town Akureyri, has been operational since October 2018.19

The country’s willingness to engage in lop-sided cooperation arrangements with China intensified after Iceland’s three largest banks (with assets between them 10 times larger than the country’s economy) collapsed and caused a financial crisis that lasted several years.20 They included the currency swap agreement with China of 3.5 billion RMB, concluded in 2010, and extended in 2013, between the central banks of Iceland and China.21 Iceland also became the first European country to sign a free trade agreement with China in 2013.22

Svalbard/Norway

China’s Ny-Ålesund Yellow River Station on Svalbard Island has been operating since 2004.23 Since 2017, it has been managed by PRIC. Previously, it was under the oversight of the CAA. Its building is rented from Norway’s Royal Company.24 The declared purpose of the facility is to use it as an ‘integral step for China to improve its understanding about the impact of climate change in the Arctic to other continents, Asia in particular’.25 It has the world’s largest space physics observatory and is able to accommodate 37 personnel in summer and 4 in winter (the highest occupancy of any other country with facilities there).26 In September 2018, the Polar Research Institute of Hong Kong (PRIHK) established a station (known as the Bauhinia Station) in Longyearbyen, Svalbard, located about 150 km away from the Yellow River Station.27

Finland

Chinese investment in Finland was minimal until the period of Helsinki’s Chairmanship of the Arctic Council from 2017–2019, during which time China’s interest spiked. Ultimately, in January 2019, the success of China’s so-called ‘check book’ diplomacy was evident during President Niinisto’s visit to Beijing. At that time, a comprehensive agreement was reached, calling for a China-Finland Joint Action Plan (2019–2023), which laid the groundwork for additional Chinese investment in the country going forward.28 Implementation of this action plan has included an agreement between Chinese RADI and Finnish Meteorological Institute to establish a joint Research Center for Arctic Space Observations and Data Sharing to be built in Sodankyla, Lapland.29

Greenland

Although Greenland, to date, resisted Chinese demarches, it remains a target for Chinese investment. In 2017, rather discretely, a Chinese-funded satellite ground station and a research facility were launched in Greenland, a collaboration between a local Greenland Institute of Natural Resources and Global Change and Earth System Science Research Institute of the Beijing Normal University (BNU).30

Interestingly, in 2017, Greenland’s Prime Minister planned to obtain funding from Chinese state-run banks for building three commercial airports in Greenland (costing some $555 million), but this arrangement was terminated after concerns were expressed by Denmark and the US (which has a large military base there at Thule).31 A year earlier, in 2016, the Hong Kong-based company General Nice Ground attempted to acquire an old naval base in Greenland,32 but it was stopped by the Danish government over security concerns.33 It is important to note that Chinese companies hold a stake in uranium and rare-earth mineral (REE) mines there. In fact, Greenland is said to be emerging as one of key components of Beijing’s Polar Silk Road as the country has a potential to become another major hub (beyond China) for REE mining.

Key Findings

The examples referenced in the section above demonstrate the incremental approach that China takes in the developed, democratic countries, often through seemingly innocent scientific collaboration which is then expanded beyond the original scope, including into potential military applications. This is in contrast with the offers of vertically-integrated space sector packages (partial or complete) offered by China to developing countries, often including large-scale subsidized financing.34 Accordingly, China’s broader strategic gains in the Arctic are much harder to detect and quantify (including legitimizing of its growing involvement in the region).

China’s space sector activities are closely aligned with its ‘Polar Silk Road’ initiative, a subsidiary of the country’s broader BRI, giving the country access to valuable northern latitude land and infrastructure. It is difficult to make a clear distinction between civilian and political-military activities of China in this region, but a connection has been identified between the establishment of the ground stations in the Arctic and the Chinese military.

In short, the Arctic is part of China’s **global space power projection** (and associated economic benefits) the implications of which are not well understood today. NATO would be well-advised to **understand**, and **carefully monitor**, this risk environment, including its scale and underlying motives.

#### SSA capabilities within NATO are key.

David Auerswald, 21 (David Auerswald, Ph.D., is a professor of security studies at the U.S. National War College, 5-27-2021, accessed on 7-10-2022, War on the Rocks, “A U.S. SECURITY STRATEGY FOR THE ARCTIC”, <https://warontherocks.com/2021/05/a-u-s-security-strategy-for-the-arctic/>, HBisevac)

Goals for an Arctic Strategy

Though the Biden administration has yet to release a National Defense Strategy and National Military Strategy, guideposts exist to begin conceptualizing a new Arctic security strategy. Blinken expressed the U.S. desire to keep the Arctic peaceful when speaking at the May 2021 Arctic Council ministerial meeting. The administration’s March 2021 Interim National Security Strategic Guidance focuses on deterring and preventing adversaries from threatening the United States and its allies, inhibiting access to the global commons, or dominating key regions (i.e., the Indo-Pacific, Europe, and the Western Hemisphere). Even though the document does not mention the region, its priority actions are applicable to the Arctic, such as leading a stable and open international system underwritten by alliances, partnerships, multilateralism, and international rules.

Any new U.S. Arctic security strategy should have three goals: **deter military attacks** against U.S. or allied territory originating from the Arctic, prevent China or Russia from **weakening** existing rules-based **Arctic governance** through coercion, and **prevent regional hegemony** by either China or Russia. To accomplish these goals, U.S. strategy should develop military capabilities for use in the North American and European Arctic subregions and then demonstrate the ability to use them in harsh Arctic conditions. The U.S. government should persuade regional allies and partners that the United States can be a trusted security partner in the region. Finally, the strategy should contain inducements to the private sector to build dual-use Arctic infrastructure that benefits the private sector while giving the military platforms from which to observe and operate in the Arctic.

The Arctic’s Geopolitical Context

Any Arctic strategy is constrained by the region’s harsh terrain and weather conditions. High latitudes and harsh weather make communications, global positioning, and domain awareness a significant challenge across the Arctic. In the Alaskan Arctic, ground-based infrastructure outside the Anchorage-Fairbanks-Prudhoe corridor is localized rather than interconnected and is dependent on bulk summer resupply. U.S. security infrastructure in the Arctic comprises aging early warning radars in Alaska and Greenland, missile defenses and significant 5th-generation fighter aircraft in Alaska, submarines in Arctic waters, and modest rotational forces in Iceland and Norway. U.S. relations with Arctic nations have been generally cooperative, with the exception of relations with Russia on non-Arctic issues since 2014. Finally, different security issues are associated with the three Arctic subregions — the North American, European, and Russian Arctic — with the European Arctic subregion being the area with the greatest security challenges.

A new Arctic strategy should factor in climate change, protect the Arctic Council’s viability, and assume a future budget-constrained environment. It’s safe to assume that Arctic warming will continue and regional activity — shipping, mining, commercial fishing, tourism, etc. — will **increase** as a result. Transnational cooperation on **Arctic science** and **soft-security issues** (search and rescue, oil spill prevention, etc.) is a **valued** behavior. As a result, maintaining the Arctic Council as a viable international forum serves the continued interests of Arctic states both because of the substantive work done by the council’s working groups and as a venue for transarctic consultations. A new strategy should not needlessly threaten this progress.

Finally, the next U.S. Arctic strategy will be means-constrained. The Arctic will be a relatively low budget priority for the U.S. government and its military services. None of the recent U.S. military strategies for the Arctic obligate significant spending in the region for new capabilities or permanent presence.

Below I list the main goals and new or promised capabilities of recent U.S. defense strategies for the Arctic. With the exception of the Air Force’s strategy, none of the strategies commit the United States to major defense investments in the Arctic, and the Air Force expenditures are not aimed at the Arctic per se, but are instead global capabilities that happen to be based in the Arctic or in space. Indeed, the gaps identified below are big-ticket items. The assumption, then, is that any new Arctic security strategy will be means-constrained going forward but should compensate for the gaps identified in the table.

**\*\*TABLE OMMITED\*\***

Arctic Threats and Opportunities

The key threats to U.S. interests in the region are from **Russian military forces** in the Arctic and from **Chinese influence attempts**. Russian military activity in the Barents and Greenland Seas (the northern part of the Greenland-Iceland-United Kingdom gap) poses the most direct threat to U.S. security interests. Russian forces there could attack the **U.S. homeland**, **ships** and **data links** crossing the North Atlantic, and threaten **NATO allies** in northern Europe. Russian forces in the Bering and Chukchi Seas off the Alaskan coast are equally concerning. Russian capabilities could also be used to flout international law through unilateral assertions of control along the Northern Sea Route or the undersea Lomonosov Ridge, should the Commission on the Limits of the Continental Shelf rule against Russia’s recent expansive claims to the Arctic seabed.

China’s regional actions are troubling, particularly its use of government-linked investments, loans, and trade deals to influence Arctic states or populations. Threats could also arise from the military potential in China’s bathymetric mapping or its polar research stations across Scandinavia. Any U.S. security strategy in the Arctic should alleviate these threats.

### SSA ADV---Arctic---NATO Key

#### NATO is key---close relationships have already laid the groundwork for subsequent cooperation.

Sharon Burke, 21 (Sharon Burke is the director of the Resource Security program at New America and is a former U.S. assistant secretary of defense, 1-28-2021, accessed on 7-10-2022, War on the Rocks, “THE ARCTIC THREAT THAT MUST NOT BE NAMED”, <https://warontherocks.com/2021/01/the-arctic-threat-that-must-not-be-named/>, HBisevac)

In fact, NATO should be one of the most **important** U.S. investments in the region. Four of the five Arctic coastal states are NATO members, Russia being the fifth. Iceland, just a squidge off the littoral, is a permanent member of the Arctic Council, and also a NATO founding member. The United States has **close** bilateral and multilateral **relationships** with these nations, and with the other Arctic Council member states, Sweden and Finland, as well. These alliances and partnerships are an asset as **tangible** as any platform, and **far more powerful**. All of these Arctic nations, including the United States, have pragmatic cooperative relationships with Russia and China, as well, but the behavior of both countries in recent years has given most Arctic nations pause and a reason for **increased cooperation** with **each other**. The Trump administration more or less squandered that opportunity, with its negative messaging from the top, but the Biden administration gets the benefit of a fresh start. All of these NATO and Nordic partners place **great importance** on dealing with climate change as well, and under Trump, U.S. unwillingness to engage with them more broadly on clean energy, climate change adaptation, or climate negotiations was a drag on those important relationships.

#### Key NATO allies are stationed in the Arctic---key to interoperability and info sharing.

Abbie Tingstad, 2-10 (Abbie Tingstad is associate director of the Engineering and Applied Sciences Department, codirector of the Climate Resilience Center, and a senior physical scientist at the nonprofit, nonpartisan RAND Corporation. Scott Savitz is a senior engineer at RAND, 2-10-2022, accessed on 7-10-2022, RAND, “U.S. Military May Need to Invest More in Arctic Capabilities”, <https://www.rand.org/blog/2022/02/us-military-may-need-to-invest-more-in-arctic-capabilities.html>, HBisevac)

The first is the need for a capability-based, portfolio approach to Arctic investments. The United States may need to ensure access, mobility, support infrastructure, **domain awareness**, and communications across multiple domains in the region. To achieve this, the United States could invest in many other areas besides icebreakers.

Second, the United States might do well to focus more on U.S. ally and partner capabilities in the region. The United States relies on alliances, often espousing the benefits of partnership, and indeed the United States has “**friends in high places**” in the Arctic, including NATO allies **Canada**, **Denmark**, and **Norway**, as well as healthy relationships with Sweden and Finland. Other non-Arctic allies, such as **Britain** and the **Netherlands**, also have Arctic military capabilities. It could be critical to expand joint training and exercises with these nations, as well as to increase emulation of some of their exquisite Arctic capabilities. Furthermore, being a good partner also requires investment. For the United States in the Arctic, this could include gaining **interoperability** and ability to **share more** in areas where the United States is historically strong, such as air and subsurface naval power, as well as **intelligence**.

### SSA ADV---Arctic---UQ---Ukraine

#### Ukraine fractured Artic peace---leaving nations adrift in the face of accelerating competition.

Umair Irfan 4-25. Umair Irfan covers climate change, energy, and Covid-19 vaccine development for Vox. He is also a contributor to Science Friday. “Russia’s invasion of Ukraine is fracturing the delicate peace in the Arctic.” Vox. 4-25-2022. https://www.vox.com/22993194/russia-ukraine-invasion-arctic-council-climate-change //EM

Russia’s invasion of Ukraine is rippling throughout the world, and some of the strongest waves are crashing in the far north.

There, Russia’s aggression has led to the suspension of the Arctic Council, the main international forum for cooperation in the Arctic, which Russia, awkwardly, was slated to chair until 2023.

For decades, the Arctic in general — and the council in particular — was something of an oasis from tense and raucous international relations, working on trade, environmental, and scientific issues while carefully eschewing security concerns. The council continued to operate after Russia’s invasion of Crimea in 2014, for instance.

But the latest invasion was a bridge too far, posing “grave impediments to international cooperation,” according to a joint statement from the other seven Arctic Council members in March.

That’s left what had been a unified group of nations adrift in a critical time for the Arctic: Climate change is quickly altering the Arctic landscape, creating new economic opportunities, more headaches for infrastructure on land, and new friction points between countries. The confluence of Russia’s invasion of Ukraine and climate change stand to alter balance of trade and security in the Arctic irrevocably, and a region that once avoided the troubles of the rest of the world is now being confronted by them.

Russia’s invasion of Ukraine fractured the delicate peace in the Arctic

Despite the recent tensions, countries in the far north have long aspired for “Arctic exceptionalism,” the idea that the region would remain immune from political wrangling and conflicts brewing in other parts of the world.

“The Soviet Union is in favor of a radical lowering of the level of military confrontation in the region,” said Soviet leader Mikhail Gorbachev in a speech in 1987. “Let the North of the globe, the Arctic, become a zone of peace. Let the North Pole be a pole of peace.”

Since then, Arctic exceptionalism has largely held, with countries in the region trying to work together and overlook their differences in other areas. In 1996, Arctic nations founded the Arctic Council. Until Russia’s invasion of Ukraine, it was composed of eight states: Canada, Denmark (via Greenland), Finland, Iceland, Norway, Russia, Sweden, and the United States. The council also includes six permanent groups representing Indigenous people in the Arctic.

Over the years, the group established agreements on scientific research, protecting fisheries, conducting search and rescue operations, developing environmental rules, and defending the rights of Indigenous people. The council, however, explicitly does not deal with military issues.

Countries have also pursued their own economic interests in the Arctic outside of the council. Russia, the country with the longest Arctic coastline, has vastly expanded its footprint in the Arctic in recent decades, building roads, airports, power plants, and nuclear-powered ice breakers, leaning into fossil fuel extraction to boost its economy. Oil and gas provide 40 percent of Russia’s federal budget and account for 60 percent of its exports. Overall, it generates about 20 percent of its gross domestic product above the Arctic Circle, mainly from oil and gas, but also from mining minerals and metals.

“Russia is hell-bent on developing Arctic oil and gas resources because it has no other choice,” said Malte Humpert, founder and a senior fellow at the Arctic Institute think tank. “Purely from a logistical and technical aspect, what Russia has achieved in the Arctic is really, really impressive.”

Russia is establishing new shipping routes through the Arctic as well. And to protect all this economic development, Russia’s expanded its military presence in the region, with new bases, hardware, and troops. It’s also conducting long-range bomber flights. “Over the next 30 years, the Arctic will be critical for Russian economic survival,” according to a 2021 US Army strategic plan.

“The question has always been, where do legitimate security interests end and where does militarization of the Arctic begin?” Humpert said.

That question makes some other countries uneasy, particularly given that they have stakes in the Arctic too. China has become a major customer for Russian fuels from the Arctic and is now the second-largest shipper in the region. The US Army report said that Russia and China could “seek to use military and economic power to gain and maintain access to the region at the expense of US interests.”

Russian militarization, and its invasion, have spurred other countries to step up their military activities in the region. NATO forces are now conducting exercises in the Arctic, which Russia has warned could lead to “unintended incidents.” The US has deployed F-35 fighter jets to Alaska and is conducting its own drills in the area.

Russia’s war in Ukraine, explained

At the moment, all that’s happened are drills. But having so much military might in a place that was supposed to be “a zone of peace,” has some experts concerned. “We’re basically back to the Cold War in terms of level of activity,” said Robert Huebert, an associate professor of political science at the University of Calgary.

The Arctic Council was never meant to delve into military matters. But the hope was that the cooperation it fostered in other areas would minimize the chances of aggression. However, the invasion may end up excluding Russia from the Arctic Council for good, according to Huebert.

For one thing, Russian President Vladimir Putin is looking to build a new polar organization with China. “If in fact he’s successful in doing this, I don’t see how the Russians can be brought back,” Huebert said.

Sweden and Finland are also considering joining NATO, the North Atlantic Treaty Organization, as a result of Russia’s invasion. That could become a permanent wedge between Arctic nations. The prospect of NATO expanding its membership was a big reason why Russia invaded Ukraine to begin with. “The moment Finland and Sweden join NATO, I just don’t ever see the Russians coming back to the Arctic Council,” Huebert said.

Russian officers talk to each other at a base called the “Arctic Trefoil” on the island of Alexandra Land, Russia, on May 17, 2021. Once a desolate home mostly to polar bears, Russia’s northernmost military outpost is bristling with missiles and radar and its extended runway can handle all types of aircraft, including nuclear-capable strategic bombers.

Climate change is creating new opportunities and flashpoints in the Arctic

The Arctic itself is rapidly changing. It’s warming more than twice as fast as the global average, reshaping the icy ocean and the lands around it. Arctic sea ice is declining at its fastest rate in 1,500 years.

But while the Arctic is warming quickly, the effects are not equal across the region. “One of the things that climate change has really illustrated is that there’s more than one Arctic,” Huebert said. Rising temperatures play out differently depending on whether it’s on Alaskan permafrost, Finnish tundra, or Greenland’s ice sheet. Even within the Arctic, some places are heating up more than others.

Since 1900, the Arctic has warmed on average by 2 degrees Celsius, 3.6 degrees Fahrenheit, fueled by the heat-trapping gasses from burning fossil fuels. That’s playing out several key ways.

Fish stocks are moving further north as species like cod and redfish seek cold refuge from warming oceans. Many Arctic nations count on fishing, but right now, there is a moratorium on fishing in the Arctic for at least 15 years. After that, the waters could become a lot more crowded than they are now: “I think the boats will follow eventually if that moratorium is lifted,” said Mia Bennett, an assistant professor of geography at the University of Washington.

Shipping has already become easier. Arctic sea ice is not just retreating to record lows, but the ice that remains is also often thinner, allowing icebreakers to more readily guide vessels through frigid waters. In 2016, the Crystal Serenity became the first cruise ship to transit the Northwest Passage. Warming is also facilitating offshore oil and gas drilling in the Arctic. The US Geological Survey estimated the Arctic holds 13 percent of the world’s undiscovered oil and 30 percent of undiscovered natural gas.

But warming is also making life more difficult in other ways. “It’s actually getting much trickier on land to build stable terrestrial infrastructure,” Bennett said. Higher temperatures means the permafrost isn’t so permanent. The softer ground is causing roads to buckle and buildings to list. The Pentagon recently warned that US military installations in the Arctic are being damaged by the effects of warming. Onshore drillers have even had to chill the ground under their rigs in order to stabilize them and continue drilling.

Shorter and warmer winters mean the ground doesn’t harden back up as much and rivers don’t freeze over, making it more difficult to maintain ice roads to bring in supplies. Wildfires have also ignited in the Arctic Circle as climate change has fueled heat waves and extended fire seasons.

Russia has faced some of the worst of it. Massive wildfires in Siberia blanketed the country in smoke in recent years. The fires this year are already spreading at an unprecedented rate. On June 20, 2020, the Russian town of Verkhoyansk recorded a temperature of 100.4 degrees Fahrenheit, the hottest temperature ever recorded north of the Arctic Circle.

“All this is largely connected to the climate change — both global and in our country,” Putin said in August.

While climate change is an omnipresent factor in the Arctic, Huebert cautioned that it’s not necessarily the “cause” of many of the recent developments in the region. Russia has faced strong economic pressure to exploit more of its natural resources and would likely be expanding its footprint even if the Arctic hadn’t warmed. And despite the changes in the climate seen so far, the Arctic remains a difficult place to work and live. “It’s being definitely facilitated by climate change, it’s making it easier, but it’s not making it easy,” Huebert said.

Still, climate change is acting as an accelerant for activity in the region. Those activities, particularly fossil fuel extraction, in turn are speeding up the transformation of the Arctic. And all this new bustle in a once frigid and desolate part of the world, coupled with climate change, could then spark more conflict.

The future of the Arctic is on thin ice

Intelligence agencies are now trying to anticipate future disruptions in the Arctic and have identified some potential ignition points.

“We assess that Arctic and non-Arctic states almost certainly will increase their competitive activities as the region becomes more accessible because of warming temperatures and reduced ice,” reads an October 2021 report from the National Intelligence Council. “Competition will be largely economic but the risk of miscalculation will increase modestly by 2040 as commercial and military activity grows and opportunities are more contested.”

One looming concern is how countries will claim territory in the newly revealed Arctic ocean. Countries currently control the water stretching 200 nautical miles from their shorelines as exclusive economic zones.

### SSA ADV---Arctic---Internal

#### Allied integration of satellite intelligence overcomes communication barriers vital for deterrence.

Aaron Mehta & Theresa Hitchens 21. Editor in chief of Breaking Defense. He previously served as deputy editor and senior Pentagon correspondent for Defense News, as well as a staff writer for the non-profit Center for Public Integrity; Space and Air Force reporter at Breaking Defense. The former Defense News editor was a senior research associate at the University of Maryland’s Center for International and Security Studies at Maryland (CISSM). “NORTHCOM Needs Help In Space For Arctic Communications.” Breaking Defense. 8-25-2021. https://breakingdefense.com/2021/08/northcom-needs-help-in-space-for-arctic-communications/ //EM

WASHINGTON: The biggest focus of collaboration between US Northern Command and US Space Command will be on secure communication capabilities in the Arctic, according to the leader of NORTHCOM/NORAD.

Responding to a question as the annual Space and Missile Defense conference in Huntsville, Ala., earlier this month about how his team and SPACECOM are integrating, Gen. Glen VanHerck noted that secure comms will be particularly vital for the Arctic area — itself becoming a more prominent part of the NORTHCOM/NORAD mission to defense the homeland.

“Limited communications north of 65 latitude, and the ability to command and control in our homeland — when you’re under attack in the electromagnetic spectrum secure, reliable communications will be something that we have to maintain,” VanHerck said, noting he’s “working with SPACECOM on that.”

The general noted that proliferated Low Earth Orbit (below 2,000 kilometers in altitude) constellations will be “crucial” for the future mission — something he previewed earlier in the year, when he discussed a series of tests being run through Air Force Research Laboratory.

The Air Force has also been running a series of wargames to flesh out its year-old Arctic Strategy, with the far north seen as critical in any future conflict with Russia or China. The Navy too has been doubling down on DoD concerns that the warming environment is upping the ante in competition for Arctic resources, including oil.

In February, during a press conference with Canadian Prime Minister Justin Trudeau, President Joe Biden noted the importance of the Arctic to the two NATO allies.

The two leaders “agreed to modernize the North American Aerospace Defense Command — NORAD — which is still the only bi-national military command of its kind,” Biden told reporters. “And we will launch an expanded U.S-Canadian Arctic dialogue to cover issues related to continental security, economic and social development, and Arctic governance.”

Further, Congress has raised red flags about increased Russian military activity in the Arctic region, as well as China’s attempts to position itself as an Arctic nation despite the facts of geography.

The 2021 National Defense Authorization Act authorized $46 million for the Space Force to begin developing an initial satellite capability for the region, focused on “low- and medium-earth orbit communications that could support additional satellite capability to begin to establish more robust communications at these northern latitudes.” Congressional appropriators bumped that sum up to $50 million in the 2021 defense appropriations bill.

Something else that is crucial for NORTHCOM in space? Getting rid of stovepiped information.

“The biggest challenge with [using] space layer data right now is over-classification and sharing of information,” VanHerck said. “The fact of the matter is, we can’t live with that data and information in stovepipes, it must be shared to take action on, in real time or near real time, for decision making or actual execution of deterrence or defense options.”

On that regard, VanHerck fits into a broader push seen among top US officers dealing with space issues in calling for greater declassification, including Gen. John Hyten, the vice chairman of the Joint Chiefs of Staff, who has made a public call for cutting classification overall.

“In space, we over-classify everything,” Hyten told the National Security Space Association on Jan. 22. “Deterrence does not happen in the classified world. Deterrence does not happen in the black; deterrence happens in the white.”

### SSA ADV---Arctic---Internal---Intelligence Sharing

#### Sharing intelligence is key.

Abbie Tingstad & Scott Savitz 22. Codirector, Climate Resilience Center, Senior Physical Scientist; Senior engineer at the RAND Corporation. Much of his research focuses on how to improve the effectiveness and resilience of operational forces through the use of new technologies and modified tactics. He has developed numerous models and simulations in support of such analyses. “U.S. Military May Need to Invest More in Arctic Capabilities.” RAND. 02-10-2022. https://www.rand.org/blog/2022/02/us-military-may-need-to-invest-more-in-arctic-capabilities.html //EM

Moscow and Washington turned to diplomacy this week amid intensifying Russian military activity in the vicinity of its near abroad. The buildup of troops along the Ukrainian border and sending of “peacekeeping” forces to support the Tokayev regime's violent crackdown on protests in Kazakhstan are not comparable except in their timing. However, they serve as a double reminder of Russia's political stature and military might.

The Barents Sea region of the Arctic, where Russia meets Norway, is becoming another seam of tension between NATO and Russia. The region features the headquarters of the Russian Navy's Northern Fleet in Severomorsk, as well as valuable technology and mining hubs and Indigenous and other communities. Russia has been intensifying the frequency and scale of exercises in the area. NATO has also conducted exercises close by in recent years, prompting Russian responses. Moscow also disputes the maritime limits of Oslo's jurisdiction in the Arctic archipelago of Svalbard, based on its interpretation of a 1920 treaty.

Despite continued diplomacy to resolve NATO-Russia points of contention within and beyond the Arctic (including the alliance's relationships with Ukraine and Georgia), Russia's recent military activity in the Arctic raises questions for the United States as to what types of Arctic military capabilities it needs as part of an overarching strategy to ensure credibility at the negotiating table and an ability to deal with crises.

Russia's recent military activity in the Arctic raises questions for the United States as to what types of Arctic military capabilities it needs.

Part of the challenge is the Arctic's uniqueness. In a crisis, redeployment of forces from other regions to the Arctic would be hampered by the region's extreme climate, its remoteness, the vast distances within it, its sparse infrastructure, its limited transportation and medical services, and scarce satellite coverage. Equipment needs to be tailored for the harsh Arctic environment; similarly, personnel need prior training within it to be able to operate effectively despite nights that last for months, ionospheric effects that impede communications, the need to wear bulky clothing that hampers movement, and manual dexterity and a host of other challenges.

The last decade has seen numerous U.S. national and service-specific Arctic strategy documents aimed at spurring plans for new capabilities and capacity. The most important recent investment decision has been to recapitalize the U.S. Coast Guard's icebreaker fleet. However, two important factors critical to effective U.S. preparations for countering Russia in the Arctic (and perhaps China, which in recent years has become increasingly involved in the region) are often overlooked.

The first is the need for a capability-based, portfolio approach to Arctic investments. The United States may need to ensure access, mobility, support infrastructure, domain awareness, and communications across multiple domains in the region. To achieve this, the United States could invest in many other areas besides icebreakers.

Second, the United States might do well to focus more on U.S. ally and partner capabilities in the region. The United States relies on alliances, often espousing the benefits of partnership, and indeed the United States has “friends in high places” in the Arctic, including NATO allies Canada, Denmark, and Norway, as well as healthy relationships with Sweden and Finland. Other non-Arctic allies, such as Britain and the Netherlands, also have Arctic military capabilities. It could be critical to expand joint training and exercises with these nations, as well as to increase emulation of some of their exquisite Arctic capabilities. Furthermore, being a good partner also requires investment. For the United States in the Arctic, this could include gaining interoperability and ability to share more in areas where the United States is historically strong, such as air and subsurface naval power, as well as intelligence.

### SSA ADV---Arctic---Impact

#### Artic conflict causes global nuclear war

Dr. Michael T. Klare 20, Five Colleges Professor of Peace and World Security Studies at Hampshire College, Ph.D. from the Graduate School of the Union Institute, BA and MA from Columbia University, Member of the Board of Director at the Arms Control Association, Defense Correspondent for The Nation, “World War III’s Newest Battlefield: U.S. Troops Head for the Far North”, 2/9/2020, https://www.tomdispatch.com/post/176661/tomgram%3A\_michael\_klare%2C\_war\_in\_the\_arctic/#more

In early March, an estimated 7,500 American combat troops will travel to Norway to join thousands of soldiers from other NATO countries in a massive mock battle with imagined invading forces from Russia. In this futuristic simulated engagement -- it goes by the name of Exercise Cold Response 2020 -- allied forces will “conduct multinational joint exercises with a high-intensity combat scenario in demanding winter conditions,” or so claims the Norwegian military anyway. At first glance, this may look like any other NATO training exercise, but think again. There’s nothing ordinary about Cold Response 2020. As a start, it’s being staged above the Arctic Circle, far from any previous traditional NATO battlefield, and it raises to a new level the possibility of a great-power conflict that might end in a nuclear exchange and mutual annihilation. Welcome, in other words, to World War III’s newest battlefield.

For the soldiers participating in the exercise, the potentially thermonuclear dimensions of Cold Response 2020 may not be obvious. At its start, Marines from the United States and the United Kingdom will practice massive amphibious landings along Norway’s coastline, much as they do in similar exercises elsewhere in the world. Once ashore, however, the scenario becomes ever more distinctive. After collecting tanks and other heavy weaponry “prepositioned” in caves in Norway’s interior, the Marines will proceed toward the country’s far-northern Finnmark region to help Norwegian forces stave off Russian forces supposedly pouring across the border. From then on, the two sides will engage in -- to use current Pentagon terminology -- high-intensity combat operations under Arctic conditions (a type of warfare not seen on such a scale since World War II).

And that’s just the beginning. Unbeknownst to most Americans, the Finnmark region of Norway and adjacent Russian territory have become one of the most likely battlegrounds for the first use of nuclear weapons in any future NATO-Russian conflict. Because Moscow has concentrated a significant part of its nuclear retaliatory capability on the Kola Peninsula, a remote stretch of land abutting northern Norway -- any U.S.-NATO success in actual combat with Russian forces near that territory would endanger a significant part of Russia’s nuclear arsenal and so might precipitate the early use of such munitions. Even a simulated victory -- the predictable result of Cold Response 2020 -- will undoubtedly set Russia’s nuclear controllers on edge.

To appreciate just how risky any NATO-Russian clash in Norway’s far north would be, consider the region’s geography and the strategic factors that have led Russia to concentrate so much military power there. And all of this, by the way, will be playing out in the context of another existential danger: climate change. The melting of the Arctic ice cap and the accelerated exploitation of Arctic resources are lending this area ever greater strategic significance.

Energy Extraction in the Far North

Look at any map of Europe and you’ll note that Scandinavia widens as it heads southward into the most heavily populated parts of Denmark, Finland, Norway, and Sweden. As you head north, however, it narrows and becomes ever less populated. At its extreme northern reaches, only a thin band of Norway juts east to touch Russia’s Kola Peninsula. To the north, the Barents Sea, an offshoot of the Arctic Ocean, bounds them both. This remote region -- approximately 800 miles from Oslo and 900 miles from Moscow -- has, in recent years, become a vortex of economic and military activity.

Once prized as a source of vital minerals, especially nickel, iron ore, and phosphates, this remote area is now the center of extensive oil and natural gas extraction. With temperatures rising in the Arctic twice as fast as anywhere else on the planet and sea ice retreating ever farther north every year, offshore fossil-fuel exploration has become increasingly viable. As a result, large reserves of oil and natural gas -- the very fuels whose combustion is responsible for those rising temperatures -- have been discovered beneath the Barents Sea and both countries are seeking to exploit those deposits. Norway has taken the lead, establishing at Hammerfest in Finnmark the world’s first plant above the Arctic Circle to export liquified natural gas. In a similar fashion, Russia has initiated efforts to exploit the mammoth Shtokman gas field in its sector of the Barents Sea, though it has yet to bring such plans to fruition.

For Russia, even more significant oil and gas prospects lie further east in the Kara and Pechora Seas and on the Yamal Peninsula, a slender extension of Siberia. Its energy companies have, in fact, already begun producing oil at the Prirazlomnoye field in the Pechora Sea and the Novoportovskoye field on that peninsula (and natural gas there as well). Such fields hold great promise for Russia, which exhibits all the characteristics of a petro-state, but there’s one huge problem: the only practical way to get that output to market is via specially-designed icebreaker-tankers sent through the Barents Sea past northern Norway.

The exploitation of Arctic oil and gas resources and their transport to markets in Europe and Asia has become a major economic priority for Moscow as its hydrocarbon reserves below the Arctic Circle begin to dry up. Despite calls at home for greater economic diversity, President Vladimir Putin’s regime continues to insist on the centrality of hydrocarbon production to the country’s economic future. In that context, production in the Arctic has become an essential national objective, which, in turn, requires assured access to the Atlantic Ocean via the Barents Sea and Norway’s offshore waters. Think of that waterway as vital to Russia’s energy economy in the way the Strait of Hormuz, connecting the Persian Gulf to the Indian Ocean, is to the Saudis and other regional fossil-fuel producers.

The Military Dimension

No less than Russia's giant energy firms, its navy must be able to enter the Atlantic via the Barents Sea and northern Norway. Aside from its Baltic and Black Sea ports, accessible to the Atlantic only via passageways easily obstructed by NATO, the sole Russian harbor with unfettered access to the Atlantic Ocean is at Murmansk on the Kola Peninsula. Not surprisingly then, that port is also the headquarters for Russia’s Northern Fleet -- its most powerful -- and the site of numerous air, infantry, missile, and radar bases along with naval shipyards and nuclear reactors. In other words, it’s among the most sensitive military regions in Russia today.

Given all this, President Putin has substantially rebuilt that very fleet, which fell into disrepair after the collapse of the Soviet Union, equipping it with some of the country’s most advanced warships. In 2018, according to The Military Balance, a publication of the International Institute for Strategic Studies, it already possessed the largest number of modern cruisers and destroyers (10) of any Russian fleet, along with 22 attack submarines and numerous support vessels. Also in the Murmansk area are dozens of advanced MiG fighter planes and a wide assortment of anti-aircraft defense systems. Finally, as 2019 ended, Russian military officials indicated for the first time that they had deployed to the Arctic the Kinzhal air-launched ballistic missile, a weapon capable of hypersonic velocities (more than five times the speed of sound), again presumably to a base in the Murmansk region just 125 miles from Norway’s Finnmark, the site of the upcoming NATO exercise.

More significant yet is the way Moscow has been strengthening its nuclear forces in the region. Like the United States, Russia maintains a “triad” of nuclear delivery systems, including intercontinental ballistic missiles (ICBMs), long-range “heavy” bombers, and submarine-launched ballistic missiles (SLBMs). Under the terms of the New Strategic Arms Reduction Treaty (New START), signed by the two countries in 2010, the Russians can deploy no more than 700 delivery systems capable of carrying no more than 1,550 warheads. (That pact will, however, expire in February 2021 unless the two sides agree to an extension, which appears increasingly unlikely in the age of Trump.) According to the Arms Control Association, the Russians are currently believed to be deploying the warheads they are allowed under New START on 66 heavy bombers, 286 ICBMs, and 12 submarines with 160 SLBMs. Eight of those nuclear-armed subs are, in fact, assigned to the Northern Fleet, which means about 110 missiles with as many as 500 warheads -- the exact numbers remain shrouded in secrecy -- are deployed in the Murmansk area.

For Russian nuclear strategists, such nuclear-armed submarines are considered the most “survivable” of the country’s retaliatory systems. In the event of a nuclear exchange with the United States, the country’s heavy bombers and ICBMs could prove relatively vulnerable to pre-emptive strikes as their locations are known and can be targeted by American bombs and missiles with near-pinpoint accuracy. Those subs, however, can leave Murmansk and disappear into the wide Atlantic Ocean at the onset of any crisis and so presumably remain hidden from U.S. spying eyes. To do so, however, requires that they pass through the Barents Sea, avoiding the NATO forces lurking nearby. For Moscow, in other words, the very possibility of deterring a U.S. nuclear strike hinges on its ability to defend its naval stronghold in Murmansk, while maneuvering its submarines past Norway’s Finnmark region. No wonder, then, that this area has assumed enormous strategic importance for Russian military planners -- and the upcoming Cold Response 2020 is sure to prove challenging to them.

Washington’s Arctic Buildup

During the Cold War era, Washington viewed the Arctic as a significant strategic arena and constructed a string of military bases across the region. Their main aim: to intercept Soviet bombers and missiles crossing the North Pole on their way to targets in North America. After the Soviet Union imploded in 1991, Washington abandoned many of those bases. Now, however, with the Pentagon once again identifying “great power competition” with Russia and China as the defining characteristic of the present strategic environment, many of those bases are being reoccupied and new ones established. Once again, the Arctic is being viewed as a potential site of conflict with Russia and, as a result, U.S. forces are being readied for possible combat there.

Secretary of State Mike Pompeo was the first official to explain this new strategic outlook at the Arctic Forum in Finland last May. In his address, a kind of “Pompeo Doctrine,” he indicated that the United States was shifting from benign neglect of the region to aggressive involvement and militarization. “We’re entering a new age of strategic engagement in the Arctic,” he insisted, “complete with new threats to the Arctic and its real estate, and to all of our interests in that region.” To better protect those interests against Russia’s military buildup there, “we are fortifying America’s security and diplomatic presence in the area... hosting military exercises, strengthening our force presence, rebuilding our icebreaker fleet, expanding Coast Guard funding, and creating a new senior military post for Arctic Affairs inside of our own military.”

The Pentagon has been unwilling to provide many details, but a close reading of the military press suggests that this activity has been particularly focused on northern Norway and adjacent waters. To begin with, the Marine Corps has established a permanent presence in that country, the first time foreign forces have been stationed there since German troops occupied it during World War II. A detachment of about 330 Marines were initially deployed near the port of Trondheim in 2017, presumably to help guard nearby caves that contain hundreds of U.S. tanks and combat vehicles. Two years later, a similarly sized group was then dispatched to the Troms region above the Arctic Circle and far closer to the Russian border.

From the Russian perspective, even more threatening is the construction of a U.S. radar station on the Norwegian island of Vardø about 40 miles from the Kola Peninsula. To be operated in conjunction with the Norwegian intelligence service, the focus of the facility will evidently be to snoop on those Russian missile-carrying submarines, assumedly in order to target them and take them out in the earliest stages of any conflict. That Moscow fears just such an outcome is evident from the mock attack it staged on the Vardø facility in 2018, sending 11 Su-24 supersonic bombers on a direct path toward the island. (They turned aside at the last moment.) It has also moved a surface-to-surface missile battery to a spot just 40 miles from Vardø.

In addition, in August 2018, the U.S. Navy decided to reactivate the previously decommissioned Second Fleet in the North Atlantic. “A new Second Fleet increases our strategic flexibility to respond -- from the Eastern Seaboard to the Barents Sea,” said Chief of Naval Operations John Richardson at the time. As last year ended, that fleet was declared fully operational.

Deciphering Cold Response 2020

Exercise Cold Response 2020 must be viewed in the context of all these developments. Few details about the thinking behind the upcoming war games have been made public, but it’s not hard to imagine what at least part of the scenario might be like: a U.S.-Russian clash of some sort leading to Russian attacks aimed at seizing that radar station at Vardø and Norway’s defense headquarters at Bodø on the country’s northwestern coast. The invading troops will be slowed but not stopped by Norwegian forces (and those U.S. Marines stationed in the area), while thousands of reinforcements from NATO bases elsewhere in Europe begin to pour in. Eventually, of course, the tide will turn and the Russians will be forced back.

No matter what the official scenario is like, however, for Pentagon planners the situation will go far beyond this. Any Russian assault on critical Norwegian military facilities would presumably be preceded by intense air and missile bombardment and the forward deployment of major naval vessels. This, in turn, would prompt comparable moves by the U.S. and NATO, probably resulting in violent encounters and the loss of major assets on all sides. In the process, Russia’s key nuclear retaliatory forces would be at risk and quickly placed on high alert with senior officers operating in hair-trigger mode. Any misstep might then lead to what humanity has feared since August 1945: a nuclear apocalypse on Planet Earth.

There is no way to know to what degree such considerations are incorporated into the classified versions of the Cold Response 2020 scenario, but it’s unlikely that they’re missing. Indeed, a 2016 version of the exercise involved the participation of three B-52 nuclear bombers from the U.S. Strategic Air Command, indicating that the American military is keenly aware of the escalatory risks of any large-scale U.S.-Russian encounter in the Arctic.

In short, what might otherwise seem like a routine training exercise in a distant part of the world is actually part of an emerging U.S. strategy to overpower Russia in a critical defensive zone, an approach that could easily result in nuclear war. The Russians are, of course, well aware of this and so will undoubtedly be watching Cold Response 2020 with genuine trepidation. Their fears are understandable -- but we should all be concerned about a strategy that seemingly embodies such a high risk of future escalation.

Ever since the Soviets acquired nuclear weapons of their own in 1949, strategists have wondered how and where an all-out nuclear war -- World War III -- would break out. At one time, that incendiary scenario was believed most likely to involve a clash over the divided city of Berlin or along the East-West border in Germany. After the Cold War, however, fears of such a deadly encounter evaporated and few gave much thought to such possibilities. Looking forward today, however, the prospect of a catastrophic World War III is again becoming all too imaginable and this time, it appears, an incident in the Arctic could prove the spark for Armageddon.

### SSA ADV---Kessler---Space---1AC

#### Debris compounds---remains of spacecraft or rocks cascades and multiplies which closes off space.

Jon Kelvey, 22 (Jon Kelvey is a science writer and studied cognitive neuroscience at UC Berkeley, 1-3-2022, accessed on 7-10-2022, Inverse, “KESSLER SYNDROME: HOW RUNAWAY SPACE JUNK COULD TRAP HUMANS ON EARTH”, <https://www.inverse.com/science/what-is-kessler-syndrome>, HBisevac) ISS = International Space Station

When you’re screaming through the void faster than a speeding bullet, any traffic you encounter might as well be made of, well, speeding bullets. Defensive driving is recommended.

Hazardous space debris has twice threatened the **I**nternational **S**pace **S**tation recently. On or around November 12, a debris field generated by a Russian military anti-satellite missile, or ASAT test, sent ISS crew members — including Russian cosmonauts — to shelter in the station’s Dragon and Soyuz spacecraft in case they needed to evacuate, while on December 2, the station maneuvered around a chunk of a defunct American Pegasus rocket.

No one was hurt in either case, and the risks were hardly novel — the ISS has maneuvered around space debris more than 30 times since 1999. But it’s also a problem that’s almost **guaranteed** to **worsen** given worrying trends in the militarization of space and the fact that all signs point to **ever more** objects being launched into space every year.

Take into consideration mega-constellations like SpaceX’s Starlink, for which “the plan is to launch 100,000 active satellites in the next few years,” Jonathan McDowell, a Harvard astrophysicist who has been tracking satellites on the side for more than a decade, tells Inverse. “The collision rate grows as the square of the number of satellites. If you have 10 times as many satellites, you will have 100 times as many collisions.”

And the thing is, space debris is not simply the detritus of old space missions. A satellite stricken by orbital debris becomes debris itself, which can then hit another satellite, creating debris that can strike another, and so on. It’s a chain reaction known as **Kessler Syndrome**, and while it doesn’t take place in the half-hour time frame as dramatized in the movie Gravity, the result may be the same: **no more outer space for anybody**.

“At least some models suggest that, yeah, it's already underway,” McDowell says, “it's just going to take a century to play out.”

SPACE JUNK BASICS

It’s a good thing the sky is so big, because humans have flung a lot of things up there. And every bit of it, from large spacecraft to tiny pieces of cloth, are careening around at 17,500 miles-per-hour or faster. At those speeds, even collisions between somewhat small objects can be catastrophic.

“The unit I like to use is a megajoule, which is the kinetic energy of a one-ton truck hitting you at 100 miles an hour,” McDowell says. Collisions between small satellites can generate tens of thousands of megajoules of kinetic energy, while even tiny pieces of debris still pack enough of a punch to drill bullet holes in the ISS and other space assets. The Hubble Space Telescope carries a Whipple shield, for instance, a sort of bulletproof vest to absorb the energy of more minor debris impacts.

It’s an imperfect solution, “smaller” being relative and “big” being game over.

“If you get hit by a big enough piece of debris, [a Whipple shield] is not gonna be enough,” McDowell says. “And if something comes down the telescope aperture and hits the Hubble mirror, that’s also not good.”

The good news is that organizations that track debris, such as the US Space Command, have a pretty good handle on the big stuff in orbit — anything from multi-ton dead satellites to debris 10 centimeters across.

“The trackable debris we follow as individual objects, and we’re tracking about 40,000 objects, of which 5,000 or so are working satellites and the rest is junk,” McDowell says. “If you look at stuff down to just one centimeter, there’s probably a million of those. But we don’t really know because they’re too small.”

There are two main sources of space debris at the moment, the primary being old rocket stages still in orbit decades after the delivery of their payload. “The fuel and the oxidizer get together because the seals fail,” McDowell says, “And they go bang.”

The secondary source is military anti-satellite tests, he says, which generate debris clouds that can persist for decades.

But if a Kessler Syndrome cascade is already underway, and continues apace unmitigated, eventually the most significant source of space debris will be the **pulverized remains** of satellites, spacecraft, and space stations dashed upon **rocks** of our **own making**.

A HISTORY OF SPACE JUNKING AND SPACE PUNKING

Putting aside the occasional meteor shower, space debris is an entirely human creation — satellites don’t launch themselves.

But not all space debris is created equally. Many objects are merely byproducts of early space exploration, while the birth of others was more intentional.

For example, while Russia has drawn international criticism for its ASAT test in November, in the early 1960s, it was the Soviet Union who accused the United States of purposefully polluting the spaceways.

Between 1961 and 1963, the United States launched almost half a billion copper needles into low-Earth orbit, Caltech historian of technology Lisa Ruth Rand tells Inverse. Called Project West Ford, it was an attempt to create an artificial ionosphere for long-range radio communications in case a US-USSR nuclear war disrupted other means.

The Soviets were not amused, and accused the US of “trying to destroy all space so that no one else could use it, out of spite,” Rand says.

Both the Soviet Union and the United States developed and tested anti-satellite missile technologies in the 1970s and 80s, creating orbital debris and leading to a lull in ASAT tests until 2007, when China used an ASAT to destroy an old weather satellite.

The US used an ASAT missile to destroy a spy satellite that failed after its launch in 2008, and India launched a small satellite in January of 2019 only to shoot it down with an ASAT in March 2019.

The next and most recent ASAT test to actually destroy a satellite in space was the Russian test in November, and all four of the tests created debris, some of which will remain in orbit for years to come.

“Most of the debris from the Russian ASAT will be down on a timescale of like five years, and the rest of it will be down on the timescale of 10 to 20 years, which, it’s still not good,” McDowell says. “For the Chinese ASAT, which was up at a higher altitude, more like 900 kilometers, some of that debris is likely going to be up there for many decades.”

Such intentional creation of space debris seems irrational and irresponsible given how problematic incidental space debris already is. A 2009 collision between an Iridium communications satellite and a defunct Russian satellite over Siberia first turned Rand on to studying space debris as a research focus while in grad school, and for every impact, there are many more close calls.

In 2012, for instance, a defunct Soviet Kosmos satellite threatened the Fermi Gamma-ray Space Telescope and presented its operators with a tough decision, Rand says. “Either light up thrusters that had been dormant for years, that were cold and could blow the whole works,” or hope the debris would pass further from Fermi than projected, such predictions always coming as probabilities rather than certainties.

She says that the operators ultimately opted to risk using the thrusters, and the space telescope moved, and all was fine, but it was still a risky situation.

And such situations are not always improved when all satellites involved are still live and operational. In September 2019, Rand says, a Starlink satellite and an ESA satellite almost collided when operators at SpaceX failed to check their email and missed some urgent missives from their counterparts at ESA.

And over the summer of 2021, McDowell recently tweeted, the Chinese space station twice dodged Starlink satellites that may have passed within 1 kilometer of the station.

“These are the kinds of close calls are happening a lot and increasingly more as the number of objects in outer space increases,” Rand says. “The number of functioning satellites in space is just exploding. It’s huge. It’s getting bigger and bigger every day.”

WHAT IS KESSLER SYNDROME AND WHY DOES IT MATTER?

In some ways, the **Kessler Syndrome** is like a ***slow-moving zombie apocalypse***. (In George Romero’s classic Night of the Living Dead, Rand notes, it’s theorized a contaminated satellite returning from Venus triggers the zombie rise.) The space debris chain reaction converts otherwise operational space assets into **further navigational hazards**. “It’s an unwanted weaponizing of a valuable object into something that becomes dangerous,” Rand says. Had the Fermi telescope thrusters failed, “that would have been the loss of a **major scientific instrument** and cultural heritage artifact that had become a series of projectiles.”

And the threat of losing space assets means the Kessler Syndrome has a costly impact long before the chain reaction has progressed enough to **prevent access** to space.

More satellites in space mean more potential collisions, which means more satellites — and space stations — making more frequent evasive maneuvers to avoid further collisions, all of which can interrupt operations and cost operators money by decreasing the lifespan of their satellites. Every Starlink satellite has a limited amount of krypton propellant onboard for maneuvering around debris and Chinese space stations, for instance, and when the tank is near empty, it’s time for that satellite’s long fiery goodbye bow in the upper atmosphere — failure to do so just increases the problem by adding another dead satellite.

“Space is big,” Rand says, “but once things start to collide, it becomes **rapidly small**.”

Rapidly, but not linearly. Unfortunately, if the Kessler cascade is already underway, it will take years to reach a point where it’s happening in what humans perceive as “real-time.” By then, it may be too late.

“On a timescale of decades, you’ll have to dodge more and more often, and eventually you won’t be able to dodge anymore because the traffic is so bad,” McDowell says. Adding the caveat that it’s just his back-of-the-envelope math, he says, “we are probably exceeding the carrying capacity of low Earth orbit right now.”

The consequence of full bore Kessler syndrome allowed to run its course would be to negate the **sci-fi ambitions** of people like Elon Musk. To **proscribe** humans from the **cosmos** and **limit** our future to that of a **one-planet species** for many lifetimes — physically and intellectually. The space debris could ruin ground-based astronomy, too, hemming in our minds as well as our rockets.

“It would mean to basically close ourselves off from the rest of the cosmos,” Rand says. “That the endgame of the space age is not so much humanity becoming cosmopolitan, becoming multi-planetary, becoming part of the universe, but instead making it so that we just can’t leave anymore.”

#### Access to space is key to solving inevitable extinction.

Marko Kovic, 19 (Marko Kovic, PhD from the University of Zurich and co-founder president of the Zurich Institute of Public Affairs Research, March 2019, accessed on 7-8-2022, Zurich Institute of Public Affairs Research, “The Future of Energy”, <https://osf.io/preprints/socarxiv/aswz9/download>, HBisevac)

Existential risks are risks that might lead to the extinction of humankind [1]. Natural **existential risks** (such as **asteroids** that might **crash into Earth**) are basically constant. The **risks** of a **giant asteroid** crashing into Earth today is the same as it was **500 years** ago. **Anthropogenic**, ~~man-made~~ **existential risks**, on the other hand, are **growing** in **number** and **severity**. They are a **side-effect** of **technological progress**: The more we develop technologically, the greater man-made existential risks become. Nuclear weapons, to name only one example, are a **direct consequence** of scientific and technological **progress**.

There are different approaches to existential risk mitigation. One approach is to develop targeted strategies for specific existential risks. If we want to reduce the existential risk posed by nuclear weapons, then we can and should develop specific strategies for that risk.

Another approach is to develop and pursue what can be called **meta-strategies** that target **all** existential risks **at once**. One of **most effective** meta-strategies for tackling existential risks in general is **space colonization**: If we manage to establish permanent and self-sustainable human habitats **beyond Earth**, then our **proverbial existential eggs** are **not all in one basket** anymore. For example, if **disaster strikes** on Earth, but there are **billions** of humans living on **Venus** and **Mars**, humankind would **continue to exist** even with Earth-humans gone.

Because of existential risks, a **long-term future** in which humankind still exists almost **certainly** has to be a future in which humankind has **succeeded** in **colonizing space**. Today, even though we regularly venture into space, we do not yet have space colonization capabilities. There are a number of technological challenges that we need to overcome in order to become capable of space colonization. One of those challenges is energy. There are several reasons why.

### SSA ADV---Kessler---Space

#### The Kessler Syndrome makes space impossible to navigate.

Paul Ratner, 18 (Paul Ratner is a writer for Big Think and has his BA from Cornell and MFA from Chapman, 8-29-2018, accessed on 7-10-2022, Big Think, “How the Kessler Syndrome can end all space exploration and destroy modern life”, <https://bigthink.com/surprising-science/how-the-kessler-syndrome-can-end-all-space-exploration-and-destroy-modern-life/>, HBisevac)

Exploring space is one of humanity’s most hopeful activities. By going out into the great unknown of the Universe, we hope to extend our reach, find new resources and life forms, while solving many of our earthly problems. But going to space is **not** something to take for **granted**—it can actually become **impossible**. There is a scenario, called the **Kessler Syndrome**, that can cause the **end** of **all space exploration** and dramatically impact our daily lives.

In 1978, the NASA scientist Donald J. Kessler proposed that a chain reaction of **exploding space debris** can end up making space activities and the use of satellites **impossible** for generations. He predicted that the number of objects that we keep launching into Low Earth Orbit (LEO) can create such a dense environment above the planet that inevitable collisions could cause a cascading effect. The space junk and shrapnel generated by one collision could make further collisions much more possible. And if you have enough collisions, the amount of space debris could overwhelm the orbital space entirely.

What makes that situation possible is the fact that there are millions of micrometeoroids as well as man-made debris that is already orbiting Earth. The danger posed by even a small fragment that’s traveling at high speeds is easy to see. As calculated by NASA, a 1-centimeter “paint fleck” traveling at 10km/s (22,000 mph) can cause the same damage as a 550-pound object traveling 60 miles per hour on Earth. If the size of the shard was increased to 10 centimeters, such a projectile would have the force of 7 kilograms of TNT. Now imagine thousands of such objects flying around at breakneck speeds and crashing into each other.

If a **chain reaction** of **exploding space junk** did occur, filling the orbital area with such dangerous debris, the space program would indeed be in **jeopardy**. Travel that goes beyond the LEO, like the planned mission to Mars, would be made more **challenging** but still conceivably possible.

### SSA ADV---SC Good---Bostrom

#### Every delay kills trillions of humans

Bostrom 3 [Nick, Winner of the 2010 Eugene R. Bostrom Award for the Pursuit of Human Advancement (awarded by Seth Gannon; read Bostrom’s acceptance essay, linked on Bostrom’s CV when you get a chance), other lesser quals include Professor of Philosophy, Yale University, Director of the Future of Humanity Institute at Oxford University, “Astronomical Waste: The Opportunity Cost of Delayed Technological Development,” 2003, Utilitas Vol. 15, No. 3, pp. 308-314, <http://www.nickbostrom.com/astronomical/waste.html>]

As I write these words, suns are illuminating and heating empty rooms, unused energy is being flushed down black holes, and our great common endowment of negentropy is being irreversibly degraded into entropy on a cosmic scale. These are resources that an advanced civilization could have used to create value-structures, such as sentient beings living worthwhile lives. The rate of this loss boggles the mind. One recent paper speculates, using loose theoretical considerations based on the rate of increase of entropy, that the loss of potential human lives in our own galactic supercluster is at least ~10^46 per century of delayed colonization.[1] This estimate assumes that all the lost entropy could have been used for productive purposes, although no currently known technological mechanisms are even remotely capable of doing that. Since the estimate is meant to be a lower bound, this radically unconservative assumption is undesirable. We can, however, get a lower bound more straightforwardly by simply counting the number or stars in our galactic supercluster and multiplying this number with the amount of computing power that the resources of each star could be used to generate using technologies for whose feasibility a strong case has already been made. We can then divide this total with the estimated amount of computing power needed to simulate one human life. As a rough approximation, let us say the Virgo Supercluster contains 10^13 stars. One estimate of the computing power extractable from a star and with an associated planet-sized computational structure, using advanced molecular nanotechnology[2], is 10^42 operations per second.[3] A typical estimate of the human brain’s processing power is roughly 10^17 operations per second or less.[4] Not much more seems to be needed to simulate the relevant parts of the environment in sufficient detail to enable the simulated minds to have experiences indistinguishable from typical current human experiences.[5] Given these estimates, it follows that the potential for approximately 10^38 human lives is lost every century that colonization of our local supercluster is delayed; or equivalently, about 10^31 potential human lives per second. While this estimate is conservative in that it assumes only computational mechanisms whose implementation has been at least outlined in the literature, it is useful to have an even more conservative estimate that does not assume a non-biological instantiation of the potential persons. Suppose that about 10^10 biological humans could be sustained around an average star. Then the Virgo Supercluster could contain 10^23 biological humans. This corresponds to a loss of potential equal to about 10^14 potential human lives per second of delayed colonization. What matters for present purposes is not the exact numbers but the fact that they are huge. Even with the most conservative estimate, assuming a biological implementation of all persons, the potential for one hundred trillion potential human beings is lost for every second of postponement of colonization of our supercluster.[6]

#### Life won’t suck in space!

**Bostrom, 12** (Nick Bostrom has a background in physics, computational neuroscience, and mathematical logic as well as philosophy, Winner of the 2010 Eugene R. Bostrom Award for the Pursuit of Human Advancement, 2003, accessed on 1-5-2022, University of Oxford, "Astronomical Waste: The Opportunity Cost of Delayed Technological Development", https://www.nickbostrom.com/astronomical/waste.html, HBisevac) \*\*the next part of everyone’s favorite Bostrom card ;)\*\*

II. THE OPPORTUNITY COST OF DELAYED COLONIZATION

From a utilitarian perspective, this huge loss of **potential human lives** constitutes a correspondingly huge loss of **potential value**. I am assuming here that the human lives that could have been created would have been worthwhile ones. Since it is commonly supposed that even current human lives are typically worthwhile, this is a weak assumption. Any civilization advanced enough to colonize the local supercluster would likely also have the ability to establish at least the minimally **favorable conditions** required for **future lives** to be **worth living**.

The effect on **total value**, then, seems greater for actions that **accelerate technological development** than for practically any other possible action. Advancing technology (or its enabling factors, such as economic productivity) even by such a tiny amount that it leads to colonization of the local supercluster just **one second earlier** than would otherwise have happened amounts to bringing about more than **10^29 human lives** (or 10^14 human lives if we use the most conservative lower bound) that would not otherwise have existed. Few other philanthropic causes could hope to match that level of utilitarian payoff.

Utilitarians are not the only ones who should strongly oppose astronomical waste. There are many views about what has value that would concur with the assessment that the current rate of wastage constitutes an enormous loss of potential value. For example, we can take a thicker conception of human welfare than commonly supposed by utilitarians (whether of a hedonistic, experientialist, or desire-satisfactionist bent), such as a conception that locates value also in **human flourishing**, meaningful relationships, noble character, individual expression, aesthetic appreciation, and so forth. So long as the **evaluation function** is aggregative (does not count one person’s welfare for less just because there are many other persons in existence who also enjoy happy lives) and is not relativized to a particular point in time (no time-discounting), the **conclusion will hold**.

These conditions can be relaxed **further**. Even if the **welfare function** is not perfectly aggregative (perhaps because one component of the good is diversity, the marginal rate of production of which might decline with increasing population size), it can still yield a similar bottom line provided only that at least some significant component of the good is sufficiently aggregative. Similarly, some degree of time-discounting future goods could be accommodated **without changing the conclusion**.[7]

### SSA ADV---SC Good---AT: Aliens

#### Aliens don’t exist---new studies disprove

Redd, 18—Space.com contributor, citing Anders Sandberg, philosopher at the University of Oxford (Nolan Taylor, “Alien Life May Be Rare in Our Galaxy Today,” <https://www.space.com/41080-alien-life-may-be-rare-today.html>)

The hunt for E.T. may have gotten more difficult. New research suggests that alien life may not be as widespread as we had hoped. When it comes to hunting for alien civilizations, a key question is how plentiful intelligent extraterrestrials are in the universe — but the answer to that question depends on a lot of knowledge scientists don't have yet. In 1960, Frank Drake, an astronomer and hunter of extraterrestrial intelligence, devised an equation to calculate the probability of hearing from an intelligent, communicating alien civilization. The Drake equation relies on the values of several constants to determine how widespread such civilizations might be, how likely they are to evolve and how likely they are to have broadcast when we were able to detect. While some of the numbers, such as how many stars have planets around them, are fairly well-known, others, such as the fraction of those worlds with life, remain uncertain. [The Father of SETI: Q&A with Astronomer Frank Drake] Over the years, scientists have attempted to "solve" the Drake equation. But the uncertain quantities required estimation. Optimists tended to put in numbers that would reflect their thoughts — life on other planets is plentiful! Civilizations last for millions of years! Pessimists skew their results the other way, assuming life is rare and civilizations quickly burn out. Searching for a more accurate answer to the question 'Are we alone?' the new study's researchers have included the uncertainties of the numbers — how confident scientists are in them. Rather than giving each component a hard-and-fast amount, they attempted to gauge the strength of the research into these questions. "We can show that, given current scientific uncertainty, we get a distribution that could make both the optimists and pessimists happy at the same time: a fair chance of several alien civilizations, but also a fair chance of no aliens within the visible universe," Anders Sandberg told Space.com by email. Sandberg, a philosopher at the University of Oxford, is the lead author on the new research. "The uncertain sky should not be surprising given our level of uncertainty," Sandberg said. The study, which is available on the preprint site Arxiv, has been submitted to the journal Royal Society of London A. Alone in the universe? In 1950, Italian-American physicist Enrico Fermi looked to the skies and asked, "Where are they?" If the universe is filled with alien civilizations, why have none of them contacted Earth? The question, referred to as the Fermi paradox, provided the fuel for the Drake equation. The Drake equation has never sought a definite number. Instead, it has been used to make a rough estimate of the number of detectable civilizations in the Milky Way (N). According to the equation, N = RfpncflfifcL That number is based on the rate of star formation per year (R), the fraction of stars with planets (fp), the number of habitable planets per system of planets (nc), the fraction of those planets with life (fl), the fraction of life that is intelligent (fi), the fraction of intelligent civilizations that are detectable (fc), and the average lifetime of such civilizations in years (L). Observations of distant stars, with instruments such as NASA's Kepler telescope, have revealed that planets are plentiful around stars, and habitable worlds are spread across the galaxy. All the other variables remain up in the air. [The Most Intriguing Alien Planet Discoveries of 2017] Sandberg and his colleagues decided to change the inputs for the unknown parts of the equation. Rather than estimating a single number, they included the range. For instance, saying that there is a 1/100 chance for life to evolve doesn't make it clear whether the odds are exactly 1 out of 100, between 1/1000 and 1/10, or between one and one in a googol (10^100), Sandberg said. "One of the features that differs in [the new research] from previous Fermi paradox analyses is that the current authors tackle the problem of order-of-magnitude uncertainties in each component of Drake's equation in a less-biased, more robust way," Ian Jordan, an astronomer and engineer at the Space Telescope Science Institute in Baltimore, told Space.com in an email. Jordan is not part of the new research. By factoring in the scientific uncertainty for components like how often life evolves, the researchers determined that the odds that we are the only intelligent life in the Milky Way range between 53 and 99.6 percent. The odds get a bit better when they include the observable universe — the chance that humanity is alone ranges between 39 and 85 percent. The research was published on the journal preprint server arXiv. The new numbers mean there's a good chance humanity is the only detectable intelligent civilization around. Sandberg doesn't necessarily think that's a bad thing.

#### If they did exist, they would’ve already colonized us---finite resources on home planets

Bostrom, ‘8 Nick Bostrom, philosopher at the University of Oxford, a Ph.D. degree in philosophy from the London School of Economics, and was a British Academy Postdoctoral Fellow at the University of Oxford, 2008, “Where Are They?: Why I Hope The Search For Extraterrestrial Life Finds Nothing”, MIT Technology Review, <https://nickbostrom.com/extraterrestrial.pdf>, EO

I will return to this scenario shortly, but first I shall say a few words about another theoretical possibility: that the extraterrestrials are out there, in abundance but hidden from our view. I think this is unlikely, because if extraterrestrials do exist in any numbers, it’s reasonable to think at least one species would have already expanded throughout the galaxy, or beyond. Yet we have met no one. Various schemes have been proposed for how an intelligent species might colonize space. They might send out “manned” space ships, which would establish colonies and “terraform” new planets, beginning with worlds in their own solar system before moving on to more distant destinations. But much more likely, in my view, would be colonization by means of so‐called “von Neumann probes”, named after the Hungarian‐ born prodigy John von Neumann, who included among his many mathematical and scientific achievements the development of the concept of a universal constructor. A von Neumann probe would be an unmanned self‐replicating spacecraft, controlled by artificial intelligence, capable of interstellar travel. A probe would land on a planet (or a moon or asteroid), where it would mine raw materials to create multiple replicas of itself, perhaps using advanced forms of nanotechnology. These replicas would then be launched in various directions, thus setting in motion a multiplying colonization wave. 3 Our galaxy is about 100,000 light years across. If a probe were capable of travelling at one‐tenth of the speed of light, every planet in the galaxy could thus be colonized within a couple of million years (allowing some time for the bootstrapping process that needs to take place between a probe’s landing on a resource site, setting up the necessary infrastructure, and producing daughter probes). If travel speed were limited to 1% of light speed, colonization might take twenty million years instead. The exact numbers do not matter much because they are at any rate very short compared to the astronomical time scales involved in the evolution of intelligent life from scratch (billions of years). If building a von Neumann probe seems like a very difficult thing to do—well, surely it is, but we are not talking about a proposal for something that NASA or the European Space Agency should get to work on today. Rather, we are considering what would be accomplish with some future very advanced technology. We ourselves might build Neumann probes in decades, centuries, or millennia—intervals that are mere blips compared to the lifespan of a planet. Considering that space travel was science fiction a mere half century ago, we should, I think, be extremely reluctant to proclaim something forever technologically infeasible unless it conflicts with some hard physical constraint. Our early space probes are already out there: Voyager 1, for example, is now beyond our solar system. Even if an advanced technological civilization could spread throughout the galaxy in a relatively short period of time (and thereafter spread to neighboring galaxies), one might still wonder whether it would opt to do so. Perhaps it would rather choose to stay at home and live in harmony with nature. However, there are a number of considerations that make this a less plausible explanation of the great silence. First, we observe that life here on Earth manifests a very strong tendency to spread wherever it can. On our planet, life has spread to every nook and cranny that can sustain it: East, West, North, and South; land, water, and air; desert, tropic, and arctic ice; underground rocks, hydrothermal vents, and radioactive waste dumps; there are even living beings inside the bodies of other living beings. This empirical finding is of course entirely consonant with what one would expect on the basis of elementary evolutionary theory. Second, if we consider our own species in particular, we also find that it has spread to every part of the planet, and we even have even established a presence in space, at vast expense, with the international space station. Third, there is an obvious reason for an advanced civilization that has the technology to go into space relatively cheaply to do so: namely, that’s where most of the resources are. Land, minerals, energy, negentropy, matter: all abundant out there yet limited on any one home planet. These resources could be used to support a growing population and to construct giant temples or supercomputers or whatever structures a civilization values. Fourth, even if some advanced civilization were non‐expansionary to begin with, it might change its mind after a hundred years or fifty thousand years—a delay too short to matter. Fifth, even if some advanced civilization chose to remain non‐expansionist forever, it would still not make any difference if there were at least one other civilization out there that at some point opted to launch a colonization process: that expansionary civilization would then be the one whose probes, colonies, or descendants would fill the galaxy. It takes but one match to start a fire; only one expansionist civilization to launch the colonization of the universe.

### SSA ADV---SC Good---AT: Disease

#### Space Col brings technology that solves disease – empirically proven gains

Donoviel 19 (Dorit Donoviel, Ph.D., director of the Translational Research Institute for Space Health, associate professor in the Department of Pharmacology and Chemical Biology and the Center for Space Medicine at Baylor College of Medicine, “Space exploration is reinventing healthcare,” The Hill, 7/19/19, <https://thehill.com/opinion/technology/453853-space-exploration-is-reinventing-healthcare>, ccm)

The spirit of the Apollo program inspired us to tackle a huge challenge as one species, to test our limits, work together and sacrifice in order to achieve great heights. The benefits are numerous including medical breakthroughs enabled by space technology advances.

Discoveries in space robotics and new materials propelled the field of prosthetics, improving the quality of life for many. In my own backyard Drs. Michael DeBakey and George Noon worked with NASA engineers to develop the first Left Ventricular Assist Device that saved the lives of thousands awaiting heart transplants. Millions of cancer patients depend on the digital imaging techniques developed by the space program to enhance MRI and computerized tomography (CT) scans so that we can detect tumors early, or better yet, that there are not any to find at all.

Though many do not realize it, humans have been living and working in space continuously for the past two decades. The conditions of spaceflight have accelerated our ability to study progressive degenerative diseases. This novel paradigm of understanding human physiology under the stresses of living in space holds great promise for new sources of medical breakthroughs for Earth.

Although astronauts are carefully selected to be exceptionally healthy and exhibit peak physical and mental performance, after only four to six months in space, they can develop numerous medical conditions. Without appropriate exercise, they lose bone and muscle mass. They become prone to developing kidney stones. Their hearts become deconditioned. Their blood vessels stiffen. A subset of astronauts develop a swelling of the optic nerve and possibly an increase in pressure on the brain. Even dormant viruses become activated, alongside changes to the immune system. There is a sense of urgency to solve these problems if we are to send humans to Mars and return them safely in the next decade or two.

This is why NASA is investing in cutting-edge research for human health and performance including high-risk high-reward approaches funded through the Translational Research institute for Space Health (TRISH).

Supporting potentially ground-breaking innovations requires a leap of faith in the right direction.

Keeping astronauts healthy during deep space exploration missions — where there are no hospitals and no medical specialists — requires a different paradigm for healthcare. Astronauts are typically engineers and scientists, and only occasionally physicians.

On the way to Mars, when communications with Earth will be limited, they could be forced to act as both patients and healthcare providers. If a medical condition is allowed to progress when they are millions of miles away from Earth, the situation could become catastrophic.

Therefore, astronauts will need to detect even the most subtle changes in their own health status early enough to prevent disease. This requires a healthcare paradigm of predicting, preventing and mitigating ailments by intervening early.

This means enabling monitoring, diagnostic and therapeutic medical capabilities that are simple to use, safe, robust and miniaturized. Additionally, what will work in a small spacecraft in the hands of an engineer is also likely to work in a community clinic with limited resources. Or even in our homes. This different approach to healthcare can help save lives and reduce costs — at a global level.

Space demands the best in healthcare innovations, focusing on prevention and early intervention using smart, creative solutions. On a mission to Mars, blood tests will be done in a matter of minutes, by the patient, on a single drop of blood. A trained and adaptive computer algorithm will track health status based on a variety of physiological parameters and alert astronauts when important deviations from normal become evident.

Automated eye exams will be performed by the astronauts on themselves and images will be analyzed by a computer for changes. Customized medications will be tailor-made for the patient on the spot. If a minor medical procedure is required, the caregiver will learn and practice beforehand using augmented reality tools and software simulations adjusted for zero-gravity.

Kidney stones will be found early and treated quickly and painlessly using ultrasound to “push” them out of the kidney so they can be cleared naturally with urination. Sleep and mood will be improved using sound stimulation and health will be improved by individualized diets which will be enriched with high-nutrient plants grown efficiently within a small footprint. Most importantly, all these advances have clear and important applications on Earth.

Space exploration has already yielded hundreds of inventions that filled our arsenal for fighting diseases. To land women and men on Mars and return them healthy, we must reinvent healthcare. The positive consequences of this work will impact all of humanity. The spirit of Apollo is alive and well in space health research today. And for science, medicine and technology pioneers, our most important work is still ahead.

#### Humans outweigh

Juan Carlos Marvizon 16, PhD, Member of the Brain Research Institute, UCLA, 12/6/16, “Not just intelligence: Why humans deserve to be treated better than animals,” https://speakingofresearch.com/2016/12/06/not-just-intelligence-why-humans-deserve-to-be-treated-better-than-animals/

However, modern neuroscience has in fact uncovered many differences between humans and the rest of the animals that makes us unique. These differences are not limited to a quantitative difference in intelligence but extend to many other mental and behavioral abilities that make us completely unique (Penn et al., 2008), a qualitatively different type of being. Below I provide a list of the most important of those abilities. Theory of Mind is the ability to understand what other people are feeling and thinking [pp. 172-178 in (Blackmore, 2004); pp. 48-54 in (Gazzaniga, 2008)]. We do that by running inside our heads a model of what is happening in other person’s mind. Of course, the model is not always right, but nevertheless it is extremely valuable because it lets us predict the behavior of people around us. Theory of mind seems to require the right anterior insula, a part of the brain cortex that evolved very rapidly in apes. The function of the right anterior insula is to create hypothetical models of the internal state of our body in different circumstances (Craig, 2010, 2011). For example, when we imagine what it would feel like to stab our toe, is the right anterior insula doing that. Likewise, the right anterior insula can make a model of the internal state of the body of another person. Of course, theory of mind is much more than that and involves the cognitive abilities of many other parts of the brain. Research on theory of mind has revealed it to be uniquely human (Penn and Povinelli, 2007), although some studies claims to have found it in rudimentary form in chimpanzees (Call and Tomasello, 2008; Yamamoto et al., 2013). One negative aspect of theory of mind is that it often creates the delusion of attributing human consciousness to inanimate objects or animals. The same way we project our thoughts and feelings to a person that we see behaving in a way similar to us, we project human thoughts and feelings to an animal or an object we see doing something that resembles human behavior. This delusional form of theory of mind is responsible for the anthropomorphizing of animals that is so common in modern culture. Episodic memory. There are two basic forms of memory: procedural and declarative [pp. 303-306 in (Gazzaniga, 2008)]. Procedural memory is present in both humans and animals and consists in the retention of perceptual, motor and cognitive skills that are then expressed non-consciously. For example, when we walk, swim, ski, listen to music, type on a keyboard or process the visual information we get from a television screen, we use procedural memory. Declarative memory stores information about facts and beliefs about the world, and can be further divided into semantic and episodic memory. Semantic memory is about facts in the world that stand by themselves, independently of our self, whereas episodic memory is remembering things that happened to us. That is, episodic memory retains events as they were experienced by ourselves in a particular place and time. Episodic memory appears to be uniquely human, because it involves subjective experiences, a concept of self and subjective time. This is important because it allows us to travel mentally in time through subjective experiences, while animals are locked in the present of their current motivational state. Humans emotions. Mammals, birds and some other animals have a set of six basic emotions listed by Ekman: anger, fear, disgust, joy, sadness and surprise. However, we humans are able to feel many other emotions that regulate our social behavior and the way we view the world: guilt, shame, pride, honor, awe, interest, envy, nostalgia, hope, despair, contempt and many others. While emotions like love and loyalty may be present in mammals that live in hierarchical societies, emotions like guilt, shame and their counterparts pride and honor seem to be uniquely human. There is much controversy these days on whether dogs feel guilt and shame, there is evidence that they do not, but they may also have acquired this emotion as a way to interact with humans. What is clear is that many of the emotions that we value as human are not present in animals. Empathy and compassion. Empathy is defined as the capacity to feel what another person is feeling from their own frame of reference. It is a well-established fact that many animals react to distress by other animals by showing signs of distress themselves. However, this does not seem to represent true empathy as defined above, but a genetically encoded stress response in anticipation of harm. Since empathy requires feeling what the other person is feeling from their own frame of reference, it seems to require theory of mind. Only if we stripe the requirement of adopting the other’s frame of reference we can say that animals have empathy. Empathy involves the newly evolved anterior insula in humans (Preis et al., 2013), bonobos and chimpanzees (Rilling et al., 2012). Compassion is currently thought to be different from empathy because it involves many other parts of the brain. It seems to be associated with complex cultural and cognitive elements. Therefore, it seems safe to assume that animals are not able to feel compassion. Language and culture. Although animals do communicate with each other using sounds, signs and body language, human language is a qualitative leap from any form of animal communication in its unique ability to convey factual information and not just emotional states. In that, human language is linked to our ability to store huge amounts of semantic and episodic memory, as defined above. The human brain has a unique capacity to quickly learn spoken languages during a portal that closes around 5-6 years of age. Attempts to teach sign languages to apes has produced only limited success and can be attributed to a humanization of the brain of those animals, raised inside human culture. The effectiveness of spoken and written language to store information across many generations gave raise to human cultures. The working of the human brain cannot be understood without taking culture into account. Culture completely shapes the way we think, feel, perceive and behave. Although there are documented cases of transmission of learned information across generations in animals, producing what we could call an animal culture, no animal is as shaped by culture as we are. Esthetic sense or the appreciation of beauty also seems to be uniquely human. Of course, animals can produce great beauty in the form of colorful bodies, songs and artful behavior. What seems to be lacking is their ability to appreciate and value that beauty beyond stereotypical mating and territorial behaviors. Even attempts to teach chimps to produce art by drawing have largely failed. Ethics is the ability to appreciate fairness, justice and rights. It is at the very core of our ability to form stable societies and to cooperate to achieve common goals. It depends on theory of mind (which allows us to “put ourselves in somebody else’s shoes”); on social emotions like guilt, shame, pride and contempt; on empathy and compassion, and on cultural heritage. Lacking all those mental abilities, animals have no sense of ethics. Even though some studies have shown that monkeys have a primitive sense of fairness (particularly when it applies to their own interest), it is but a pale anticipation of our sense of justice. It simply goes to show how that ethics is rooted in our evolutionary history. The fact that animals cannot even remotely comprehend the concept of rights is a strong argument for why they should not have rights. What sense does it make to give animals something that they do not know that they lack? Extended consciousness. They question of what is consciousness has been called by scientists and philosophers “the hard problem” due to the difficulty of answering it (Blackmore, 2004). Therefore, the related question of whether animals have consciousness, or what animals have it, remains similarly unanswered in the strict sense. However, based on their behavior, we commonly assume that animals like cats, dogs and horses are conscious and able to make some autonomous decisions. On the other hand, unless we invoke some mystical definition of consciousness, it is safe to assume that animals with small nervous systems, like jellyfish, worms, starfish, snails and clams have no consciousness whatsoever. They are like plants: living beings able to react to the environment as automatons. That leaves a lot of animals for which it is hard to guess whether they are conscious or not: insects, fish, octopi, lizards and small mammals like mice and rats. What has been becoming clear is that we humans possess a kind of consciousness that no other animal has: the ability to see ourselves as selves extending from the past to the future [pp. 309-321 (Gazzaniga, 2008)]. This special kind of consciousness has been called by neuroscientist Antonio Damasio “extended consciousness” [Chapter 7 in (Damasio, 1999)] and allow us a sort of “mental time travel” to relive events in the past and predict what may happen to us in the future (Suddendorf and Corballis, 2007). Extended consciousness is based on our ability to have episodic memory and theory of mind. Episodic memory configures remembered events around the image of the self, whereas theory of mind allows us to create a model of our own mind as it was during a past event or to hypothesize how it would be in a future event. I should also point out that a few animals (apes, dolphins and elephants) may turn out to have episodic memory, theory of mind and hence extended consciousness. However, this is still very much in doubt. Suffering and happiness. It is a common mistake to confuse suffering with pain and happiness with joy. Pain is the representation of a bodily state and the emotion associated with it (Craig, 2003). Likewise, joy is an emotion associated with an excited but pleasant body state in an agreeable environment. Suffering and happiness are much deeper than that, and refer to the totality of a mental state, encompassing cognition, emotion and state of consciousness. Although suffering and happiness are normally associated with certain emotions, there is not always a correspondence with them. For example, one can be happy while feeling scared or sad, or suffer even in the presence of a passing joy. The error of philosophers like Peter Singer (Singer, 1991) and Tom Reagan (Reagan, 1985) is that they consider suffering as something that occurs independently of cognition and other mental abilities, when it does not. Arguably, happiness and suffering require some continuity in time, which would seem to require extended consciousness. Furthermore, conceptions of happiness extending to antiquity refer to lifelong attitudes like hedonism (the quest for personal pleasure) and eudemonia (working to acquire virtue or to achieve goals that transcend oneself), pointing to the fact that human happiness depends on cultural values. In view of all this, we need to wonder whether happiness and suffering can exist in beings that have no episodic memory, no extended consciousness, no sense of self, and no culture. Can happiness and suffering really be attributed to animals lacking these mental abilities? Or is this an illusion , an anthropomorphizing caused by the overreaching of our theory of mind? Without going to that extreme, it is quite clear that we humans have a capacity to be happy and to suffer that goes far beyond what animals can experience. So human suffering counts more than any suffering than an animal could have. There are many more differences between human and animals. However, the ones that I have listed here are important because they give us our special feeling of humaneness. All of them are based on scientific facts about the human mind that are slowly being unraveled by neuroscience, not on religious beliefs or on ideology. However, what cannot be based on science is the value we attribute to those differences. Ultimately, this is a decision based on our ethical intuition. Still, for most people what determines how much consideration we should give to a being is its ability to be conscious; to feel empathy; to feel guilt and pride and shame and all other human emotions; to be happy as we are happy and to suffer like we suffer. An important corollary of the ideas proposed here is to utterly refute the “marginal case” argument. Thus, even when a human brain is damaged by disease, accident or old age, most of the properties that I have listed here remain because they are deeply engrained in the way the human brain works. Theory of mind and extended consciousness appear early in human life and are the last things to go in a deteriorating brain. It takes coma to deprive us of them. A person may have a reduced intelligence or other cognitive disabilities, but s/he still has theory of mind, empathy, compassion, extended consciousness and all those human emotions. That is why when we encounter those people we recognize them as humans and we know we should treat them as humans. They are not animals and should never be treated as such. Intelligence is just a tiny part of what it means to be human.

### SSA ADV---SC Good---AT: Universe destruction

#### There’s no chance that anything we do could possibly destroy the Universe

Dr. Tom Head 14, PhD from Edith Cowan University, M.A. in Humanities from California State University, Dominguez Hills, M.Th. Student in Practical Theology, University of South Africa, expected 2022, Author of Conversations with Carl Sagan, Author of World History 101, BA from Excelsior College, Author or Coauthor of 29 Nonfiction Books, Columnist, Scriptwriter, Research Paralegal, “Why We Can’t Accidentally Destroy the Universe”, Mysterious Universe, 9-15, https://mysteriousuniverse.org/2014/09/why-we-cant-accidentally-destroy-the-universe/

Stephen Hawking’s recent remarks regarding the possibility that our descendants might one day destroy the universe by disrupting the Higgs field with a larger-than-Earth supercollider has gotten people thinking: is there anything we could do now that would destroy the universe?

The answer to that question is, by all appearances, a pretty clear no. Here are two good reasons why:

1. The universe is really, really durable.

Last April, astronomers witnessed gamma-ray burst (GRB) 130427A and, short of being bigger than other gamma ray bursts they’d observed, it wasn’t particularly remarkable: just a star 20 to 30 times the Sun’s mass collapsing and exploding in a way we can’t fully understand, creating a black hole and outshining local objects from millions of light years away. This sort of thing happens fairly regularly all over the universe, and was presumably more common for most of the universe’s history.

Although these gamma-ray bursts occur on a scale and with a power that exponentially exceeds anything humanity can produce (and anything humanity is likely to produce for a very long time), they don’t appear to do any tangible harm to the structure of the universe itself.

2. We don’t have the technology to do anything the natural world isn’t already doing.

If we can’t endanger the universe with raw explosive power, can we can endanger it by tinkering with the natural order of things? Maybe, if we ever figure out how, but everything humanity has ever done so far has fallen well within the parameters of the natural order of things.

Even nuclear fission, the go-to example of humanity harnessing the power of the gods, is nothing new; it occurred naturally in 17 underground sites in West Africa two billion years ago, no Manhattan Project needed. And the Large Hadron Collider, wonderful though it is, just stimulates weak, observable versions of processes that naturally occur in local space on a regular basis. There is, in the words of Ecclesiastes, nothing new under the Sun. All we’re ultimately doing is rearranging our environment, much like other nestmaking animals do; we have yet to create anything that is, in a cosmic sense, out of the ordinary. And as the universe is unlikely to be destroyed by something that it ordinarily produces on its own, it should be safe from us for a long time to come.

### SSA ADV---SC Good---AT: War

#### No interstellar war – required technology and incentives for war don’t align

Cirkovic 19 – Milan M Cirkovic Corresponding author at: Future of Humanity Institute, Faculty of Philosophy, University of Oxford (“Space colonization remains the only long-term option for humanity: A reply to Torres” Futures Volume 105, January 2019, Pages 166-173Serbia https://doi-org.proxy.lib.umich.edu/10.1016/j.futures.2018.09.006G)

4. Interstellar warfare: fantasy and real fantasy Even if we accept – in spirit, if not in words – Clarke’s Third Law (“any sufficiently advanced technology is indistinguishable from magic”; Clarke, 1999), the inverse does not hold: there are infinitely many conceivable “magical” effects which could not be realized with any advanced technology under the known laws of physics. As stated above, it is doubtful, to say at least, that there ever will be a “galaxy destroying weapon”, irrespectively of how much time and effort is expended. The influence of science fictional discourse, while in general beneficial for futures studies, becomes at this point perhaps too strong (especially in a rather naïve, Star Wars- or Starship Troopers-like manner). The discussion might be finished here, since it seems unreasonable to engage in such extreme speculation; so, a few comments in the rest of this section should be taken with reservations. Although there have not been serious strategic studies of the topic, there are many indications that the “interstellar warfare” is an oxymoron. Insofar as there are no topological shortcuts in forms of traversable wormholes (and even if there are some, but with fixed points of entrance and egress), there is a large delay and logistic nightmare in sending any military expeditions across interstellar distances. Except in the case of huge technological imbalance – which is possible in contact between (post)human and some extraterrestrial civilization, but highly unlikely if not impossible between any two (post)human factions – the defense of planetary systems would have overwhelming advantage, measured by orders of magnitude in both reconnaissance, logistics, and capacity for tactical concentration of forces. Above all, the defenders could easily destroy any non-stellar resources in the defended system if their situation becomes desperate enough, so that “piracy and plunder” would simply not be viable options in the interstellar case. And, if the desired resources consist of uplifted stellar matter, there would always be billions of undefended stars in the Galaxy. (This would be valid even if the efficiency of colonization is 99%. In the unlikely scenario that all stars in the Galaxy are colonized and defended, which is perhaps in itself incompatible with the Torres’s argument, since the constant destructive warfare will likely impede or arrest the colonization efforts, the required timescale is so long that it will perhaps make more economic and strategic sense to go after undefended resources in other Local Group galaxies.) In brief, plunder is hardly viable as a motivation for interstellar warfare. A reasonable conclusion that interstellar travel will always be expensive and difficult, coupled with the defensive advantages and the total abundance of undefended cosmic resources elsewhere, makes this motivation of “Machiavellian actors” largely irrelevant. “Tuckerian actors” have been dealt with in the Section 2 above. Finally, there remains the option of warfare for the sake of spreading particular “bad memes” (Zubrin, 1999). If this kind of motivation requires the same expenditure of time and resources required for the interstellar travel (not to mention intergalactic travel, which is an entirely different order of magnitude problem, with additional difficulties, like the impossibility of gathering any fuel or resources en route), it is reasonable to conclude that such instances would be rare. Of course, it is impossible to eliminate the possibility that particularly virulent political or religious movements will emerge in the distant future, leading to an overwhelming motivation for spreading The Word by fire and sword even in the face of unfavorable strategic odds. This seems improbable, however, for at least two reasons. (i) The relevant “bad memes” will certainly be easier to spread by other means, notably modulated radiation and inscribed matter packages, in forms of self-reproducing software or other virulent forms, which might be violent in a generalized sense, but still would not entail any of the drastic scenarios of destruction invoked by Torres. Insofar human history is any guide, while religions are stronger in the contemporary world than they have been for the last couple of centuries, this is manifested by televangelists rather than crusades.7 (ii) The immunization against such bad memes is quite likely to improve by many orders of magnitude, just as new computer viruses always provoke stronger and more efficient immunization response. In this sense, the conclusions of Pinker (2011) seem fully vindicated; and they are certainly more appropriate for the interstellar case.

### SSA ADV---SC Good---AT: Kovic

#### Goes AFF---risk outweighs and the AFFs legal framework resolves the turns

Marko Kovic 20 (Marko Kovic is the co-founder president of the nonprofit think tank ZIPAR (Zurich Institute of Public Affairs Research) and the co-founder and CEO of the consulting firm ars cognitionis, July 2020, accessed 10/25/21, “Risks of space colonization”)AGabay

The issue of space colonization risks should spill over from academia into public life as soon as possible. Academic research and debate is certainly necessary in order to further map out the problem, but ultimately, our **collective goal**, I believe, is to establish **empirically** and **philosophically sensible** real-world **governance** in order to make **space colonization** as **safe** as **possible**. Reducing the risks of space colonization even by a **tiny fraction** means an **enormous increase** in expected **moral value**, or an even greater decrease in expected moral disvalue. The future in which **humankind colonizes space** is **vast**, and so are both the **potential happiness** as well as the potential suffering we can fill that future with.

### SSA ADV---SC Good---Extinction Inevitable

#### Extinction inevitable

Henry Gee, 21 (Henry Gee is a paleontologist, evolutionary biologist and editor at Nature, 11-30-2021, accessed on 7-9-2022, Scientific American, "Humans Are Doomed to Go Extinct", https://www.scientificamerican.com/article/humans-are-doomed-to-go-extinct/, HBisevac)

The most **insidious threat** to humankind is something called “**extinction debt**.” There comes a time in the progress of **any species**, even ones that seem to be thriving, when extinction will be inevitable, no matter what they might do to avert it. The cause of extinction is usually a delayed reaction to habitat loss. The species most at risk are those that dominate particular habitat patches at the expense of others, who tend to migrate elsewhere, and are therefore spread more thinly. Humans occupy more or less the whole planet, and with our sequestration of a large wedge of the productivity of this planetwide habitat patch, we are dominant within it. H. sapiens might therefore already be a **dead species walking**.

The **signs are already there** for those **willing to see them**. When the **habitat** becomes **degraded** such that there are **fewer resources** to go around; when **fertility** starts to **decline**; when the **birth rate sinks below the** **death rate**; and when **genetic resources are limited**—the only way is **down**. The question is “How fast?”

I suspect that the human population is **set** not just for shrinkage but **collapse**—and **soon**. To paraphrase Lehrer, if we are going to write about human extinction, we’d better start writing **now**.

### Inherency---AT: StratCon---2AC

#### StratCon just overstretched NATO with vague commitments---lacking proper interoperability and robust enforcement.

Christopher Harper et al. 7-7. Nonresident Senior Fellow at the Scowcroft Center for Strategy and Security Transatlantic Security Initiative; Barry Pavel, Senior Vice President and Director, Scowcroft Center for Strategy and Security; Leah Scheunemann, Deputy Director, Scowcroft Center for Strategy and Security Transatlantic Security Initiative; Paul R.S. Gebhard, Nonresident Senior Fellow, Scowcroft Center for Strategy and Security Transatlantic Security Initiative. “Scowcroft strategy scorecard: NATO's Strategic Concept clear on threats, but will require sustained commitment from Alliance.” Atlantic Council. 7-7-2022. https://www.atlanticcouncil.org/content-series/scorecard/scowcroft-strategy-scorecard-natos-strategic-concept/ //EM

Sir Christopher Harper

Nonresident Senior Fellow, Transatlantic Security Initiative

The new Strategic Concept is considerably better than I had anticipated or hoped. It is unambiguous and clear-sighted, which is impressive when one considers how tricky it must have been to get thirty nations (at head-of-state-or-government-level) on side with every word, comma, full stop and nuance. It is a vast improvement on its predecessor which has, for far too long, been woefully outdated and hence unable to fulfill its objective of being the Alliance’s top-level guide rail.

I would have liked to have seen more emphasis on the rapid development, deployment and utilization of innovative technology for, inter alia, strategic and operational decision support. I would also have welcomed a more decisive and, if necessary, radical drive to promote standardization and interoperability. It is not the availability of intellectual horsepower, disruptive thinking or world-leading technology that hampers either of these endeavors, but rather Alliance bureaucracy and risk-aversion.

Distinctiveness

Is there a clear theme, concept, or label that distinguishes this strategy from previous strategies?

This Strategic Concept is very clear and unambiguous about the threats, risks, issues, and challenges that confront the Alliance. It is refreshing to see adversaries clearly delineated. This is a considerable improvement on all previous versions.

Sound strategic context

Does the strategy accurately portray the current strategic context and security environment facing NATO? Is the strategy predicated on any specious assumptions?

The Strategic Concept offers a realistic and unvarnished perspective of the current strategic context and of the global security environment.

Defined goals

Does the strategy define clear goals?

Defined goals are arguably more the stuff of plans than strategies. That said, for a document of this nature, the target setting is adequate.

Clear lines of effort

Does the strategy outline several major lines of effort for achieving its objectives? Will following those lines of effort attain the defined goals? Does the strategy establish a clear set of priorities, or does it present a laundry list of NATO activities?

The Strategic Concept does not prioritize or articulate a program for the achievement of goals or objectives. In the face of the ever-shifting sands of the global defense and security environment, it is the role of the North Atlantic Council (NAC) and Military Committee (MC) to debate and decide these aspects. The document is more than adequate in offering the necessary guidance.

Realistic implementation guidelines

Is it feasible to implement this strategy? Are there resources available to sustain it?

Some might say that the Strategic Concept lacks clarity here. I would argue that it offers more than enough meat for the NAC and MC to chew on.

Barry Pavel

Senior Vice President and Director, Scowcroft Center for Strategy and Security

The new Strategic Concept, which I believe should be updated more frequently going forward (but may have to endure through the rest of this decade as that appears to have been the recent practice), is a relatively solid document that accounts reasonably well for the new and ever-changing security context, while outlining an executable strategy for NATO. However, I would have liked to have seen a bit more clarity on prioritization of threats and on some of the core priorities for how the strategy can be executed most effectively (e.g., moving from deterrence-by-retaliation toward deterrence-by-denial).

Distinctiveness

Is there a clear theme, concept, or label that distinguishes this strategy from previous strategies?

The new Strategic Concept contains a bit more continuity in many of its elements with the 2010 version than had been expected. While accounting for the dramatically different security environment—and, for example, pointing to an enhanced force posture to address it—there was not really a clear theme, concept, or label.

Sound strategic context

Does the strategy accurately portray the current strategic context and security environment facing NATO? Is the strategy predicated on any specious assumptions?

The strategic context section is solid, capturing the Russian threat very well (“the Euro-Atlantic area is not at peace”) and the “systemic challenges” posed by China, for example. However, I was startled that the China section was so low on the priority list, coming after humanitarian and other challenges, and that the threat of terrorism was so high (coming immediately after Russia). It also would have been good to have seen a bit of foresight applied, with some projections of where the security environment might be headed.

Defined goals

Does the strategy define clear goals?

The Strategic Concept did a good job on goals, as it usually does, with great clarity around the top-level purpose, as well as the priority objectives of the document

Clear lines of effort

Does the strategy outline several major lines of effort for achieving its objectives? Will following those lines of effort attain the defined goals? Does the strategy establish a clear set of priorities, or does it present a laundry list of NATO activities?

Lines of effort are addressed well, but there does appear to be a “laundry list” feel to those activities that covers a bit too much ground. That certainly is to be expected for a document agreed on by 30 nations who share core values and interests but also bring distinct perspectives to the serious questions of Alliance strategy.

Realistic implementation guidelines

Is it feasible to implement this strategy? Are there resources available to sustain it?

Fortunately, defense budgets across most of the Alliance are increasing, which will help NATO members to more effectively execute this broad, ambitious strategy. However, the devil will be in the details because, as the Strategic Concept points out, the security environment is “contested and unpredictable.”

Leah Scheunemann

Deputy Director, Transatlantic Security Initiative

Overall, the Strategic Concept keeps the Alliance on its important trajectory to focus on the direct threat of Russia, recognizes NATO’s global role in preserving liberal democratic values, and adapts to growing transnational challenges and opportunities like climate change and technological innovation. Where the strategy is in danger is in implementation beyond the Madrid Summit and specifically sustaining such modernization and investments to focus on collective defense. Fingers crossed that the political leaders remain unified and that the bureaucracy prevails in implementation over the coming years.

Distinctiveness

Is there a clear theme, concept, or label that distinguishes this strategy from previous strategies?

This Strategic Concept is definitely distinct from the 2010 version, which is unsurprising given the many monumental shifts to the security environment in Europe and globally in the past twelve years. The key theme of the Strategic Concept is that Russia has shattered peace in Europe. The Alliance is clearly articulating the threats that NATO faces, including authoritarian actors, clearly delineating Russia as NATO’s primary threat, but also outlining the “challenges” posed by China for the first time in a NATO strategy, as well as focusing on climate change, technological innovation, and new agendas like human security and women, peace, and security. However, there are several key areas where NATO maintained continuity with the previous strategy, including focusing on terrorism and a so-called 360-degree approach against threats from all directions, even as the threat from NATO’s east looms larger than ever before

Sound strategic context

Does the strategy accurately portray the current strategic context and security environment facing NATO? Is the strategy predicated on any specious assumptions?

The Strategic Concept includes a fantastic list of challenges, including a clear outline of the threat posed by Russia and authoritarian aggressors in general and pitting NATO as a “a bulwark of the rules-based international order” in this global competition. There is a surprisingly stark list of challenges posed by the People’s Republic of China to NATO’s “interests, security and values,” however it comes after the mention of terrorism, which rings a bit hollow given the strategic reality of European NATO members being focused on the war on their doorstep in the midst of an ongoing pandemic, which receives no mention. I also think the assessment of the circumstances in which NATO may have to use nuclear weapons as “extremely remote” is inaccurate given the overt nuclear modernization, breach of international laws, and aggressive rhetoric from Russia just this year.

Defined goals

Does the strategy define clear goals?

The Strategic Concept has to be viewed as a top-level document that sets the stage for follow-on work at all levels of the Alliance and by member states and one would not demand a list of defined, attainable, or measurable goals from the document. The Strategic Concept strongly defines NATO’s goal as safeguarding its members and its values and reaffirmed NATO’s three core tasks, in order: deterrence and defense, crisis management, and cooperative security. I appreciate that the Strategic Concept did not confuse NATO’s purpose with a fourth core task of resilience and instead wove resilience throughout the strategy as a core tool and competency for achieving all of NATO’s goals, and that the strategy highlight’s NATO’s global role, but continues to bite off a lot to chew in the years to come.

Clear lines of effort

Does the strategy outline several major lines of effort for achieving its objectives? Will following those lines of effort attain the defined goals? Does the strategy establish a clear set of priorities, or does it present a laundry list of NATO activities?

Again, one has to view the Strategic Concept as a top-level strategy that paves the way for continued adaptation at all levels of the Alliance. I do think the Strategic Concept will provide the top cover needed for leaders in key areas to advance necessary adaptations, specifically on deterrence and defense, where there is a need for NATO to accelerate its good steps taken since the Russian invasion of Ukraine in 2014. The devil will really be in the details of implementation, only some of which we have seen so far with the vague announcements of the new force model and new regional plans discussed at the summit that would require thousands of more ready troops assigned to NATO without an articulation of how readiness will be bolstered especially without all countries meeting a defense spending minimum, let alone going above and beyond the notorious 2 percent metric.

Realistic implementation guidelines

Is it feasible to implement this strategy? Are there resources available to sustain it?

NATO has agreed to a historic new strategy at a time of war on the European continent at a scale not seen since World War II. I have great confidence in the many leaders at NATO and throughout the Alliance’s member states to continue to advance and accelerate the changes the Alliance has made since 2014 to address the renewed threat of a revisionist Russia, while also tackling new challenges that exacerbate global insecurity with greater vigor. What I am more pessimistic about is NATO’s ability to sustain upward pressure on defense budgets to implement this very expensive vision and continue to safeguard collective security.

Paul R.S. Gebhard

Nonresident Senior Fellow, Transatlantic Security Initiative

NATO has issued a strong, clear statement that reaffirms the core principles and purposes of the Alliance, to deter and defend its security and values in the face of Russia’s invasion of Ukraine and direct threat to the security of Europe. In a direct rebuke to President Vladimir Putin, NATO reiterated the Alliance’s commitment to membership for Ukraine. The Alliance has made clear that the threats it faces are global and directly connected to the security of Europe, and that China’s stated ambitions and coercive policies challenge NATO’s interests, security, and values. NATO heads of state reaffirmed their commitment to provide the necessary resources to implement their decisions and to meet their commitments under the Defense Investment Pledge for 2 percent of GDP.

NATO strategic concept scorecard grade

Distinctiveness

Is there a clear theme, concept, or label that distinguishes this strategy from previous strategies?

The top-line message for the Strategic Concept is, “We are united.” The Strategic Concept is the clear articulation at a policy level of the operational unity that the Alliance has demonstrated since the Russian invasion of Ukraine, including reaffirming the Alliance’s Bucharest decision on membership for Ukraine.

The Strategy reaffirms strongly several points that NATO in recent years has danced around, including the essential role of nuclear weapons to the Alliance’s security, now much more prominently featured in the text and clearly, and directly articulated, and the Alliance’s global perspective on threats to its security. On China, for the first time in a Strategic Concept, NATO includes a new, lengthy and detailed discussion of the challenged posed by the PRC to the Alliance. As they say, the Alliance works well in practice, but can it work in principle? The Strategic Concept offers a resounding “yes.”

Sound strategic context

Does the strategy accurately portray the current strategic context and security environment facing NATO? Is the strategy predicated on any specious assumptions?

The Strategic Concept does a good job of portraying the current, present strategic context with robust and specific language on Russia and the threat it poses to the Alliance. However, the cursory treatment of terrorism in two stand-alone paragraphs belies the continued threat posed by transnational terrorism to the Alliance, and certainly seems odd after the Alliance’s 20 years of focus on terrorism as one of its primary concerns.

Defined goals

Does the strategy define clear goals?

Unfortunately, the Strategic Concept, like its predecessor documents, is strong on top-line statements as to purpose and principles of the Alliance, and much less detailed as to specific goals. This is not particularly surprising for a heads-of-state-and-government document but where the Alliance could have been more specific, in particular, on defense investment, the Strategic Concept remains vague. The Strategic Concept treats defense investment, aka defense spending, in the final three paragraphs of a forty-nine paragraph document, and only obliquely references the specific targets for Alliance defense spending of 2 percent of GDP and 20 percent of total budget on procurement, by mention of the Defense Investment Pledge. Again, there is not mention of defense investment in the preface to the document.

Clear lines of effort

Does the strategy outline several major lines of effort for achieving its objectives? Will following those lines of effort attain the defined goals? Does the strategy establish a clear set of priorities, or does it present a laundry list of NATO activities?

Not surprisingly for a consensus document among thirty countries at the head-of-state level, the Strategic Concept presents a laundry list of NATO activities ranging from nuclear readiness to climate change and attacks on cultural property. Without demeaning the existential global threat of climate change or the importance of protecting our shared cultural heritage, it seems that NATO, in taking on these objectives, is stretching itself well beyond its core missions of deter and defend, crisis management, and cooperative security and is not particularly well equipped to do so.

Realistic implementation guidelines

Is it feasible to implement this strategy? Are there resources available to sustain it?

The Strategic Concept does not include guidelines as such given the high level at which it is, appropriately, pitched. In terms of resources, NATO will have the resources to implement the strategy provided that all of its members meet, quickly, the 2 percent and 20 percent targets agreed to in the Defense Investment Pledge. The track record of most NATO members, unfortunately, is not promising in this regard. Notably the United Kingdom Prime Minister appears to have rejected the appeals of his Minister of Defense for a substantial increase in spending, in part to offset the impact of inflation. The concern is that the UK’s actions will provide cover for other states that want to lag in their investments.

#### It’s irrelevant to military capabilities---it’s a mere political trick.

Ed Arnold 7-1-2022, Research Fellow for European Security at ISS "New Concepts but Old Problems: NATO’s New Strategic Concept," No Publication, https://www.rusi.org/explore-our-research/publications/commentary/new-concepts-old-problems-natos-new-strategic-concept//DG

How Much Does the Strategic Concept Actually Matter?

Politically, the Strategic Concept and the unity it represents are very important. However, militarily and operationally, it is less significant. The 2010 Strategic Concept had been moribund since at least 2014, following Russia’s annexation of Crimea, but of course NATO has still been operating effectively since. While a lot of effort has gone into building consensus for Madrid, in many ways the hard work starts now. There is a coherence issue. The Strategic Concept, as NATO’s strategy, comes after the two main plans – SACEUR’s Concept for the Deterrence and Defence of the Euro-Atlantic Area and the future NATO Warfighting Capstone Concept – have already matured.

There was tacit acknowledgement at the Madrid summit that many underlying operational plans would have to be revised. However, with NATO’s strategy transforming, mere tweaks to plans do not seem sufficient, and their core assumptions should be revisited. For NATO’s Warfighting Capstone Concept – how it fights in the future – it is imperative that analysis of Russia’s military performance in Ukraine now becomes the backbone for its development. Moreover, despite the collective might of NATO, it cannot do everything, and the commitment at the 2015 Warsaw summit to a ‘360-degree approach’ to security – both thematically and geographically – risks overstretch. In a hardening world, the Alliance must take the opportunity to go back to its roots and seek support from other actors, such as the EU. It is still expected that a NATO–EU joint declaration will materialise before the end of the year.

### Inherency---AT: StratCon---1AR

#### Doesn’t solve cohesion---alt causes

Lindsay Maizland, 6-30-2022, "NATO Countries Signal Resolve at Summit: What Does It Mean for Russia?," Council on Foreign Relations, https://www.cfr.org/in-brief/nato-countries-signal-resolve-summit-what-does-it-mean-russia//DG

The summit was an impressive show of resolve to counter Russia’s aggression, including through continued diplomatic, economic, and military support for Ukraine. NATO pledged to further expand its military support for its vulnerable allies along the Russian frontier. In particular, the United States announced that it will establish a permanent headquarters for its V Corps in Poland. Most important was the eleventh-hour agreement that Turkey reached with Finland and Sweden, by which Ankara lifted its objections to their joining the alliance and allowed NATO to begin the accession process. However, challenges remain. Burden-sharing is a perennial issue: Even after Russia’s assault on Ukraine, the majority of members fall short of their commitment to spend at least 2 percent of their gross domestic product (GDP) on defense. The laggards include, most importantly, Germany, although it has taken steps recently to meet that target as a multiyear average. Moreover, in the weeks ahead, the alliance’s resolve will be tested, as strains over rising inflation and concerns over energy and food supply mount across the Euro-Atlantic region. In recent weeks, France, Germany, and Italy have expressed interest in finding a negotiated settlement to the conflict, which would likely leave some seized Ukrainian territory in Russian hands. That position is vehemently opposed by Poland and the Baltic states, among others. Though those differences were pushed into the background during this summit, they have not gone away.

#### Doesn’t solve deterrence---intensifies hybrid threats

Hans Petter Midttun, 6-30-2022, "NATO’s Strategic Concept-2022: names Russia as threat, deletes key commitment to act on this threat," Euromaidan Press, https://euromaidanpress.com/2022/06/30/natos-strategic-concept-2022-names-russia-as-threat-deletes-key-commitment-to-act-on-this-threat//DG

When NATO is no longer willing to employ military power to “escalate to de-escalate,” it might be failing as a military alliance. It is reflected in the new strategic concept as it steps away from its commitment to “stop ongoing conflicts where they affect Alliance security”;in its failure to act on Russian violations of international law since 2008; in its failure to respond to the Hybrid War Russia has conducted against NATO and EU members since 2014; and not least, in its failure to respond resolutely to the ongoing attempt to subjugate Ukraine through the use of both military and non-military force. NATO fails to counter the Russian “fait accompli” strategy, using the threat of nuclear escalation as a means to secure freedom to use military force as an integrated part of its increasingly more aggressive foreign policy. As a result, Russia is openly threatening Estonia, Latvia, Lithuania, Poland, and Norway. And the Alliance takes another step backward. Today, Lithuania and Kaliningrad. Tomorrow, Norway and Svalbard. NATO has, however, recognized that the Euro-Atlantic area is not at peace. That’s a hugely important first step towards acknowledging the Russian strategic messaging of being at war.

#### Concept is ambitious, not material---actual implementation is a work in progress

David M Herszenhorn, 6-30-2022, Correspondent for Politico "From Madrid summit, NATO steps into more dangerous era," POLITICO, https://www.politico.eu/article/ussr-allied-leaders-russia-conflict-dangerous-cold-war-nato//DG

“I was present at the NATO summit adopting the former strategic concept — I was foreign minister — and then we had the aspiration of a partnership,” Støre said. But citing “the daily destruction, the extraordinary brutal use of military force” in Ukraine, the Norwegian leader added, “In 2022, I think, you know, nobody doubts the seriousness of the situation.” Among the most crucial decisions taken by leaders at the summit were plans to strengthen NATO’s so-called force posture, including with ambitious plans to be able to mobilize as many as 300,000 troops within 30 days. There was some confusion and disagreement about when such a capability might be achieved, but the resolve among allies to bolster their presence on the eastern flank was not in the slightest doubt The new model is about “more assured availability” of forces from allies, said one senior NATO official. “More readiness, more exercising, more preparation for the locations that these forces might have to deploy to — particularly in defense of the alliance — so that is the heart of what is new. “It’s a work in progress,” the senior official added. “We will continue to work with allies over the next year or so to identify the forces that can be attached to this model and to populate the model. But we know the forces exist … So this is an exercise of pre-identifying forces, which can be linked to defense plans.”

#### It’s exclusively a blueprint---Madrid only created funding

IEU, 7-2-2022, Inisght EU monitoring, "Madrid Summit ends with far-reaching decisions to transform NATO – INSIGHT EU MONITORING," No Publication, https://portal.ieu-monitoring.com/editorial/madrid-summit-ends-with-far-reaching-decisions-to-transform-nato/381914//DG

Leaders endorsed a new NATO Strategic Concept, the blueprint for the Alliance in a more dangerous and competitive world. It sets out NATO’s approach to Russia and to other threats, including terrorism, cyber and hybrid. For the first time, the Strategic Concept addresses the challenges posed by China. Leaders agreed on steps to fight climate change, including targets to cut NATO greenhouse gas emissions and move towards Net Zero by 2050. A new NATO Innovation Fund to help the Alliance sharpen its technological edge was also launched at the Summit. NATO leaders met with key partners to address global challenges and Indo-Pacific partners Australia, Japan, New Zealand, and the Republic of Korea participated together in a NATO Summit for the first time. Allies also recommitted to the fight against terrorism, and addressed NATO’s response to threats and challenges from the Middle East, North Africa and Sahel.

### Inherency---AT: StratCon---Ambiguity

#### StratCons ambiguity means it can’t solve ADV 1.

Benjamin Silverstein, 20 (Benjamin Silverstein is a researcher with experience in the National Laboratory network conducting research on the use of counterspace technologies to support deterrence goals, 8-3-2020, accessed on 7-9-2022, War on the Rocks, “NATO’S RETURN TO SPACE”, <https://warontherocks.com/2020/08/natos-return-to-space/>, HBisevac)

The potential for space-based conflict has never been more apparent. Indeed some view it as inevitable, and in preparation states are adopting policies and doctrine to guide military space activities. Multinational security organizations like NATO are beginning to follow this trend as their adversaries act on intent to weaponize space. Last year, NATO took steps forward by launching a new space policy and recognizing space as an operational domain. The policy itself remains **classified**, **blunting** its ability to support NATO security goals. Unfortunately, the core security benefits of the new space policy are **diminished** as classification levels prevent **open discourse** about **allied resolve** to **protect satellites** from hostilities. By not releasing the terms of the policy, the alliance does not clearly outline if and how Article 5 protections apply to space assets. Even if NATO issued **unambiguous** classified **guidance** or allies privately share an understanding of how to apply collective defense in space, a **classified internal policy** cannot communicate **credible resolve** to an adversary. NATO has yet to concretely affirm the allliance’s commitment to collective defense in outer space.

### Inherency---AT: StratCon---Specific

#### Concept’s loose “deterrence” doesn’t solve---plan’s transparency is key

Victoria Samson, 6-2-2022, office director for the Secure World Foundation "2022 Annual Meeting: Marking 50 Years of Accomplishments and Setting the Course for Challenges Ahead," No Publication, https://www.armscontrol.org/armscontrol2022//DG

That's where things like having transparency about your capabilities and your policies about your programs that can demonstrate good intent by sharing information about responsible behavior are positive ways to look at it. Then, just in terms of ways to move forward, the idea behind the commitment not to test ASAT missile tests is gathering some momentum because it ties into a concern about not deliberating about crate debris on orbit, which everyone agrees is not good because debris—as I said before—can damage anyone whether or not you have a space caterpiece program or not. There's the idea of like no non-consensual close approaches—the idea you don't get up close to another country's satellite without their approval or their understanding because that's a concern—as well as the idea of acting with due regard for others. Some of these ideas are in the 1967 Outer Space Treaty but does not mean that it's still helpful and applicable, so there are ways forward in terms of sharing information and having points of contact for when there's possible conjunctions or close approaches for your space capabilities. These are all good and the last thing I'll say that's really changing is that—particularly for arms control capabilities that are strategic—oftentimes they were seen as solely the prominence of geopolitical superpowers. Yeah, this is a U.S.-Russia thing. Maybe, it's the U.S.-Russia-China thing. Okay, we're bringing India in because they had an ASAT test but no one else. It's not really important. So a lot of countries—the G77—they just didn't see counter space capabilities as something that was relevant to them, but that that attitude is changing because there's a growing recognition that every person on this planet is a user of space data and so every person on this planet has an incentive to make sure that space does not interfere with or it's not deliberately trashed and that it's a stable predictable reliable domain. Countries around the world are starting to recognize this and starting to become more involved in these discussions, so that's what I hope.

### Inherency---Top Level---1AC/2AC

#### Recent NATO Summits have merely re-committed to A5 without clear thresholds---absent, concrete communication and capabilities, adversaries don’t perceive credible deterrence.

Kaitlyn Johnson 21. Deputy director and fellow of the Aerospace Security Project at the Center for Strategic and International Studies. Ms. Johnson supports the team’s strategic planning and research agenda. Her research specializes in topics such as space security, military space systems, and commercial and civil space policy. “NATO in Space” in *Part III: Evolution in Warfare:* *NATO 2030 Towards a New Strategic Concept and Beyond.* Paul H. Nitze School of Advanced International Studies, Johns Hopkins University.Brookings Institution Press, 2021. <https://www.sais.jhu.edu/kissinger/nato-2030-towards-new-strategic-concept-and-beyond> //EM

Communication

Effective communication is foundational to deterrence. The deterrer must communicate that they are both capable of response if attacked, and that this response is a credible threat to an adversary. NATO has a couple of clear foundational articles addressed to this. The most prominent, of course, is Article 5 which underpins collective defense and outlines that an armed attack on one NATO member state is considered an equal attack on all NATO member states. At the June 2021 NATO Summit, the Alliance acknowledged that they included attacks from, within, or to space in the Article 5 declaration. However, without clear declaration and public discussion about the thresholds and considerations of specific attacks in or from space, it will allow for a gray operating zone. For example, Russia has already taken advantage of these undefined thresholds by locally jamming GPS signals during a major NATO military exercise. While this was a reversible effect, and did not physically harm the satellites themselves, it certainly denied the Alliance’s access to space. Communicating what is considered an armed attack against space systems is paramount to establishing an effective deterrence strategy. It is also foundational to pursuing strategies for operation and response in the case of a conflict that extends into or involves the space domain.

NATO Article 6 also presents a challenge for defining and responding to attacks on space forces. As stated, an armed attack includes those “…on the forces, vessels, or aircraft of any of the Parties, when in or over these territories or any other area in Europe in which occupation forces of any of the Parties were stationed on the date when the Treaty entered into force or the Mediterranean Sea or the North Atlantic area north of the Tropic of Cancer.”37 Satellites present a unique challenge to this statement. While they might be considered a force or vessel, satellites in GEO are in orbit over the equator, even if the ground stations they communicate with are in the northern hemisphere. Additionally, satellites in LEO, depending on their orbit and inclination, will always pass over areas not defined above. Would this then indicate that an attack on a satellite does not violate the treaty, so long as it is not orbiting north of the Tropic of Cancer at the moment of the attack? These geographic boundaries clearly do not apply to space assets, yet space assets are the foundation of many modern military capabilities. This discrepancy needs to be publicly addressed by NATO leadership to effectively communicate the Alliance’s deterrence strategy for space. Finally, NATO’s first space policy document was produced in 2019, yet as of September 2021, there is no unclassified version released to the public. This missed opportunity stifles communication of NATO’s space priorities to the public, other international partners, and adversaries.

Space Defenses

A clear way to bolster deterrence by denial is to ensure that attacks on Alliance members’ space systems are difficult to achieve. There are several methods of defending satellites against attack, and not all defenses are useful against every type of attack. Therefore, a varied strategy of passive and active defenses is necessary to ensure the protection of satellites and continued use in a denied environment.

Passive Defenses.

Passive defenses loosely fall into three categories: architectural, technical, and operational.38 Architectural defenses rely on the design of the satellite constellation itself to ensure that the mission and capability can withstand attack or degrade gracefully. A few examples of this are:

1. Disaggregation is the separation of capabilities from one platform to several. For example, the US currently operates communication satellites that have both tactical and strategic—i.e., nuclear—signals. Disaggregation would separate these missions to preserve strategic communications in the event of an attack on tactical communications.

2. Distribution is when multiple satellites are responsible for providing a capability to the operator. The combined data from several satellites ensures that an adversary would have to target all of these satellites to fully deny the capability.

3. Proliferation indicates that a large number of the same satellites are performing the same mission. This increases the overall capacity and size of the constellation and acts as almost a swarm of satellites operating in sync but not reliant on one another to provide capability to the operator.

Technical defenses are those that change the hardware or software of a satellite to protect it against attack. Some of these are commonplace in many operating military satellites today. Examples include:

1. Shielding is a key technical defense that protects vulnerable systems from high levels of radiation. Shielding is already, to some degree, used for some military satellites to protect against the radiated space environment and nuclear effects in space. Increased shielding could protect more satellites against electromagnetic pulses or high-powered microwave weapons.

2. Filtering and shuttering protect sensors on remote sensing satellites from laser dazzling or blinding. Like a filter or shutter on a camera, this technical defense allows only light of a certain wavelength or level of intensity to reach the sensor.

3. Jam-resistant waveforms protect against jamming by encoding the data transmitted on a radio wave to the satellite or back to Earth. Different tactics such as frequency hopping or interleaving may further protect satellites from electronic counter-space weapons.

Finally, operational defenses are those that rely on the operation of the satellite itself. Operational defenses include:

1. Maneuvering a satellite may move it out of harm’s way of an incoming attack. However, maneuvering often takes time and would expend fuel, which shortens a satellite’s operational lifetime.

2. Reconstitution allows nations to quickly replace existing space capabilities by launching more satellites or bringing additional ground stations online.

3. Rapid deployment calls for the quick launch of space capabilities when needed. The pace of launch would likely require extra satellites to be on hand and in storage, and a launch vehicle to be quickly procured and available.

Passive defenses, like those described above, present the best possible option for NATO deterrence by denial and interoperability across different Alliance member capabilities because of the opportunity for technology and standards sharing, as well as the team-centric nature of resiliency for space missions. Sharing technology and standards across space systems, to include best practices, allows nations with disparate space systems and architectures to ensure that a common standard of protection or defense is assured across the mission-set. Countries that have strong cybersecurity for military missions, to include space systems, lead in establishing NATO strategies for strong space cybersecurity. Likewise, Alliance members with redundant mission capability should take the lead on developing best practices for integration and interoperability to ensure a resilient capability in the case of denial of space services.

Active Defenses.

Active defenses are those that target the threat itself, either after the attack has begun or proactive efforts if an attack is deemed imminent. For space systems, this means targeting the counter-space weapon itself, even if it is another satellite. Active defenses against counter-space attacks can either be space- or ground-based.39 Space-based active defenses often include capabilities onboard satellites that will target, degrade, destroy, or distract the attacking weapon. Space-based active defenses could also include separate satellites that host these capabilities, which are deployed to guard a high-value space asset. These ‘bodyguard’ satellites, equipped with onboard active defense systems, have been proposed recently by France.40 Some options for onboard active defenses systems, either on the satellite itself or on defensive bodyguard satellites include: jamming and spoofing, dazzling or blinding lasers, kinetic shoot-back systems, or even the capability to physically seize the counter-space weapon. Ground-based defenses are systems based on Earth that could target counter-space systems and supporting infrastructure. These include cyberattacks on the command-and-control battle management system, jamming or spoofing, a direct-ascent ASAT, or other kinetic attacks on space or ground infrastructure.

The biggest political challenge with active space defenses is that while the user or defender may view them as defensive measures, some of them could also be used offensively as counter-space weapons. Therefore, nations must seriously weigh the political ramifications of investing in active defenses. For NATO, this means a collective conversation and decision about how to address the growing weaponization of the space domain, and whether the Alliance views active defense measures as deepening weaponization or as valued defenses in an increasingly unstable domain.

Space Situational Awareness.

Investing in better knowledge and understanding of the space domain would make a critical impact in decision-making and allow for a better defense of space capabilities. It is difficult to diagnose a disabled or non-responsive satellite. On-orbit servicing satellites (or satellites designed to repair or upgrade other satellites in space) are not yet widely used or available, therefore SSA is critical to determining if a satellite was impaired by an attack or an environmental phenomenon like space weather or debris. It is incredibly difficult to accurately characterize and track all satellites in orbit, but without such capability, political leaders are unable to make confident decisions regarding space systems and defenses. Investing in robust optical, infrared, and radar SSA systems requires a network ground-based and space-based systems. For ground systems, regionally based alliances are less effective. For a full view of near-earth space, SSA systems need several radars around the world in each hemisphere. The credibility and effectiveness of deterrence in space is reliant on SSA and the information and ability to make informed characterizations of incidents.

NATO posture to promote deterrence is incredibly regionally based to the European continent. However, in order to track, detect, and characterize all objects in orbit, NATO needs ground station terminals across the globe, not solely in the European theatre. Despite Luxembourg’s recent agreement to develop a NATO SSA center, cooperating with allies and partners outside of NATO will be critical to ensure a full view of near-Earth orbits.

Interoperability and Partnerships

Key to any multinational alliance and especially NATO, interoperability of space forces and data must be addressed. Space has traditionally been one of the most classified domains, likely due to its origins supporting nuclear arsenals and the intelligence community during the Cold War. This has greatly impacted the sharing of space-based intelligence and data amongst nations, especially from the US to other Allies and partners. These barriers must be reclassified and lowered to build a more effective and interoperable force. NATO forces from all member states must train with access to space assets and data, as well as train for a space-denied environment.

Since NATO no longer operates its own satellites, interoperability among national space assets must also be addressed. NATO must clearly delineate what assets are available and usable for NATO purposes during peacetime or wartime. Looking forward, NATO members must consider how to reduce redundancy, ensure resiliency, and build a cohesive set of space assets that will enable the warfighter and reassure collective defense. An assessment of threats to NATO space missions and the mosaic of defenses that could be employed to assure capability should be thoroughly assessed in order to determine cross-Alliance space defenses. This will require close collaboration and communication about Alliance space systems capabilities and defenses. Clear expectations and honesty about vulnerabilities of certain space systems would allow NATO members to collaborate to create complimentary or resilient space architectures to other NATO allies.

#### Those don’t solve capability gaps for Russia and China to exploit---effectively opening grey zones for China and Russia to test NATO resolve. Only the plan creates united NATO capabilities to deter adversaries.

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Strategic Ambiguity: How Much is too Much?

Overall, the Brussels Communiqué sends a strong signal that the Allies are prepared to defend their interests in space, including through the use of force if necessary. However, the clarity of this message is diluted by the uncertainty surrounding the exact conditions which may prompt the Allies to invoke Article 5 in response to an armed attack. This ambiguity may be seen as an asset: leaving hostile powers guessing the exact conditions that could trigger a forceful military response by the Alliance may prompt those powers to proceed with greater caution.25

Strategic ambiguity thus has its benefits. However, hostile actors may also read it as a lack of resolve. In the present case, at least two factors may encourage such a reading. The first relates to the uncertain parameters of the right of self-defense itself and the ambiguities that surround its application in space.26 For example, could non-kinetic interference against space-based assets or services, such as signal jamming, rise to the level of an armed attack? If so, under what circumstances does such interference satisfy the gravity threshold required to constitute an armed attack?27 Is it lawful to declare a space exclusion zone or to deploy “bodyguard” satellites to defend critical space-based assets in anticipation of an attack in the exercise of the right of self-defense? Having recognized the applicability of Article 5 to space attacks, NATO nations need to develop a shared approach to these and related questions in order to demonstrate unity and resolve.

The second factor relates to the geographical limits that Article 6 of the NAT imposes on the operation of Article 5 of the NAT. The first sub-paragraph of Article 6 deals with attacks on Allied territory. It is clear from the language of this sub-paragraph that armed attacks launched into the territory or islands of NATO members from or through space fall squarely within the ambit of Article 5. Armed attacks launched against their assets in space are caught by the second sub-paragraph of Article 6, which deals with attacks against the “forces, vessels or aircraft of any of the Parties.” While neither the notion of a vessel,28 nor that of an aircraft, 29 extends to objects primarily designed for operation in outer space, the concept of ‘forces’ is broad enough to cover spacecraft and their personnel. There is a catch, however. The second sub-paragraph of Article 6 of the NAT refers to attacks taking place “in or over” Allied territories. This means that, at best, attacks against Allied forces in space are covered by Article 5 only whilst in orbit “over” such territories and above their airspace. Accordingly, the destruction of an Allied satellite may engage Article 5 if the satellite was orbiting over the territory of a NATO nation, but not if it was orbiting over the South China Sea, for instance.30

NATO nations thus face a dilemma. The geographical limitations imposed by Article 6 of the NAT on the operation of their mutual assistance commitment increases the vulnerability of their space assets to hostile maneuvers by potential adversaries, especially in the Southern Hemisphere where the Alliance has the fewest Space Surveillance Network (SSN) assets. To address this vulnerability, the Allies may consider Article 5 to be applicable to attacks against their space assets wherever they may operate, that is without any geographical restrictions. However, extending the scope of Article 5 to cover all around Earth may expose NATO to accusations that it seeks to militarize this domain. Also, such a move would lack credibility unless it is underwritten by capabilities necessary to defend Western space assets and the services they provide.

Ignoring the matter is not an option. China and Russia are known for exploiting legal “grey zone” situations by conducting hostile operations below the traditional threshold of physical violence amounting to an armed attack.31 They are likely to test NATO’s legal readiness and political resolve in the space domain, for example, by using blind spots to undertake nefarious activities such as co-orbital jamming or RPOs. Strategic ambiguity on the geographical scope of application of Article 5 is likely to invite, rather than deter, such hostile probing.

### Inherency---Top Level---Background

StratCon just reclarified A5’s application to space and vaguely postured about deterrence.

<<<FOR REFERENCE>>>

NATO 6-29. “NATO 2022 STRATEGIC CONCEPT.” 6-29-2022. https://www.nato.int/nato\_static\_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept.pdf/

Maintaining secure use of and unfettered access to space and cyberspace are key to effective deterrence and defence. We will enhance our ability to operate effectively in space and cyberspace to prevent, detect, counter and respond to the full spectrum of threats, using all available tools. A single or cumulative set of malicious cyber activities; or hostile operations to, from, or within space; could reach the level of armed attack and could lead the North Atlantic Council to invoke Article 5 of the North Atlantic Treaty. We recognise the applicability of international law and will promote responsible behaviour in cyberspace and space. We will also boost the resilience of the space and cyber capabilities upon which we depend for our collective defence and security.

### Internal---Missile Defense

#### It severs our ability track nuclear missiles via existing, early warning systems.

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In a recent speech, Secretary of the Air Force Frank Kendall highlighted missile warning and tracking as “a no-fail space mission.” He is exactly right.

For decades, adversary nations have observed US military advantages, specifically the unique ability to execute robust long-range strikes. These operations hold key targets at risk — command centers, production facilities, logistics lines, supply depots and more. Destroy the right combination of these and an opposing military force will have a hard time staying in the fight.

That is why adversary nations have doubled down on developing their own long range strike options through a range of missile technologies. They want to hold US homeland targets and our forward operating bases at risk and, consequently, this threat must be blunted.

Key to defeating a long-range strike from our adversaries is having the means to detect, track and counter a range of new and virulent delivery systems. This requires a modernized warning and tracking enterprise comprised of a multi-layered space-based architecture of sensors across all orbital regimes. As Congress debates next year’s defense budget, lawmakers must fund, support and provide attentive oversight for this ambitious but critical piece of national defense architecture in space.

The United States is not beginning from scratch. Missile warning and tracking systems existed since the early days of the Cold War. They are essential today for detecting nuclear-armed ballistic missile launches. Capabilities like Space Based Infrared System (SBIRS), paired with ground radars, are optimized for this task. The satellites, which are in high geosynchronous orbits, provide a broad view of the globe and can detect the heat signature of a missile’s rocket plume. The ground radars can then track the inbound threat.

However, our adversaries understand the limitations of the current system, motivating them to invest in a new generation of hypersonic weapons and other maneuvering, non-ballistic missiles that take advantage of blind spots in our current warning and tracking enterprise. These new systems have smaller heat signatures to detect from space, and they fly less predictable tracks. This requires the US to respond with a multi-orbit sensor architecture that can detect and track these new threats in new ways, while still keeping an eagle’s eye out for ballistic missile launches.

Importantly, the next generation of missile warning and tracking capability must be resilient and not easily targetable by an adversary. Due to actions by China and Russia, space is no longer a peaceful sanctuary for defensive military applications. Both nations are fielding anti-satellite (ASAT) weapons capable of destroying US space-based missile warning sensors. Current US satellites are vulnerable as they fly fixed, predictable orbits and lack sufficient defenses.

### Internal---Situational Awareness---Climate

#### Domain awareness solves climate change.

Jamie Patrick Shea 22. Senior fellow for peace, security, and defense at Friends of Europe and former deputy assistant secretary general for emerging security challenges at NATO. “NATO and Climate Change: Better Late Than Never.” GMFUS. 3-11-2022. https://www.gmfus.org/news/nato-and-climate-change-better-late-never //EM

Introduction

It has taken some time for the security implications of climate change to find their way on to the NATO agenda. This can be explained by the many security challenges that the alliance has faced in the 21st century—a more assertive Russia in NATO’s eastern neighborhood, the withdrawal from Afghanistan, the threat of cyberattacks and hybrid warfare campaigns, and now the implacable rise of China as a global military and technological power. At the same time, for a security community used to reacting to—not anticipating—crises and to dealing with concrete and imminent challenges, climate change may well have seemed difficult to assess. It would have a future, not present, impact and affect areas of the world, such as sub-Saharan Africa or the Middle East and Central Asia, where the alliance was little engaged. In the international arena, the focus was on mitigation, trying to significantly reduce greenhouse gas emissions, rather than on adaptation, making our societies more resilient to cope with the shocks that climate-change-driven events would more frequently engender. Once the dimensions of climate change as a security challenge became clearer, policymakers would have time to adjust their strategies and capabilities.

Yet the past few years have underscored that the future is now. There is no more luxury of time to respond to this challenge. The planet is sending repeated warnings that climate change has reached a tipping point and poses a constant threat to the functionality of economies and societies. This will make larger areas of the globe uninhabitable, as living with 50 degrees Celsius (122 degrees Fahrenheit) or hotter becomes the norm rather than the exception. The past three summers have been the hottest on record; the past five years have seen the largest numbers of category 4 and 5 hurricanes. Devastating forest fires have displaced people from the west coast of the United States, western Canada, Siberia, Greece, Portugal, and Australia. Colorado recently experienced such a fire in the middle of the winter. In January, meteorologists recorded the most extreme temperature vortex ever, with minus 50 degrees Celsius (minus 58 degrees Fahrenheit) in the Arctic and plus 50 degrees Celsius (plus 122 degrees Fahrenheit) in Australia. We have become used to heavier rainfalls and more widespread flooding. Rising sea levels have placed entire cities and even countries in jeopardy, as we heard in the powerful words from Bermuda’s prime minister, representing the small island states, at 2021 United Nations Climate Change Conference (COP26) in Glasgow last November. Indeed, 50 percent of Asia’s population today lives in coastal cities. The biodiversity that has regulated the smooth functioning of our natural habitat for thousands of years is being rapidly depleted. Prolonged droughts affect freshwater availability and put acute stresses on food production and rural livelihoods, leading the United Nations to forecast that by mid-century, 40 percent of the globe’s land surface will be subject to acute water stress. We will need to contend with more climate refugees than those today on the move because of conflicts or poverty (currently an all-time high of 26 million).

Climate change is arguably the first truly global security challenge in that, according to UN reports, only 11 out of the current 193 UN member states do not currently experience its impact in one form or another.

Only belatedly have we become aware of the role that droughts play in exacerbating social and political tensions in places such as Syria, Darfur, and Afghanistan. Of course, not every natural disaster can be laid at the door of climate change, as earthquakes in Haiti or the recent eruption of an undersea volcano near Tonga attest. Moreover, the planet’s climate has rarely been stable, and historians have documented extreme cold spells in the 17th century or devastating droughts in biblical times. It was, after all, the catastrophic Lisbon earthquake in 1757 that for Voltaire ended the 18th century’s age of optimism. Yet the mountain of scientific evidence produced by the UN’s Intergovernmental Panel on Climate Change points to the role of global warming as a force multiplier for more frequent and extreme weather events, giving the planet less time to recover from one natural disaster before the next one strikes, thereby producing a cumulative destructive effect. Climate change is arguably the first truly global security challenge in that, according to UN reports, only 11 out of the current 193 UN member states do not currently experience its impact in one form or another. Any organization, like NATO, that tries to address climate change thus faces the dual challenge of responding to individual flash points (such as extreme weather events putting lives at risk or leading to social breakdown), while simultaneously understanding how climate change is shaping the future of global geopolitics, making future conflicts over land, water, or resources more likely in the longer term. Getting these predictive models right is essential if the allies are to devise the preventive strategies to head off the worst-case scenarios while mitigating the worst consequences. Thus, it was no surprise that US President Joe Biden’s administration ordered a National Intelligence Estimate of the security implications of climate change as one of its first acts upon taking office.

The first time the NATO Response Force (NRF) deployed was to Kashmir in 2006 to help Pakistan restore infrastructure and communications after a major earthquake.

The military forces of NATO countries have played an increasing role in responding to extreme weather events in recent years. In fact, the first time the NATO Response Force (NRF) deployed was to Kashmir in 2006 to help Pakistan restore infrastructure and communications after a major earthquake. In recent years, alliance military forces have been increasingly pulled into civil defense tasks. British, French, and Dutch marines and engineers have gone to the Caribbean to restore order in the wake of hurricanes that have paralyzed the normal process of government. Military firefighters and aircraft have been mobilized to combat forest fires in the United States, Canada, and Europe. British and German forces have been called up to build flood defenses, evacuate flood victims, and build pontoon bridges or reconnect power lines. Military hospitals and medical personnel have helped local authorities cope with extreme heatwaves affecting the elderly and other populations at risk. The military with their rapid-response capabilities have become the partner of choice to the civil emergency authorities within NATO countries in responding to climate-driven events. This has also been the case with other shocks that may well be linked indirectly to climate change, such as the coronavirus pandemic, which result from stresses on the natural environment and the interface between animals and humans. The pace of military deployments within alliance member states has reached such an extent that some NATO commanders are worried that this could have deleterious consequences for training and the retention of war-fighting skills.

In the process of deploying to climate-stressed zones, characterized by extreme weather events or hotter or colder conditions, NATO’s military forces have become aware of how climate change impacts their own ability to operate. For instance, the Pentagon has assessed that two-thirds of US military bases, especially along coastlines, are vulnerable to rising sea levels or extreme weather events. Hampton Roads in Virginia, which is important to NATO as the home of Joint Forces Command Atlantic and the US Second Fleet, has been assessed as especially vulnerable. Hotter temperatures, greater frequency of high winds, storm surges, or increased salinity in the oceans have led NATO military commanders to review both the resilience of their equipment (for instance, the performance of ship turbines) or the dependency of military operations on fossil fuels. In Afghanistan, for instance, helicopters and vehicles needed more than average maintenance because of dust storms and persistent high temperatures, while the high consumption of gasoline required lengthy and dangerous supply lines from Pakistan into Afghanistan that jihadists targeted. At one stage, NATO planners calculated that a $2 gallon of gasoline cost over $100 by the time it reached a NATO ISAF unit in Helmand or Kunduz.11Amory Lovins, “DOD’s Energy Challenge as Strategic Opportunity,” Joint Forces Quarterly, Issue 57, second quarter, 2010. This certainly motivated the allies to experiment with smart energy camps, powered by solar and wind generators, which were demonstrated at NATO trials such as the annual Capable Logistician exercise. The Pentagon, with an annual fuel bill surpassing $ 25 billion, has been graded as the 43rd “country” in the world in terms of fossil fuel emissions.22Neta Crawford, Pentagon Fuel Use; Climate Change and the Costs of War, Boston University paper, June 2019. Accordingly, NATO military forces have faced the twin task of fine-tuning their modus operandi and added value in supporting the humanitarian response to climate change, while adapting their own doctrine, training, and capabilities to operate in these more demanding conditions.

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NATO’s purpose has always been to defend its populations against challenges that evolve into concrete security threats and that require military forces or military organizations. The criterion has been the added value that the alliance can bring to bear. Sometimes this means that NATO is in the lead and generates the bulk of the response from within its own ranks and capabilities. This is obviously the case with territorial collective defense, particularly as it applies to Russia’s military buildup on NATO’s eastern borders at the present time. In other cases, the alliance functions in a supporting role, integrating its capabilities with those of other institutions and actors as part of a networked, comprehensive approach. What NATO brings to the table here are its analytical and intelligence cells, its strategic planning and foresight capabilities, its political consultation, joint assessment and information-sharing structures, its web of partnerships with non-member states and other international organizations, and its political-military command and control and operations network from HQ to the regional level. Few other organizations have all this machinery under one single roof. Consequently, as the climate change community has gradually accepted a role for the military in addressing climate change—after initially fearing that this would put too much emphasis on adaptation at the expense of the primary political goal of reducing carbon emissions—pressure has built on NATO to use its spectrum of capabilities in a more coherent, systematic way. The mounting urgency and universality of global warming require every institution to step up and play its part within its means and capabilities. The broad spectrum of NATO assets means that it can contribute in multiple supporting ways to a UN-led effort both to reduce global warning and adapt to the climate impacts that are already locked in, even if that warming can be limited to 1.5 to 2 degrees Celsius over pre-industrial levels. The question now is how to optimize all these NATO assets so that the alliance can receive and transmit expertise and make its contribution count.

NATO Secretary General and former UN climate envoy Jens Stoltenberg has usefully led the way. At the Brussels summit in June 2021, he declared that climate is not just a trans-boundary ecological crisis but a security crisis as well. Stoltenberg skillfully used his NATO 2030 reflection exercise and the review carried out by the group of experts he appointed to generate public pressure and build the case (against initial skepticism from some allies) for a formal NATO role in addressing climate change. Before the summit, NATO foreign ministers endorsed a joint analysis of the security implications of climate change. One paper recognized climate change not only as a threat to human security per se, but also as a force multiplier which could accelerate and intensify preexisting tensions and conflicts, many of which, because of their location close to NATO’s borders, could impinge directly on the security of the alliance.33Neta C. Crawford, Pentagon Fuel Use, Climate Change, and the Costs of War, Brown University, 2019. At the Brussels summit, the allies adopted a Climate Change and Security Action Plan broken down into four broad implementation categories. These are awareness, mitigation, adaptation, and partnerships.

Awareness

In the first area, awareness, NATO possesses a range of sensing and mapping instruments that can collect data on climate trends and correlate and fuse this data into a composite picture. NATO navies, especially the United States’, have sophisticated oceanographic and meteorological tracking sensors that can plot changes in the jet stream or in the melting of the Arctic polar ice. The NATO Centre for Maritime Research and Experimentation at La Spezia, Italy, has been doing this work in the Mediterranean and Atlantic for many years and has its own research vessel, the Alliance. As NATO develops more capability in space using a mix of national military and commercial satellites, it will also be better able to track ocean warming and land phenomena such as desertification. The EU’s new generation of Copernicus satellites are already able to do this. This data collection and fusion will not enable NATO to predict outbreaks of popular protest or specific migration flows from arid rural communities, but by tracking climate-stressed areas, it can indicate likely pressure points and feed into an international watch list or early-warning system. The question is how and where will the alliance plug in its strategic forecasting and modeling: directly into the UN (UN Environment Programme, Intergovernmental Panel on Climate Change), into the EU or the NGO climate change community, or back to allied governments to use as they see fit? Canada has offered to host a NATO Climate and Security Centre of Excellence to foster the exchange of information and expertise among allies and partners. One of its first tasks could be to set up a remote data-sensing network where forecasting and modeling could be centralized and made immediately accessible to the global climate community of interest (UN and agencies, international bodies, governments, and NGOs) on a pooling basis. This could extend to complementarity in the sharing of satellite observation data based on common links and protocols. An exchange between NATO and EU satellite data would be a good place to start. Another task is to see how data can be used within NATO to support evidence-based decision-making.

Mitigation

In the area of mitigation, the alliance is targeting the reduction of its own CO2 emissions from its military equipment and operations. Here it is under pressure from the NGO community to set the same targets for emissions reductions that allied countries have agreed to in their Nationally Defined Contributions to the COP 26; that is to say, around 50 percent by 2030 and net zero by mid-century. Given the priority of collective defense in NATO at the moment and the need for fossil-fuel-guzzling fighter aircraft and tanks, meeting this target may prove impossible. Collective defense also necessitates large-scale military field exercises rather than the table-top simulations that were used in times of lesser tension.

NATO could consider setting up a Green Fund to help finance trials and demonstrations and to help the less advanced allies make the transition to green energy.

Yet NATO forces can go green in many other areas, such as transporting supplies by rail and waterways rather than road. Battery-operated vehicles and electric-powered robots will certainly play a larger role in logistics and rear operations. Drones will reduce the numbers of aircraft and ships that the alliance needs to maintain and deploy. 3D manufacturing will also allow for cheaper and more energy-efficient production of many of the weapons systems and components that NATO armies use, and the smart energy camps already referred to can significantly reduce the operating costs of the large number of headquarters and bases in the NATO command structure. NATO is a natural venue for allies and partners to organize trials and experimentation, exchange best practices and experience, and use NATO’s system of certification and STANAGs (standardization agreements) to set common standards and promote interoperability for green energy equipment. Currently the alliance is working on a common methodology for measuring military CO2 emissions. It will be important for this to be rigorous, as it will be scrutinized carefully by the NGO community, who no doubt will be pushing, too, for NATO to show transparency and accountability in publishing the results annually. The willingness and ability of the allies to input reliable data in a common timeframe will be crucial to the credibility of the process. Ideally these climate-related inputs should be part of NATO’s defense planning process and setting of capability targets, which would help ensure that they receive high-level attention in capitals. In view of Secretary General Stoltenberg’s push for more common funding, NATO could consider setting up a Green Fund to help finance trials and demonstrations and to help the less advanced allies make the transition to green energy.

Adaptation

The next line of effort concerns adaptation. This is helping other countries to adapt to the challenges of climate change as well as using NATO’s military forces to respond to the extreme weather events and natural disasters that were described earlier. This area is more tentative and even problematic for the alliance. In the first place, it depends on how active NATO will be “out of area,” and in conducting nation building, stabilization, and training missions beyond its borders now that its mission in Afghanistan is over. Although Stoltenberg has pushed the training of local forces as a future role for the alliance, and as a cheaper alternative to risky interventions, the current primacy of collective defense within the alliance will limit the appetite to take on new operations. Certainly, NATO is continuing its training mission in Iraq and is using regional training centers in Jordan, Kuwait, and even Mauritania. It has signed a technical cooperation agreement with the African Union and has a liaison office in Addis Ababa—the structures are there to work on climate change resilience issues if the will and resources are there on both sides. Yet it is the European Union that is launching new missions at the moment, with EU training missions in Mali, Burkina Faso, and most recently Mozambique. The local partners are mainly interested in military assistance to fight jihadists and anti-government militias. So it is not certain that they will want to divert scarce resources to climate change resilience, even if NATO has good products to offer. When it comes to emergency relief, NATO forces, particularly the rapid reaction units, have the capacity to provide immediate assistance, for instance in the distribution of relief supplies or the repair of telecommunications infrastructure. Yet, at a time of constant tension with Russia, the North Atlantic Council will be reluctant to allow these precious spearhead forces to depart to the other end of the globe, no matter how noble the cause.

Yet, at a time of constant tension with Russia, the North Atlantic Council will be reluctant to allow these precious spearhead forces to depart to the other end of the globe, no matter how noble the cause.

Allies may also be unwilling to contribute forces to NATO humanitarian missions if there are no common funding arrangements and they have to pick up all the costs themselves for contingencies that they could not have foreseen. This cost-sharing debate cast a long shadow over the deployment of the Response Forces (NRF)to Kashmir in 2006. (The fact that Poland, Spain, and Italy happened to have been the main NRF contributors at the time of the earthquake meant that they bore most of the costs of what was supposed to be a joint NATO operation.) Moreover, allies tend to use their own national forces to deal with natural disasters at home, such as floods, storms, and bush fires. Yet there are exceptions, such as the assistance that Turkey and Greece have sent to each other in the aftermath of earthquakes or the water-spraying aircraft that some allies sent to Greece to douse forest fires last summer. Covid-19 has also brought some useful cross-border cooperation among Europe’s militaries, as in patient transfers. If we link migration to climate change (as we will undoubtedly do more in the future), then NATO can claim a useful supporting role to the EU in working with its border agency, FRONTEX, in monitoring migration across the Aegean Sea and in providing intelligence and tanker capacity to the EU’s Sophia maritime mission off the coast of Libya.

There are plenty of other institutions and options besides NATO in this area. Hence, the alliance will need to ponder carefully on where its niche roles and added value reside.

Yet this point only underscores that the EU has most of the same military assets as NATO for emergency relief and far more civilian resources as well. Its Crisis Management Centre can do the same clearinghouse job, matching demand with supply, as the alliance’s Euro-Atlantic Disaster Relief Coordination Centre. The latter is often activated during crises but not much used, although in all fairness it was somewhat more active in organizing the transport of medical supplies and protective clothing between allies during the Covid-19 pandemic. The EU’s humanitarian aid office, ECHO, is also more closely tied to the UN’s Office for the Coordination of Humanitarian Affairs (OCHA) than the NATO structures. This is not to argue that NATO has no role in Adaptation. Individual circumstances will always matter. But there are plenty of other institutions and options besides NATO in this area. Hence, the alliance will need to ponder carefully on where its niche roles and added value reside. A dialogue with the EU, UN, and regional organizations might at least be useful to share experiences and lessons learned.

## Solvency

### Solvency---Military Key---Generic---2AC

#### FYI---the Air Force Space Command (aka the Space Force as of 2021) controls all of the military’s satellites.

Space Command, Public Affairs Office 17. “Defense Support Program Satellites.” Air Force Space Command (Archived). 3-22-2017. https://www.afspc.af.mil/About-Us/Fact-Sheets/Display/Article/1012648/defense-support-program-satellites/ //EM

Mission

Air Force Space Command-operated Defense Support Program (DSP) satellites are a key part of North America's early warning systems. In their 22,300-mile, geosynchronous orbits, DSP satellites help protect the United States and its allies by detecting missile launches, space launches and nuclear detonations.

### Solvency---AT: Say No---AT: Canada

#### Canada says yes---AND the US ensures they follow-on.

Lee Berthiaume 19. Reporter at the Canadian Press. “Canada's U.S., NATO allies developing divergent views on weaponizing space.” National Post. 11-24-2019. https://nationalpost.com/news/canada/canadas-u-s-nato-allies-developing-divergent-views-on-weaponizing-space //EM

The federal government’s 2017 defence policy laid out a broad vision for the Canadian Armed Forces’ operations in space, which recognized its importance to the country’s peace, security and prosperity — and the need to ensure satellites and other assets are protected.

Because of Canada's alliance with the United States, there might be some pressure to adopt or toe a very similar line to the United States

The policy also spoke to the need to work with Canada’s intelligence partners known as the Five Eyes — the U.S., United Kingdom, Australia and New Zealand — “with the aim of strengthening deterrence (and) improving the resilience of space systems on which Five-Eyes militaries rely.”

Yet it also called for Canada to work with other countries to promote “the peaceful use of space and provide leadership in shaping international norms for responsible behaviour in space” while supporting efforts “to ensure that space does not become an arena of conflict.”

“There are members in (NATO) who are vehemently opposed to the entire idea of waging conflict in space, among which Canada is one,” said Kuan-Wei Chen, who is overseeing development of a manual dealing with international law and the use of military force in space.

“Canada has become quite a leader in trying to establish fundamental principles or standards of space operations to ensure space is used for peaceful purposes.”

The federal government in July called for new ideas and technology to help protect Canadian satellites from natural threats such as solar weather and space debris, as well as cyberattacks, signal-jamming, lasers and anti-satellite missiles.

But the measure is intended to be defensive in nature and address the government’s stated desire to make Canada’s military and civilian satellites more resilient to threats. So far there are no indications the government is looking at offensive space capabilities.

### Solvency---AT: Say No---AT: Germany

#### Germany says yes---they are invested in securing space assets.

Richard Speed 7-5. Reporter at the Register. “Germany offers plan to tackle satellite cyberthreats.” The Register. 07-05-2022. https://www.theregister.com/2022/07/05/bsi\_satellite\_baseline/ //EM

The German Federal Office for Information Security (BSI) has put out an IT baseline protection profile for space infrastructure amid concerns that attackers could turn their gaze skywards.

The document, published last week, is the result of a year of work by Airbus Defence and Space, the German Space Agency at the German Aerospace Center (DLR), and BSI, among others. It is focused on defining minimum requirements for cyber security for satellites and, a cynic might say, is a little late to the party considering how rapidly companies such as SpaceX are slinging spacecraft into orbit.

The guide categorizes the protection requirements of various satellite missions from "Normal" to "Very High" with the goal of covering as many missions as possible. It is also intended to cover information security from manufacture through to operation of satellites.

The "Normal" category correlates to damage that is limited and manageable. "High" is high-consequence damage that "can significantly limit the operation of the satellite system." As for "Very High," the attack could result in shutdown and "reach an existentially threatening, catastrophic extent for the operator or the manufacturer."

The detail is impressive, although the document is more a baseline of what requires attention (via a checklist) rather than a straightforward set of instructions. Phases of the satellite lifecycle includes design, testing, transport, commissioning operation, and finally decommissioning. Then there are the networks and applications used to support the spacecraft itself, right down the level of subnet or server room.

### Solvency---AT: Say No---AT: Turkey

#### Turkey says yes---Erdogan is in full support of space capabilities that are especially from the US!

Arzu Geybullayeva 22. Azerbaijani columnist and writer, with special focus in digital authoritarianism and its implications on human rights and press freedom in Azerbaijan. “Erdoğan's priorities turn to space as earthly problems mount in Turkey.” Global Voices. 5-24-2022. https://globalvoices.org/2022/05/24/erdogans-priorities-turn-to-space-as-earthly-problems-mount-in-turkey/ //EM

As part of its national space program, Turkey's President Recep Tayyip Erdoğan unveiled plans to have its citizens serve aboard the International Space Station. On May 24, the Directorate of Communication published a presidential circular on the “National Space Program Strategy Document.” The eight-year strategic plan prepared by the Turkish Space Agency will serve as a roadmap for “coordinating Turkey's vision, strategy, goals, and projects in the field of space policies.”

Applications are now open for anyone under the age of 45, with a degree in engineering, the sciences, or medicine with a proficiency in English, to submit their application to fly into space. Other criteria include height, sight, and weight specifications. Two candidates will be selected from the applicant pool but only one will fly after receiving the necessary training, reported the online news platform Diken.

This isn't the first time Erdoğan has set his sights beyond earth. In 2021, he unveiled plans to land on the moon by 2023. “The first rough landing will be made on the moon with our national and authentic hybrid rocket that shall be launched into orbit in the end of 2023 through international cooperation,” Erdoğan said at the time. The year 2023 marks the centennial of the Turkish Republic.

Speaking at the Global Space Exploration Conference (GLEX) in 2021 Serdar Hüseyin Yildirim, president of the Turkish Space Agency (TUA), said the country intends to launch a domestically-built rover by 2028/2029. A prototype will fly to the moon in late 2023 added Yildirim at the time.

President Erdoğan spoke with SpaceX and Tesla founder Elon Musk in December 2021 about possible cooperation on satellite and space technology reported DW at the time. The country has launched a Turksat 5A satellite into space in January 2021 using a SpaceX rocket according to reporting by Al Monitor.

#### In fact, Erdoğan cares the most about satellites!

The Office of President Erdoğan 22. “Presidency Of The Republic Of Turkey: “Satellite technology is one of the areas in which we make the biggest progress.” 06-14-2022. https://www.tccb.gov.tr/en/news/542/138388/-satellite-technology-is-one-of-the-areas-in-which-we-make-the-biggest-progress- //EM

Making a speech at a ceremony for TÜRKSAT 5-B Satellite’s entry into service, President Erdoğan said: “We have been taking steps to elevate our country to the level it deserves in every area from aerospace industry to developing our own satellites, preparing scientists for space programmes to sending vehicle to lunar surface. In this regard, satellite technology is one of the areas in which we make the biggest progress.”

Making a speech at the ceremony, President Erdoğan noted that TÜRKSAT 3-A, launched in 2008, was still operational, and said: “We have sent other satellites to the ‘space homeland’ in the meantime. TÜRKSAT 4-A took its place in space in 2014 and TÜRKSAT 4-B in 2015. We are now adding new ones to them. Having launched TÜRKSAT 5-A and TÜRKSAT 5-B last year, we have become one of the few countries capable of sending two satellites to space in the same year.”

Highlighting that İMECE, Türkiye’s reconnaissance satellite developed by Turkish engineers, was scheduled to be launched in January 2023 and TÜRKSAT 6-A in mid-year 2023, President Erdoğan said that the number of Turkish satellites in space would rise to 10.

“It is our debt of honor to defend, with the National Space Programme, our country’s rights in space just like on land, at sea and in air,” stated President Erdoğan. “We have been taking steps to elevate our country to the level it deserves in every area from aerospace industry to developing our own satellites, preparing scientists for space programmes to sending vehicle to lunar surface. In this regard, satellite technology is one of the areas in which we make the biggest progress.”

### Solvency---Attribution

#### SSA gaps are utilized by adversaries---the AFF ensures effective deterrence through intel sharing and attribution.

Chad Keller, 18 (Chad Keller, Graduate of the United States Army War College, 1-4-2018, accessed on 7-10-2022, Army War College, “The Crumbling Sanctuary: Why America Must Restore Space Security”, https://publications.armywarcollege.edu/pubs/3606.pdf, HBisevac)

Gaps in space situational awareness can be exploited by **malicious actors** to conduct **space attacks**, while making it **difficult** for the international community to **attribute** their actions.140 Additionally, increasingly small satellites could put a strain on the ability of the United States to track those objects with current technology.141 The United States must enhance its existing capabilities to **monitor activities** in space and to develop increasingly **accurate sensors**, in order to be able to identify **nefarious actors** and **provide attribution** for any violations of norms, laws, or agreements.142 Such a system would enhance deterrence, since aggressors would be less likely to act if their actions could be **attributed**. Beyond space situational awareness, America must have the proper intelligence about the plans and intentions of space adversaries and competitors in order to properly defend itself, thwart new anti-satellite technology, and preemptively attack ground-based installations if needed.143 To that end, Washington must expand its space surveillance network, to better understand adversaries’ locations, capabilities, and movements in space.144

### Solvency---Deterrence

#### Deterrence is key---solves confrontation before it has a chance to escalate.

John Klein, 19 (Dr. John Klein, Senior Fellow and Strategist at Falcon Research, Inc. and Adjunct Professor at George Washington University’s Space Policy Institute, PhD in Strategic Studies from the University of Reading, 9-9-2019, accessed on 7-10-2022, Real Clear Defense, “Towards a Better U.S. Space Strategy: Addressing the Strategy Mismatch”, <https://www.realcleardefense.com/articles/2019/09/09/towards_a_better_us_space_strategy_addressing_the_strategy_mismatch_114728.html>, HBisevac)

A Better U.S. Space Strategy

To address a perceived first mover advantage, there should be an increased focus on **deterrence by denial**, or what others have called dissuasion. Often, dissuasion is used when describing actions “that should be taken against those identified as posing a threat to American interests prior to such potential adversaries having the actual capability to pose a danger.” To be effective, dissuasion activities must occur **before** a threat **manifests itself**. Dissuasion includes “**shaping activities**,” which can be nonmilitary in scope and are conducted during **peacetime**. A shaping example includes growing the number of allies and partners who **demonstrate resolve** in preserving the peaceful and unfettered access to space.

A strategy incorporating dissuasion seeks to convey the **futility** of conducting a hostile act, thereby causing a potential adversary’s leadership **not** to pursue a military **confrontation** in the first place. Potential adversaries may be **dissuaded** if they conclude that an attack in space will be **ineffectual** in achieving the desired effect. In the parlance of today’s U.S. space professionals, this is the realm of space mission assurance. **Space mission assurance** may include cross-domain or alternative governmental, commercial, or **international capabilities** that result in a potential adversary **not** seeking a military confrontation. Therefore, mission assurance measures—including the internally focused **resiliency characteristics** of disaggregation, distribution, diversification, deception, protection, and proliferation—are all **appropriate** for **promoting dissuasion** in space. To be clear, deterrence by punishment should still have a part in U.S. space strategy, but there is a demonstrated need to focus more on dissuasion efforts. Suitable space dissuasion efforts include fielding **multi-mode ground** terminals that utilize a variety of satellite communication frequency bands, ensuring multiple launch vehicle options and dispersed geographic spaceport locations, and contracting with several commercial Earth imaging and geolocation service providers.

### Solvency---Hardening

#### Hardening makes space systems resilient.

Alexander Chanock 13. J.D. Candidate 2014, UCLA School of Law; Claremont McKenna College, 2011. “The Problems and Potential Solutions Related to the Emergence of Space Weapons in the 21st Century.” Journal of Air Law and Commerce. Volume 78, Issue 3. https://scholar.smu.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1327&context=jalc

One major argument that space doves make is that space warfare is impractical and there are other more efficient means of addressing the vulnerability issue.99 Instead of trying to use the military to protect satellites, the United States should find ways to make satellites less susceptible to attack.100 One way of achieving this goal is to develop defensive mechanisms for satellites.0 ' For example, the United States could develop maneuvering capabilities for satellites so that they could potentially dodge in coming missiles.' 2 They could also harden satellites, which would entail adding an armor-like layer to satellites to protect them from nuclear radiation, which normally renders satellites ineffective.1 0 3 The cost of this latter improvement is not great; it is estimated that it would only cost 2% to 3% more than the original price for low-orbit satellites. 04

#### Hardening is key---countermeasures decrease and deter attack risks.

Chad Keller, 18 (Chad Keller, Graduate of the United States Army War College, 1-4-2018, accessed on 7-10-2022, Army War College, “The Crumbling Sanctuary: Why America Must Restore Space Security”, https://publications.armywarcollege.edu/pubs/3606.pdf, HBisevac)

A key component of any space strategy should be for the United States to invest in **technology** and programs that will help to harden and protect its **space-based assets**. Equipping U.S. military and civilian sat**ellite**s with countermeasures can be an effective, albeit a costly, means of protecting them from attacks. Typical countermeasures from attacks include hardening satellites, providing them with maneuver capabilities, having redundant systems, being able to quickly repair or replace damaged or destroyed equipment, dispersion of satellites into **wide areas** of space, and denial and deception about a satellite’s capabilities.145 Certain countermeasures can be used to protect satellites from specific types of attacks. For example, equipping satellites with shuttering equipment can provide effective countermeasure against laser attacks.146 Countermeasures can deter a country from attacking a satellite, because they increase the chances of that attack failing, while giving the United States justification for conducting a counterattack.

### Solvency---Multilat Key

#### Allied cooperation under U.S leadership is the only way to solve---expanded capabilities, coherent international approach, coalesce thinking, resiliency, and interoperability.

Robert **Wilson et al. ‘21** (Robert S. Wilson, Colleen Stover, and Steven R. Jordan Tomaszewski, 2021, accessed on 6-9-2022, Center for Space Policy and Strategy, “Defense Space Partnerships: A Strategic Priority”, https://aerospace.org/sites/default/files/2020-09/Wilson\_DefensePartnerships\_20200916.pdf, HBisevac) \*\*has DoD burden sharing lines\*\*

The United States has not fully **leveraged** its **allies** and defense partners in the **space domain**. This is partly due to significant obstacles, like classification and releasability, that have impeded more and deeper defense space partnerships. It also reflects the legacy of the Cold War, a period when space was dominated by a few major powers. **A new space era is upon us**. Allies and partners are developing **significant space systems** that can **enhance U.S. capabilities**.Concurrently, potential **adversaries** are developing weapons that could threaten U.S. and allied assets. The **seriousness** of the **threat** demands a more **concerted** and **international approach**. In this new space era, U.S. leadership should treat defense space partnerships as a **strategic priority**.

Introduction

The United States has defense agreements with countries that represent nearly a quarter of humanity, many of which are spacefaring nations.1 Yet, the United States has only had limited success in converting some of its defense relationships into space security relationships. In 2019, the United States and Norway agreed to include U.S.-protected communications payloads on Norwegian satellites that will be launched in late 2022, which will mark the first time the United States has put operational national security payloads on a foreign satellite.2 Although NATO’s nuclear deterrent posture comprises a mix of U.S. and allied capabilities, and British submarines deploy U.S.-made submarine-launched ballistic missiles, we are just beginning to leverage the capabilities of our international partners for military space assets and operations.\*3

Unlike during the Cold War, when space was dominated by a few major powers, space has become increasingly democratized. As of 2019, over **60 countries** have a national space budget, over **70 countries** own or operate satellites in orbit, and **nine countries**—plus the European Space Agency—can independently launch into orbit.4 This growing international engagement in space presents enormous opportunities for **defense space partnerships**.

This new era also presents serious risks. Space is becoming **increasingly contested**. In April 2020, Russia tested a direct ascent anti-satellite missile.5 A few months earlier, U.S. officials called out Russian satellites for trailing a U.S. national security satellite.6 Also in April 2020, Chris Ford, a senior official in the State Department, said that China was exploring capabilities to attack U.S. satellites, including in high orbits such as those of U.S. nuclear command, control, and communications satellites.7 The seriousness of the threat underlines the importance of **defense space partnerships**—the United States should not try to manage these threats purely **on its own**.

To enable more international defense space partnerships, U.S. leadership will need to treat such partnerships as a strategic priority, not as an afterthought or add on. This chapter looks at advantages, challenges, and mitigations for broadening and deepening security space partnerships that could prompt key decision points during the next presidential term.

Advantages of Partnerships

Defense space partnerships offer **considerable advantages**. These include allowing the United States to **expand** and **improve** its **network** and **capabilities** with fewer resources, **deter adversaries** from attacking its systems, and **coalesce allied** and partner **thinking** on space security concepts.8 A look at some common space maturity metrics suggests that many of the most mature space nations in the world are partners of the United States. Specifically:

The United States and its close partners make up 11 out of the top 15 countries with the biggest national space budgets.9

Of the roughly 2,700 active satellites in orbit, over 500 are operated by international partners and over 1,300 are operated by the United States.10

Among the world’s 22 active space launch centers, six are operated by partners and five by the United States.11

Many allies are also taking steps to emphasize the seriousness of space security. In the past year, France and Japan have established their own military units dedicated to space.12 The United Kingdom officially recognized space as an operational domain in 2018.13 And NATO, which historically has said little on space, came out with a space policy in 2019.14 Given the space maturity of many of its allies and partners, and the shared recognition of the importance of the domain, the time is advantageous for the United States to place more priority on establishing and deepening space partnerships for defense.

**Expand** and **Improve Networks** and **Capabilities**. Partners have capabilities that can improve U.S. systems and networks in geographically dispersed and strategic locations. This is particularly true in **space situational awareness**, an area in which a diverse set of **geographically-distributed sensors** can more accurately and completely capture the **operational environment**.15 Partners can help us collectively attain more **persistent surveillance** and **continuous global coverage** of satellites and debris, which is only possible if we have more and better sensors in a variety of locations. Radars and optical telescopes spread around the world can also more comprehensively identify space threats. For example, Japan is developing a deep-space radar that will observe objects in geosynchronous orbit. Given the counterspace threats from potential adversaries, the radar could also be invaluable to the United States because of its capability and location. 16

Additionally, space capabilities and operations are expensive. A clear advantage of military space partnerships is that they generate opportunities for **sharing** the **financial burden** of operating in space. As an example, the United States putting its security payloads on the Norwegian satellite will reportedly generate up to $900 million in savings.17 Hosting U.S. payloads on foreign systems, like this example, represents an area in which the United States could leverage allied and partner capabilities more so than it does currently. Hosted payloads offer affordable means to expand protected communications satellites; position, navigation, and timing satellites; and space situational awareness capabilities, among other systems. Rather than host payloads, partners can also simply contribute to the cost of a satellite system. For example, through multilateral agreements, Canada, Denmark, Luxembourg, the Netherlands, and New Zealand provided funding for the U.S. Wideband Global SATCOM-9 satellite that launched in March 2017.18 Or the United States can use partners’ satellites. For example, the United States partners with Japan and Europe to obtain weather information from space-based sensors, providing accurate weather information to warfighters around the world and avoiding the need to field additional U.S. systems.19 And it is not just satellites and payloads. Partners have terrestrial infrastructure and user equipment, including for position, navigation, and timing and satellite communications, that can be used collectively to achieve needed capabilities more efficiently. Leveraging allied systems can offer technological insights, system improvements, and capability expansions at lower costs.

**Deter Aggression**. Partnerships can create opportunities for **integrating allied** and partner **capabilities**, such as incorporating combined systems in satellite networks and ground infrastructure. Such integration can **strengthen** the **cohesiveness** of a defense partnership, which could also help deter an attack. A potential adversary may consider an attack on a purely U.S. system differently than an attack on a system that incorporates several allied and partner capabilities. Deployment of NATO’s multinational battlegroups in the eastern part of the Alliance (Estonia, Latvia, Lithuania, and Poland) is an example of this concept in the ground domain. If Russia’s military were to invade Estonia and attack the multinational forces there, the invasion could be seen as not just an attack on Estonia but on all of the countries represented in those forces and perhaps all of NATO.20 A May 2017 NATO fact sheet on its multinational forces reaffirms this: “[The multinational] presence makes clear that an attack on one Ally will be considered an attack on the whole Alliance.”21 Similarly, in the space domain, an attack on a U.S. constellation of satellites with U.S. payloads might prompt a response from the United States; an attack on a satellite constellation with a mix of U.S. and partner capabilities might prompt a response from several countries acting collectively, which may help deter a potential adversary from attacking in the first place.

With integrated allied and partner systems, U.S. satellite networks and ground infrastructure, as well as other equipment and capabilities, can become more **resilient**. The **more systems** you have, the **larger an attack** would need to be to take out a given percentage of capability: all else equal, two satellites would be more resilient than one, three satellites more resilient than two, and so on. The resilience offered by integrating allied and partner capabilities into a network, therefore, may also contribute to **deterring** a potential **adversary** from **attacking** the **network**.

Coalesce Allied and Partner Thinking on Space Security Concepts. As part of defense space partnerships, allies can more thoroughly discuss the threats to space systems and potential space conflict scenarios. If the United States wants to fully leverage its allies and partners in any future conflict in space, the United States would benefit from having more discussions with its allies about the possibility and nature of such a conflict: how it might emerge, how the respective allies can contribute, the capabilities the allies should pursue in advance, and the actions that might constitute “red lines” or cross thresholds that are more severe than others.

In recent years, the United States has taken important steps to collaborate with allies and partners on space threats and space conflict. International partners participate in military space exercises such as Space Flag, Global Sentinel, and the Schriever Wargame.22 The Five Eyes (the United States plus Australia, Canada, New Zealand, and the United Kingdom) along with France and Germany all are members of the Combined Space Operations initiative. 23 Experts we spoke to told us that the United States should continue and expand these efforts. Partner preparation for space conflicts could be valuable from an operational and geopolitical perspective. Todd Harrison, Director of the Aerospace Security Project at the Center for Strategic & International Studies, stated the following:

Rotating allies in the [Combined Space Operations Center as part of the Combined Space Operations initiative] is important because it gives those countries experts on space security issues. Let’s say Russia or China start interfering with our nuclear command and control and early warning satellites. Any allied country needs to have their own experts so they understand our response—they need folks who can say, “Yes, I understand why the Americans are escalating over this.”24

In a conflict in space, even if an allied country does not have significant defense space capabilities, it should have an understanding why the United States or other allied countries are taking the actions that they are. That understanding might help that country support the United States and allies politically and militarily in other domains.

The United States and its allies having a **shared understanding** of space threats and space conflict will help in **peacetime** too. General John Raymond, the Chief of Space Operations, has prioritized developing norms for operating in space.25 These could include something like taking steps to not create **debris** and announcing **planned maneuvers** into other orbits.26 With a similar understanding of the issues, the United States and its allies will be better equipped to develop common ideas for responsible behavior in space. This will also help with multilateral discussions, such as United Nations (UN) proposals on space security. Our partners have not always supported U.S. positions on UN space security proposals, including our negation of proposals made by Russia and China. For example, in the 2014 UN vote on Russia’s proposed draft resolution on No First Placement of Weapons in Outer Space, only three countries voted with the United States against the resolution and 125 voted for it with Russia.27 New and **deeper partnerships** will create more **commonality** in **assumptions** and **objectives** for fostering a **safe** and **secure** **space environment**.

### Solvency---NATO Key

#### NATO increasing space policy is key---anything else leaves exploitable loopholes.

Beyza **Unal, ‘19** (Dr Beyza Unal, Former Deputy Director, International Security Programme, 7-1-2019, accessed on 6-9-2022, Chatham House, “Cybersecurity of NATO’s Space-based Strategic Assets”, https://www.chathamhouse.org/2019/07/cybersecurity-natos-space-based-strategic-assets-0/4-capability-requirements, HBisevac)

4. Capability Requirements

The NATO Defence Planning Process (**NDPP**) identifies **capability needs**. These requirements can be identified through following the DOTMLPF-I (doctrine, organization, training, materiel, leadership, personnel, facilities and interoperability) capability development approach, which is analysed in detail for space capabilities (see below).

Doctrine and policy

NATO needs to **revise** NATO concept, policy and doctrine to encompass the use of **space systems** and assets in **military capabilities**. While doctrine provides the main principles by which military forces shape and guide their actions, policy provides the ‘prudent course of action or conduct to be applied in the application of a principle.’ 61 NATO has **not yet agreed on a space doctrine**. Currently NATO is developing a comprehensive Space Policy, which is a positive outcome of the 2018 Brussels Summit.62

As **every** NATO operation **requires** and **depends** on **space capabilities**, it is a **fundamental necessity** to develop a **space doctrine** to **guide operations**. Below are some guidelines for the development of such a doctrine:

Identify the objectives, threats and principles;

Identify the level of ambition regarding the extent to which NATO wants (or does not want) to become an autonomous actor in space;

Define **cyber offensive** and **defensive capabilities** of **allies**, and **cyber defensive capabilities** for **NATO**;

Set out **minimum capability requirements** for **satellite services**, with consideration of **non-survivability** of assets and **significance** of **redundancy**; and

Define the interaction with other organizations, including in the private sector and partnerships. The NATO Industry Cyber Partnership, launched in 2014, allows NATO to develop new concepts for technological advancement. The senior cadres should prioritize science and technology to a higher level in their agenda. The NATO–EU partnership is also important, particularly because the EU’s Galileo navigational system could provide resilience to NATO systems.

Some of the issues cited above could be included in the forthcoming NATO Space Policy, rather than in a doctrine. For instance:

A NATO Space Policy could identify the considerations of potential Article 5 incidents, which is the principle of collective defence. Cyberattacks that might **disturb communications** or **destroy satellites** are more likely to constitute part of a **broader strategic campaign** than an isolated incident. It is not the form a cyberattack takes, but the impact of such an attack that would lead NATO members to consider invoking Article 5.

It is also worth acknowledging the geographical nature of Article 5. The North Atlantic Treaty (Washington Treaty) of 1949 states: ‘The Parties agree that an armed attack against one or more of them in Europe and North America shall be considered an attack against them all […]’. There is an interpretational challenge to this, as cyberattacks are not bound by borders; moreover, they can be initiated outside Europe or North America but might have an indirect impact on those continents. The same applies to attacks on space assets, since they lie **outside territorial boundaries**. The NATO Space Policy will need to take into account a **geography** that includes the **ownership** of these assets and the **geographical impact** of any cyberattack on or through them.

NATO’s deterrence and defence policy involves ballistic missile defence (BMD), including interceptors, radars and the Active Layered Theatre Ballistic Missile Defence (ALTBMD) capability, which is a single battle management network that integrates all theatre ballistic missile systems, such as the Patriot missiles,63 the SAMP-T system,64 and the Medium Extended Air Defense System.65 Cybersecurity considerations should include space technology that is used within the BMD capability.

While developing capabilities through doctrine and policies, legal considerations also play a significant role. In the Wales Summit Declaration of September 2014, NATO leaders agreed that a cyberattack could trigger Article 5 (to be assessed on a case-by-case basis) and that cyber domain was a valid operational area (similar to air, sea and land). In principle, by extension, cyberattacks on space systems may fall within this framework. The main question is whether a cyberattack on a space system’s software without kinetic consequences might be considered as an armed attack that could trigger Article 5, or whether there must be direct or indirect kinetic consequences (such as the destruction of a satellite resulting in debris).66 There is also the question of the application of international humanitarian law (IHL). NATO has stated repeatedly that international law and IHL apply in cyberspace. The Tallinn Manual, a non-binding advisory document,67 also affirms the applicability of IHL to cyberspace. However, there are questions over differentiating cyberattacks against military objectives versus cyberattacks on civilian infrastructure, and over the assessment of the proportionality of a cyberattack prior to its execution. Realizing that civil and military assets are interlinked to a large extent, it is hard to estimate whether an attack is proportionate or not. Discussions with experts and NATO officials indicate that any Article 5 consideration would depend on the severity, consequences and political circumstances of an attack.

In future the use of emerging technologies, which includes AI, quantum-based cryptography, quantum computing and the development of space-based internet infrastructure, will **define** the **future of warfare**. Finding ways to transfer all **necessary civilian capability** to the **military area** with appropriate security measures could **improve NATO’s capabilities**, and incorporating a **forward-looking approach** to its doctrine and policies would **benefit NATO** in the long run.

Organization

Based on open-source analysis and on information shared among the members of the alliance, NATO is already mapping out the space capabilities of its allies. This will help assess both NATO’s existing resources and those that will be required. How quickly NATO can be fully operational in times of conflict and warfare and whether space is integrated into the planning structure are both important issues.

At the organizational level, the following considerations apply:

The **expertise** on space technology rests with the **private**, **public** and **military** sectors. Strengthening the **relationship** across these three sectors would improve NATO’s organizational capacity.

Although the cyber domain and space are intrinsically interlinked with each other, day-to-day tasks may hinder the development of common strategies by military staff. At the organizational level, there is compartmentalization. Increasing the coordination between the space and cyber communities would help to break down ‘silos’ (or barriers), and personnel could be trained in multifaceted skills.

NATO could consider establishing new frameworks with the European Space Agency. One such framework that has already come under discussion includes the possible use of GNSS in military operations.

Training

Training is essential to create awareness and prepare the alliance for worst case scenarios. NATO could promote different types of training that would capture space security and system vulnerabilities to cyberattacks. Training areas could be selected through a lessons-learned analysis where former cases could be used to highlight areas of greatest need.

Some examples are as follows:

At the political-strategic level, crisis management exercises (CMX), hybrid warfare exercises and similar training could incorporate cyber resilience and bring space elements into cybersecurity training.

At the technical level, given the complexity of space systems, focused training, modelling and simulation would be key to ensuring design integrity.

Bringing the technical and political communities together in training modules would be helpful. Often the political community and technical community do not metaphorically speak the same language and their concerns do not merge. Such training would be technology-driven and could incorporate modelling and simulation. Thus, technical expertise and knowledge could be transferred into political action plans.

Training may also involve the private sector or contractors. NATO decides whether or not it should delegate parts of the training to the private sector or to conduct it internally. There are advantages and disadvantages in both. One of the advantages in delegating the work to an outside party is that the latter could conduct an analysis without any NATO restrictions and could significantly test NATO’s planning and operations. The main disadvantage is that NATO may not be able to share classified information, which would make the training less comprehensive.

Some of the most useful training methods involve exercises, ‘war gaming’, crisis simulations and scenario planning, as well as online training education programmes, training manuals, and certifications. NATO should also measure the impact of the training and assess its skill-maintenance capacity.

Material

**Materiel** involves **military equipment** and tools that could support the **decision-making** and **operational planning** entailed in considerations of the space-based systems sector. It also involves **logistics** and **supply chain** management, and the integration of cybersecurity system design into the mainstream development and design of space systems. Analysing which companies are **habitually relied** upon in the supply of **satellite systems** may help NATO allies to **prioritize** their supply chain security efforts. Software vendors have control over putting ‘back-doors’ in the system that may not be visible or known during the procurement stage. Requesting the establishment of security requirements at the design stage of a hardware project may also increase resilience and form part of a defence-in-depth strategy.

Additional points to be considered with regards to materiel may include the following:

Should NATO have some sort of space capability, and, if so, what should the minimum capability be? Historically, NATO owned SATCOM capability, but political considerations led to the decision to rely instead upon the capabilities of alliance member states. To date, some countries within the alliance have not shown sufficient interest in NATO having its own satellite capability, and there has been no appetite to return to the old system.

It is necessary to find approaches to incorporate EU assets and equipment into NATO capability in order to increase redundancy.

Leadership

Leadership considerations involve awareness, education and training in the **vulnerabilities** of **strategic systems** to cyberattacks; leadership capabilities should also cover the issue of the defence sector’s **interdependency** with other sectors while conducting its operations. For instance, the telecommunications and defence sectors both use commercial space assets. The mutual dependency between the defence sector and other critical national infrastructure is particularly important in understanding the possible consequences of a cyberattack across all sectors.

Possible ways to improve leadership-level involvement may include:

Conducting non-technical training for the North Atlantic Council (**NAC**) on space security. This type of training could also be conducted with NATO’s Military Committee and Supreme Commanders.

The establishment of a high-level scientific board comprising the chief scientific advisers to NATO senior cadres. This group could distil any technical information to the political group.

Personnel and facilities

Member states assign personnel to operate the NATO defence and military systems that are dependent on space assets. Allies may also choose to deploy space support teams to the conflict zone (such as those deployed in Afghanistan by France and the US).68

The qualifications of personnel can be improved by:

Establishing personnel requirements for teams working on space issues.

Creating incentives for career promotion and retention of skills in order to improve resilience.

Creating memoranda of understanding with the private sector to set up joint work environments and establish hiring programmes where personnel with security clearances would be working at NATO through private-sector engagement.69

Finding ways to convince the member states to send highly qualified personnel to NATO as nations bid to fill these posts. Creating minimum requirements for the bidding process would help to attract personnel with the right qualifications.

As with the model followed by Estonia in the cyber domain,70 it is critical for alliance countries to start investing in programmes of academic study on space technology, including at masters level, through which NATO personnel can receive training and certification. Such programmes will equip personnel with essential skills and provide the alliance member states with qualified assets.

Interoperability

**Interoperability** enables allies to operate their space systems without having to make adaptations so that their systems can **function efficiently**.

Interoperability has been an issue in the land, air, and maritime domains. Space-assets planning would benefit from the lessons learned in those domains – for instance, by studying and understanding the complexities involved in intelligence- and information-sharing across all domains. Allies could allocate funds towards a body of work that could focus on interoperability in space. Doctrines and **standardization** could help to improve interoperability **among allied systems**. Yet, allies should also realize that standardization would mean using the same vectors as a baseline, thus leading to an increase in risk (in the remaining vulnerabilities) across the alliance as a whole. Allies should realize that standardization would mean using the same vectors as a baseline, thus leading to an increase in risk across the alliance as a whole. In order to share secure information through SATCOM units, France, Germany, Norway and the US have formed the multilateral Coalition Network for Secure Information Sharing (CoNSIS). Through secure communications systems, CoNSIS’s objective is to enable better and more accurate decision-making, within a shorter period of time.71

In order to ease interoperability, CoNSIS uses commercial standards as its baseline.72 For future applications, it is advisable to check whether commercial standards meet cybersecurity demands for military requirements.

Interoperability in technology is desirable but remains a challenging construct. It could become the role of **NATO** to make national space services **interoperable**. Creating a catalogue of national services might be a good starting point. Interoperability could also be established at the product level (for example, in the field of **space weather** information) where the products are **standardized** across the alliance. In order to incentivize nations to invest in this endeavour, it might be helpful to calculate the cost of inadequate interoperability across the alliance to demonstrate current or potential monetary losses.

#### NATO creates the clear regulatory framework

Alessio Di Mare, 21 (Captain Alessio Di Mare, Italian Airforce, May 2021, accessed on 6-11-2022, Joint Air Power Competence Centre, “The Role of Space Domain Awareness”, https://www.japcc.org/essays/the-role-of-space-domain-awareness/, HBisevac)

NATO neither has its own Space assets nor operates any. It relies on Space capabilities that Alliance nations provide on a voluntary basis. NATO operations strongly depend on Space services, so SDA also becomes a key resource for NATO and it needs more than just a ‘donation’ from Member States.

First of all, NATO could be the leading entity to promote the **importance** of **SDA**, encouraging the **development** and **improvement** of the current architectures and advocating for ideas ranging from the SSA concept of ‘simple routine catalogue maintenance’ to a tactical, predictive, and intelligence-driven capability integrated with **B**allistic **M**issile **D**efence and Command and Control infrastructure. Moreover, without jeopardizing the independence of a single nation to use its assets as it prefers, NATO could play the role of coordinator for the various national capabilities, integrating them to have a **clearer picture of Space** and to be able to detect any change or **potential threat** on the Alliance, similarly to what happens in civil contexts (e.g., EUSST). Our nations’ use of and dependence on Space requires the development of policies and doctrine, tools and resources to maintain the **Alliance’s superiority** in Space. As mentioned before, no country can face this situation alone. The birth of the new NATO Space Centre at Allied Air Command in Ramstein, Germany,8 could represent the first NATO step in that direction.

#### NATO is key---data-sharing and redundant layers in the space ecosystem solve ASAT fragility.

Benjamin Silverstein, 20 (Benjamin Silverstein is a researcher with experience in the National Laboratory network conducting research on the use of counterspace technologies to support deterrence goals, 8-3-2020, accessed on 7-9-2022, War on the Rocks, “NATO’S RETURN TO SPACE”, <https://warontherocks.com/2020/08/natos-return-to-space/>, HBisevac)

NATO has experience embedding space-based tools into terrestrial, maritime, and airpower exercises. However, NATO has yet to build space-specific exercises to signal **allied resolve**. This may be deliberate, stemming from an assumption that future conflict in outer space would be inextricably linked to Earth-based competition. Even if this assumption is true, it does not absolve NATO from the need to answer questions about potential allied resolve in bringing force to bear against those who interfere with space operations. Clearly, NATO recognizes the benefits of space systems and has considered how to integrate these vital capabilities into security operations. However, without a declaratory policy, it is impossible to gauge how far (if at all) NATO is willing to go to protect key space systems.

NATO Secretary General Jens Stoltenberg briefly outlined types of cooperation supported by the new policy, notably that alliance members can expect streamlined sharing arrangements for space-based services like encrypted communications and remote sensing. By promoting cooperation, the NATO policy leverages the collective allied portfolio of space-based technologies to supplement lost capabilities and negate adversarial interference with space systems. Many NATO members are **undeniably proficient** in **space technology** and can contribute to **sharing agreements**. NATO members other than the United States have nearly **tripled** the number of satellites in orbit in the past decade. The increase in satellites improves the potential for sharing **unique data** and **capabilities**, and also builds **beneficial redundant layers** within the NATO space ecosystem. These redundancies help bridge the gap between growing military **reliance** on satellites and the inherent **fragility** of space objects. Reducing **barriers** to sharing space **systems** and **data** might also **encourage** allies to discuss **strategic investments** to address any gaps.

The policy also establishes NATO as a forum for consultation between allies on space issues, although it is unclear to what extent the policy guides these consultations and what sort of newfound legitimacy the policy affords these consultations. However, it is undeniable that simply announcing a policy, even a classified one, sparks a conversation not only formally within the North Atlantic Council but informally between allies. Unfortunately, sharing and consultation do not address the alliance’s most conspicuous vulnerabilities in space.

Pursuing Protection or Encouraging Inefficiency?

Most NATO members who have dramatically expanded their reliance on satellite infrastructure have done so **without** commensurate **increases** in space-based **ability** to prevent or **deter** hostile interference with these systems. It is a state’s prerogative to improve resiliency and security, but inadequate security baselines affect both intra-alliance agreements and NATO operations as a whole. Even with sufficient security standards, potential sharing arrangements do not replace sovereign capabilities, principally because allies do not have guaranteed access to shared systems for independent and joint missions. Notably, some NATO allies have reservations about ceding control of space systems to foreign commanders during a crisis. This might drive NATO members away from beneficial redundancies and toward inefficient replication. Furthermore, it is unclear that the current NATO space ecosystem is **adequately layered** with **redundancies** to realize the benefits supported by the policy. Extensive sharing might also push states toward fragile interdependencies, and a dearth of sophisticated redundancies would make those capabilities — unsupported by substitute systems as they are — valuable targets. NATO might not be able to wholly address both of these issues, but it can make progress on other concerns.

Despite some allies’ interests in counterspace technology, NATO has not indicated that it has a plan, at any classification level, to integrate such capabilities into its concepts of operation. Furthermore, NATO does not have a comprehensive unclassified strategy to deter adversarial interference with NATO members’ space-based systems. NATO declaratory policy does not delineate space-based thresholds or actions that would trigger NATO to act in collective defense. This is especially troubling, as NATO itself recognizes that commitments to collective defense must “be clearly and unambiguously communicated to avoid misunderstanding and miscalculation by any potential adversary.” The resolve that underpins all alliance security activities is severly undermined by the alliance’s inability or unwillingness to openly communicate about space security.

NATO also lacks the tools, tactics, and procedures to effectively operate in space. NATO has neither announced an intent to implement a space situational awareness program to identify and attribute on-orbit interference, nor convened debate on a collective threat-assessment process. These are two core tasks that should be accomplished to support the alliance’s relevance in space security. Shared threat-assessment tools are key for states interested in building meaningful coalitions to address space security. Without agreed-upon threat-assessment processes, allies may arrive at different conclusions about threats to space systems, based in part on their differing abilities to collect and analyze data. This directly impacts the alliance’s ability to come to a consensus decision under the processes outlined by Article 4 of the NATO Charter. While some actors like the United States have robust space situational awareness capabilities, others don’t. NATO members may not have comparable capacities to observe or monitor space activities, leaving allies unable to assess independently collected data. Compounding this, even perfect data cannot protect NATO from disagreements based on differing opinions about a space actor’s intent. Without common methods or an established procedure for space observation and shared threat-assessment tools, NATO may be unable to arrive at a conclusion and may cede initiative back to an adversary.

Extending Collective-Defense Protections to Allied Space Assets

NATO should adopt a space strategy to guide the alliance forward in security-affirming activities. Without a declaratory policy, NATO’s public statements provide an imprecise outline of how NATO will behave in space. The announcement to designate space as an operational domain included a disclaimer that NATO has “no intention to put weapons into space,” but NATO leadership has not ruled out integrating terrestrial counterspace capabilities into NATO concepts of operations. NATO may be setting the groundwork for future space activities, but in the meantime should take specific steps to improve allied security.

At the highest level, NATO has an opportunity to blanket allied space assets with Article 5 protections. Article 6 of the NATO Charter clarifies that the alliance may only invoke collective defense in response to attacks on territory or vessels operating north of the Tropic of Cancer. The geographic limits imposed by the NATO Charter are incongruent with outer space. Revising this language to specifically include satellites, independent of their location above the Earth, would support collective defense. Attacks, harassment, or interference with space objects anywhere in orbit could degrade NATO capabilities in a transatlantic theater. Expanding the parameters of Article 6 would send strong signals to adversaries that threats to space-based assets will not be tolerated.

While this would be an unambiguous and security-reinforcing progression, the recent history of decision-making in Brussels suggests that such an amendment might require an immense political capital investment by those states most interested in protecting space-based assets. There is little reason to expect political will to be suddenly galvanized in an effort to revisit the terms of the core alliance-forming document. Furthermore, while space security has enjoyed the spotlight recently, it may be overshadowed in the future evolving security environment.

Fortunately, other less-taxing activities can benefit allied space security.

NATO should issue an overarching strategy and doctrinal guidance for military spacepower to accompany the policy. NATO has a unique advantage as a collective organization to convene strategists from likeminded but diverse military backgrounds who could cooperatively develop a warfighting strategy for space. A space-focused center of excellence would be well-suited to address this gap, and would be able to leverage institutional credibility. There are many allied countries with distinct interests in space security that might be interested in leading the effort, and a diverse cadre of experts would support the development of a comprehensive space strategy.

At the operational level, NATO can better integrate space technology into **security missions**. Current NATO doctrine and strategy outline the way allied commanders should leverage space-based systems during combat operations. These policies focus on using space to support other domains, and give no guidance on how the alliance would conduct operations in space. Although NATO will not deploy weapons in space, the alliance can craft contingencies to fit within the bounds of this restriction and not erode the credibility of its pledge not to weaponize space. NATO should take advantage of the current tractability of the normative environment in space to develop sound plans for space-based activities and not wait until immense pressures force leadership to make decisions under duress. This includes considering how to best leverage terrestrial-based counterspace capabilities, including jamming tools, directed energy technologies, and air-, land-, or sea-lauched kinetic interceptors, or if the alliance should avoid using specific weapons entirely.

The absence of a crisis in space is not an excuse to neglect the importance of integrating new space activities with structural and systematic processes. **Integrated situational awareness** is crucial as NATO expands into space. The **various levels** of **maturity** in sovereign space systems within NATO, combined with the federated structure of the alliance and the complex impacts of space technology, demand effective **integration**. This integration process should focus on implementing robust baseline security standards for space systems to enable cooperation without concerns about inviting threats through the weakest security node. Another focus should be ensuring the alliance has the ability to arrive at political decisions about taking collective action in space.

The NATO ***roadmap*** to better space security starts with defining a strategy and a concept of operations to reestablish an **effective deterrence** posture in space. Based on these developments, NATO will be able to focus **joint training** and exercises to **enhance allied capacities** to prevent, defend against, and recover from attacks on space infrastructure. In turn, these activities will demonstrate allied resolve to protect and leverage space systems in broader transatlantic security missions.

### Solvency---NATO Key---Deterrence

#### NATO key to deterrence.

Daniel Hamilton & Hans Binnendijk, 2-16 (Daniel Hamilton is Senior non-resident Fellow at the Brookings Institution and co-leads the Johns Hopkins University SAIS postdoctoral program and serves as President of the Transatlantic Leadership Network, Hans Binnendijk is a Distinguished Fellow at the Scowcroft Center for Strategy and Security and the Transatlantic Security Initiative, 2-16-2022, accessed on 6-19-2022, NATO Tasks Force Report, “One Plus Four: Charting NATO’s Future in an Age of Disruption”, <https://www.transatlantic.org/wp-content/uploads/2022/02/NATO-TF-SC-final-feb-16-2022.pdf>, HBisevac)

NATO deterrence and defense rely on assured access to outer space for **communications**, **intelligence** and **warning**, **navigation**, and many other functions. **Space assets** are essential to the **stability** of **allied economies** and **societies**. Without them, military powers are ‘~~blind, deaf and mute~~.’30 More than half of the approximately 3,000 government and commercial satellites in space operate from **allied territory**. Both kinetic and non-kinetic threats from, to, and within space could disrupt the **space operations** of the Alliance and its members, potentially leading to an **Article 5 contingency**. NATO has added a Space Operations Center to its Air Command (AIRCOM) and a Space Operations Center of Excellence in France. These agencies must articulate Alliance interests in space and assist members in coordinating their space resources via the NATO Defense Planning Process (NDPP) to meet NATO as well as national requirements. NATO must follow through on its Space Policy, agreed in June 2021, by realizing the **Strategic** **S**pace **S**ituational **A**wareness system at NATO headquarters, and working out **procedures** for NATO **response** to **incidents** in outer space, just as it has for other domains, including potential **military measures** and **political consultations**.

#### NATO is uniquely positioned to deter adversaries.

Kai-Uwe Schrogl, 20 (Professor Dr. Kai-Uwe Schrogl is the President of the International Institute of Space Law, 2020, accessed on 6-20-2022, Springer, “Handbook of space security: policies, applications and programs”, <https://link-springer-com.proxy.lib.umich.edu/content/pdf/10.1007/978-3-030-23210-8.pdf>, HBisevac)

Alliances, international cooperation, and the global proliferation of space power also play a **significant role** in deterrence by denial. This international dimension influences deterrence in several ways. First, the proliferation of states operating or deriving benefits from satellites creates stakeholders who would likely prefer that their satellites were not put in **jeopardy**. States outside of the deterrence relationship may have their satellites affected negatively if deterrence fails and conflict ensues, such as by orbital debris from kinetic attacks or the indiscriminate effects of broad radio-frequency jamming. Second, the deterring state may provide a global or multinational space-derived service, such as the US Global Positioning System satellites, which if attacked could potentially draw countries reliant on this service into the conflict on the side of the non-aggressor (Harrison et al. 2009). In these situations, an aggressor may be hesitant to attack space systems if it will have to potentially contend with an international response (Sheldon 2008). Third, allied or partner states may assist the deterring state when a conflict breaks out. The space systems of friendly countries can complement and supplement the deterrer’s own capabilities, such as through data sharing **agreements**, **interoperability**, or even by assisting in the **reconstitution** of lost space capabilities. Adversary leadership may be **deterred** from **targeting US satellites** if they perceive that the United States could leverage the capabilities of its allies to **nullify** any anticipated benefit (Sheldon 2008).

Some security experts consider the North Atlantic Treaty Organization (NATO) as being **uniquely positioned** to bolster deterrence in space through its **cooperative alliance**. The alliance is increasingly reliant on space for its collective defense and economic prosperity, and an attack on the space assets of any one ally impacts the security of all allies (Schulte 2012). Security experts assert that while NATO is dependent on space-enabled capabilities, its space doctrine and planning have **not kept up**. Presently, NATO officials are considering how the alliance should address the growing military capabilities of Russia and China, to include issuing NATO’s first strategy for space. The strategy is expected to make space an official domain of operation, giving structure to discourse on military developments in space and NATO’s response. The alliance may also decide that attacks in space would trigger the organization’s Article 5 provisions on collective defense, although internal differences on the subject remain. Analysts have long held that NATO should continue to build the expertise and capacity to conduct operations enabled by space; ensure that **doctrine**, **requirements**, and **planning account** for the operational advantages provided by space; and adapt **exercises** and **training** to ensure forces can **effectively exploit** space-based capabilities (Schulte 2012). It is still uncertain whether NATO’s space strategy will implement these recommendations.

#### Only NATO offers the necessary capabilities to deter China.

Liselotte Odgaard, 4-25 (Liselotte Odgaard is a professor at the Norwegian Institute for Defense Studies, 4-25-2022, accessed on 6-20-2022, The Washington Quarterly, Vol 45, Issue 1, “NATO’s China Role: Defending Cyber and Outer Space”, <https://www.tandfonline.com/doi/full/10.1080/0163660X.2022.2059145>, HBisevac)

Cyber and space is a promising arena for NATO to address China challenges by building **member state resilience**. Like the air and sea domains, as areas that belong to no one state and which provide access to much of the globe, they form part of the global commons. Command of the commons has been the **key enabler** of the **US global position** of **power** for many decades.26 However, China wields a sufficient range of sea, air, cyber, and space capabilities such that the **global commons** is now a **contested zone**. In contrast to the sea and air domains, cyber and space are **sparsely regulated**. This lack of international norms enhances the risk of conflict based on misperception, making **NATO cooperation** **pertinent**. Adversarial activities toward the US and Europe in the cyber and space domain threaten transatlantic security. These come not just from **China**, but also from other adversaries such as **Russia** and **Iran**. Mechanisms for addressing these challenges in the military sector are essentially generic and not, at least in their basic design, established with a particular country in mind. Thus, cyber and space provide an avenue for NATO to contribute **significantly** to **deterrence** of China without having to combat major internal resistance. NATO would also benefit from long-standing **US-EU cooperation** on cyber and space issues.27 Cyber and space provide an avenue for NATO to contribute without major internal resistance

NATO has vowed to clarify Article Five’s collective defense commitment to encompass threats to satellites in space and coordinated cyberattacks. NATO can design this effort to include adversarial behavior from China. The alliance already has an array of instruments to deal with cyber and space challenges from adversaries. These can be extended to encompass China without pronouncing it a threat.28 This approach allows the US and Europe time to adjust their cooperation to take into account the fact that China poses military threats to them both without explicitly using the language of threat at a time when NATO members do not agree if China should be defined as a challenge that can trigger Article Five responses.

Since the late 1990s, the vulnerability of shared space assets to cyberattacks has been a concern for both the US and Europe. For example, in 1998 a US-German satellite, used for peering into deep space, was rendered useless after it turned suddenly toward the sun, damaging its High Resolution Imager by exposure. NASA later determined that the accident was linked to a cyber-intrusion at the Goddard Space Flight Center. Coordinated cyberattacks have emerged as a major threat to both the US and Europe since the late 1990s. For example, for about eighteen minutes on April 8, 2010, China Telecom advertised erroneous network traffic routes that instructed US and other foreign internet traffic to travel through Chinese servers. Other servers around the world quickly adopted these paths, routing all traffic, including government and military traffic, to about 15 percent of the internet’s destinations through servers located in China.29

In the future, the need to enhance situational awareness in space is likely to lead to further integration of space assets between the US and its allies. Civilian entry points are likely to provide a growing opportunity for infiltration. The weak state of cybersecurity in civilian agencies should also be considered. Chinese military doctrine prioritizes weaponry that targets vulnerabilities in the deployment of US and allied power, such as the use of cyberattacks to disrupt surveillance assets, intelligence networks, and command-and-control systems.30 These threats are significant, since next generation systems, including fighter aircraft, destroyers, and special forces, will not function without access to space communication and space-derived data.

Although European and US allies have indigenous space programs outside the NATO framework, cyber security and outer space would be a useful field for joint explorations of how to divert and manage attacks and identify an agency which can coordinate transatlantic responses to attacks. Allies are embedded in a range of information networks which may be disrupted, giving rise to alliance management concerns emerging from attacks. The lack of **red lines** regarding behavior in cyber and outer space between the US and its allies on one hand, and adversaries such as China on the other, adds to the risk of **misperception** and **escalation**, and hence also highlights the need for **allied coordination** to avoid starting a war by mistake. An improved NATO dialogue on safeguards and alliance consultation could also assist communication with China on arms control and conflict prevention in cyber and outer space, which is not currently taking place.

Looking to the future, NATO’s success in establishing **transatlantic mechanisms** for cyber and outer **space safeguards** and **consultation** will be crucial to allow NATO a key role in taking on the China challenge in ways that help restore faith in **NATO’s credibility** as a provider of **collective defense** in all domains. It will also assist NATO in straddling the chasm between member states prioritizing threats from either China, Russia, the Middle East, or North Africa, since cyber and space threats potentially stem from all of them, and the effectiveness of cyber and space defense mechanisms do not necessarily depend on geographical origin.

Cyber and space would allow NATO a key role in the China challenge without prioritizing China

Improved **communication** between NATO and the EU will be essential for NATO to successfully address the military aspects of cyber and space threats. The framework for permanent EU-NATO relations, Berlin Plus, was concluded in March 2003. It allows for the exchange of classified information, the EU’s use of NATO assets and capabilities for EU-led crisis management operations, and the establishment of consultation arrangements.31 Due to disagreements over responsibilities and jurisdiction, however, meaningful coordination did not take place until July 2016. On this occasion, NATO and the EU issued a joint declaration stating their intention to work together on security and defense responses to unprecedented challenges emanating from the South and East of the Euro-Atlantic area.32 During Biden’s visit to Brussels in June 2021, NATO promised to strengthen cooperation with the EU on promoting peace and stability including protecting critical infrastructure, strengthening resilience, maintaining a technological edge, and addressing challenges to a rules-based order.33 The EU-US summit statement from the same visit merely reaffirms support for robust NATO-EU cooperation and promises to strengthen the partnership.34 At the level of policy implementation, it is clear when talking to NATO and EU officials that usually they do not coordinate their strategies and tactics for countering China challenges.35

The EU-US summit statement’s negligible mention of cooperation with NATO indicates that the ball is in NATO’s court if strengthening NATO-EU coordination is to take place. French and German concerns about entrapment are a major barrier to meaningful NATO-EU cooperation. The area of cyber and space security may allow NATO to work around this roadblock. In line with the EU’s practice of supporting the efforts of groups of member states to take the lead on issues where EU institutions cannot trump sovereignty, in the area of cybersecurity the EU has decentralized implementation to work around national resistance. This has allowed the EU to respond collectively and effectively to cyberattacks in Europe, primarily through bolstering capacities and law enforcement cooperation.36 However, the EU is not yet a globally influential and effective cyber-power because differences among member states over issues such as whether to prioritize tech sovereignty or Europe’s global tech competitiveness prevent the EU from acting in unison on the global stage.

The first US-EU TTC meeting held in September 2021 was an important step in strengthening the EU’s global position in cooperation with the United States, and hence called into question whether NATO has a role to play in cyber security.37 The next couple of years will demonstrate whether the EU and the US are able to focus on becoming mutually supportive global cyber security guardians by cooperating on strengthening investment screening, export controls, and rebalance global supply chains in semiconductors. The successful implementation on both sides of the Atlantic of the recommendations of the TTC working groups will determine if transatlantic cooperation positions the US and the EU as global partners in guarding cyber space. In part, this will depend on the EU’s ability to forge common positions that meet the US halfway on issues such as tech sovereignty and data privacy, points of contention through which transatlantic relations have been marred by conflict.

The potential convergence of transatlantic views on cybersecurity leaves room for NATO to play a significant role because the EU is a civilian and economic, rather than military, set of institutions. The NATO summit in Brussels in 2018 carved out a role for NATO which the EU cannot fulfill, allowing NATO members to integrate their sovereign cyber capabilities into NATO operations and missions.38 However, compared to the EU’s major role in cyber, NATO’s role is negligible. As EU civil-military cooperation ramps up in enhancing Europe’s autonomous defense profile while allowing US companies a role in this effort, the union looks set to become an even more dominant actor in transatlantic cyber defense. Because NATO is a military organization, it has the procedures and instruments to position itself in a key role in coordinating and implementing the military aspects of cyber defense between the US and Europe. The multinational cybersecurity effort which is confronting the global threat posed by Chinese state-sponsored cyberattacks involves NATO, the EU, Australia, New Zealand, and Japan, and sets NATO off to a good start in enhancing its profile in countering Chinese challenges to transatlantic cybersecurity.39 However, it remains to be seen if it manages to deliver mechanisms that succeed in integrating allied responses in the military sector in a way that complements US and EU cyber defense initiatives.

In outer space, the EU is also increasingly active, recognizing the need to deepen investments in areas such as satellite navigation, earth observation, space situational awareness, and secure communications, which are all central to enhanced space security. The EU has established the EU Agency for the Space Programme, which has oversight over everything the EU does in orbit as a bloc. Moreover, the EU uses the European Space Agency (ESA) as technical advisor and industrial procurement agent. This setup allows the EU to become more agile, dynamic, and innovative in space as rapid industrialization is taking place with US entrepreneurs and well-funded Chinese space programs in leading roles.40 In the pipeline are a next generation of Europe’s satellite-navigation system, Galileo, and an extension of the scope and capabilities of its Copernicus-Sentinel spacecraft, which monitors the state of the planet. The EU focuses on ensuring that Europe has independent space capabilities, but it does not develop instruments such as space weapons systems.41

In the outer space realm, NATO has **tremendous potential** for playing a **key role** in developing instruments in the military sector that involve European and US space capabilities. NATO’s decision to declare outer space an operational domain at the London summit in 2019 is a first step in allowing NATO an active role in addressing growing anti-satellite threats from China and Russia.42 With the **US** as the **leading power** in outer space and with the **EU** developing its space platforms to enhance **situational awareness** and **security**, NATO has the tools to work out a **common transatlantic definition** of the **anti-satellite** **challenges** that need to be addressed. The establishment of mechanisms that ensure **coordination** across military NATO commands regarding **intelligence gathering** and the interface between cyber and space defense, as well as civilian and military occurrences and initiatives, would potentially strengthen the ability of allies to **counter** anti-satellite threats **considerably**. As with cyber, NATO must first integrate the space issue into all its **organizational** and **operational structures**, and secondly, develop mechanisms that focus on **coordination** between US and European capacities on the basis of a **common understanding** of the challenges to be addressed.

### Solvency---Specific Advocate---1AC

#### Allied coordination and satellite framework card.

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6.1.2 Increase NATO Strategic Level Engagement

As stated by Moon, one Ally’s space assets being attacked will impact each other’s MS’s security (Moon, 2017, p. 8). Hence, the strategic coordination of space asset cybersecurity is vital for all NATO pillars of defence, whilst increased involvement of CSCRM should become a top priority for NATO’s strategic level executives. Eventually, this would allow for a whole-of-alliance approach to deter space-based threats through showcasing the importance and visibility of the cyber SASC (Yuval, 2019, p. 6). Following AJP-3.20, NATO commanders are required to

“continuously monitor their areas of interest to anticipate potential crises and allow them to assist the strategic level in understanding [which] includes an analysis of cyberspace as part of the overall understanding of the operating environment [and] potential risks to friendly or neutral usage of cyberspace […] against NATO, Member States, or neutral nations/entities (NSO, 2020, pp. 23-24).

This implies the creation of mission-specific guidance, agreements, arrangements, and security considerations. Aligning, NIST emphasises on CSCRM as

“a critical capability required for organizations to reduce the risk of business interruption if a cyber incident were to occur [requiring] close integration across functional and business lines, engage executive leadership effectively […] foster close supplier relationships, and leverage industry standards throughout the supply chain lifecycle” (NIST, 2020, p. 5).

To integrate the strategic level more effectively, executive-level SC leadership councils should be established throughout NATO (NIST, 2020, p. 5). Education on cyber SASC risk management should be introduced to NATO CCDCOE’s recurrent Executive Cyber Seminars. Widmann considers those seminars as the most appropriate level to discuss SC issues and cyber incidents, and consolidate strategic understanding of space asset cybersecurity and NATO’s critical dependence on it (Wells & Sielaff, 2020). The aim is to “provide the senior leadership with a baseline of information, so that if they are faced with a cyber issue in the SASC, they would have the information that they need to make good decisions” (Widmann, 2020). Furthermore, as stated by Unal, the annual NATO Information Assurance Symposium (NIAS) could focus on space in the upcoming years. In doing so, NIAS could support the clarification on responsibilities and protection measures, and suggest highergrade military cyber protection as well as security specifications for critical civilian space applications used by the military (Unal, 2019, p. 16). Such executive-level gatherings will showcase commitment, formalize responsibilities and therefore effectively ensure CSCRM (NIST, 2020, pp. 8- 13). Concrete strategic decisions to timely increase resources, which might be decided upon during such seminars, include:

- The overall review and extension of space management within the NCIA, and SpSC’s role;

- Forming an organic SpSCE at each tactical-level HQ, being permanently staffed by at least one SME or liaison officer (Vasen, 2020, pp. 21-23);

- Establishing a Direct Liaison Authority (DIRLAUTH) between the operational level and national space capacity providers to reduce requesting times (Vasen, 2020, pp. 23-25); and

- Establishing a stand-alone space operations AJP to properly acknowledge and consider increasingly complex space capabilities.

6.1.3 Spur Exchange of Academic Expertise

NATO dependency on untrusted technology should be counteracted by strategic investment in space asset Research and Development (R&D) in collaboration with its MS, and hence the development of more viable alternatives (CSC, 2020, pp. 8-10). This might be done in collaboration with the existing NATO Science and Technology Organisation (STO) Information Systems Technology Panel (NATO STO, 2020). As stated by Silverstein,

“NATO has a unique advantage as a collective organization to convene strategists from likeminded but diverse military backgrounds […] a diverse cadre of experts would support the development of a comprehensive space strategy” (Silverstein, 2020, p. 7).

Livingstone suggests inviting outside organisations and cybersecurity experts to provide expertise and differing perspectives on the topic and focus more on including cybersecurity into space asset’s designs. This might include for example to further spur cooperation between NATO and Europol, in particular between NCIA and the European Cybercrime Centre (EC3) via Europol’s Platform for Experts (EPE). EPE is a “secure, collaborative web platform for specialists [which] facilitates the sharing of: best practices; documentation; innovation; knowledge; non-personal data on crime” (EUROPOL, 2020). Exchange and collaboration are enabled via virtual communities, sharing a wide range of expertise, know-how, and information, to foster an environment of trust and online collaboration. Thus, “governments should not compete with industry but instead take advantage of the expertise in the industry and help to spur innovation going forward” (Bander et al., 2020). Hence, NATO will be allowed to encourage innovation and competition and drive excellence on the market, whilst ensuring that the appropriate levels of security are met. This will prevent companies from striving for private capital outside MS and may help to overcome industry competitors’ reluctance to share knowledge (GSA, 2019, p. 2). Also, common R&D will help to draft a common terminology within NATO and beyond, as technical cyber-speak should be adjusted and translated for the political space community (Waterman, 2019).

NATO currently reviews the establishment of a NATO Space Technology Centre (Waterman, 2020, pp. 1-6). Such a centre would

“bring together the various space-related activities of the NCIA, from SATCOM and research to operational support […] summarized in a so-called “virtual hub” for space knowhow, projects and tools” (Kanig & Forkert, 2020, p. 1).

This is important for the needed acceleration of NATO space awareness and the fielding of new military capabilities, facing for example the rise of Artificial Intelligence79 (AI), further shifting the cyber landscape for space systems as space assets increasingly employ AI capabilities. Not only will NATO need to worry about cyber doctrine and how it interacts with space, but AI doctrine and how it intersects with cyber and space. Furthermore, the centre should be led by or involve NCIA in cooperation with other COEs like CCDCOE, to “give advice on relevant cyberthreats and vulnerabilities, such as those related to the integrity or security of supply chains” (Unal, 2019, p. 26). This involves research and recommendations for agreement on what exactly constitutes space as a domain, what type of similarities and divergence space shares with cyber, and finally what kind of SC security approach should be modelled for NATO (Unal, 2019, p. 28). In that way, technological advancements can be more securely incorporated in future NATO procurement of space asset services (Zarkan, 2020).

6.1.4 Conduct Mission-Specific Cyber SASC Risk Assessments

NATO needs to make sure to know the procurement and SC environment around each specific mission, sourcing the materials and services to the level of integrity required (Livingstone, 2020). External partners should be analysed based on an exact understanding and agreement on each mission’s unique risk tolerance and critical assets, to better ensure responsibilities and liabilities (Lister, 2020). Risk assessment policy recommendations between MS and NATO are highly needed “so that everybody agrees with the same concept of diligence, safety, and risk management” (Lee, 2020). Silverstein points out that

“without agreed-upon threat-assessment processes, allies may arrive at different conclusions about threats to space systems, based in part on their differing abilities to collect and analyse data. This directly impacts the alliance’s ability to come to a consensus decision” (Silverstein, 2020).

NIST encourages the move “from detective to preventive capabilities in managing third-party cybersecurity risk” (NIST, 2020, p. 10) through establishing a proper SC cyber risk assessment framework. Doing so would ensure cyber SC risk accountability across the organization through manifesting policies, governance, procedures, tools and processes, as well as integrity, visibility and control over data sent to and received by any supplier (NIST, 2020, pp. 9-13). Furthermore, risks assessments are essential to “identify [,] determine [and] estimate the likelihood of the potential losses, [and] define the relative likelihood and consequence of various risks” (Pandey et al., 2020, p. 16). A proper NATO SASC cyber risk assessment framework should therefore include:

1. Assessment of NATO-procured ICT components, such as hardware, software, and services:

Common risk assessment includes collaboratively and proactively using software to monitor SC interruptions, implement recall policies, or allocate resources early in the space asset development lifecycle to determine SC risks and their feasibility for NATO. Also, this includes involving independent cybersecurity experts for up-to-date analyses on procurement samples; considering “known vulnerabilities that could be exploited to carry out an attack or otherwise cause adverse events” (CCSDS, 2019, p. 12); and subsequently scoring potential vulnerability impacts on NATO (NIST, 2020a, p. 13). Unal states that “any digital system that relies upon near real-time information is vulnerable to cyberattacks […] In order to understand the value of each space-dependent capability, it is important to analyze the consequences of cyberattacks on each” (Unal, 2019, p. 16). Bridging the gaps between the diverging areas of SC, cybersecurity and space assets present a “fascinating opportunity for different states to work together, because they are providing completely different perspectives, data and evidence and thus encourage out-of-the-box thinking when anticipating different types of attacks” (Lister, 2020b). Additionally, NCIA could further take advantage of collaborative open-source tools such as the Malware Information Sharing Platform (MISP) to promote rapid “cooperation and information-sharing among allies [as being] one of the most effective defences in cyberspace” (Unal, 2019, p. 26).

2. Analysis of upstream suppliers, suppliers’ sources, and the larger SC ecosystem:

It is key for NATO to identify and well manage critical space asset suppliers, which “if disrupted, would create a negative business impact on the organization” (NIST, 2020b, pp. 8-14). This includes implementing preliminary review processes and rank suppliers based on their criticality to NATO, following a supplier criticality score prioritizing SC risks; and automate supplier risk monitoring and its mitigation. Firstly, mission-critical systems, assets, data, and processes need to be identified and prioritized, secondly, those suppliers having access or providing infrastructure for such capacities. Additionally, supplier practice assessment protocols should be established, and supplier self-assessment questionnaires be implemented to determine whether key, agreed-upon controls and requirements are being met and or improvements are required. Such steps will enable NATO to “understand how NATO can partner with developers, suppliers and vendors, maintain cybersecurity standards and ensure that validity, integrity and availability of the SASC are secured” (Lister, 2020).

3. Dedication of specified NATO personnel to effectively assessing and communicating supplier risks to NATO’s executive leadership:

A centralized space asset SASC cyber risk assessment team and cross-functional SC Risk Councils should be established to proactively review and mitigate relevant risks (NIST, 2020, pp. 5-8). These teams should be responsible for providing and enforcing oversight and guidance on SASC cyber risk assessments and requirements to business units, approving SC changes such as new suppliers or contract renewals, and providing joint post-incident analysis and recurring seminars on the current SASC cyberthreat landscape. Thus, this team would serve as the central resource for SC threats (CSC, 2020, pp. 8-10). Such a new task force would significantly improve SASC risk information sharing and appropriate resource funding to aggregate all-source information by public and private partners. It would allow to rapidly address SC incidents and simplify supplier management below the executive leadership level. Finally, it would set an increased focus on heightened SCSRM support for IT service, software, and hardware SCs, pointing out particular vulnerabilities of each MS’s SC.

6.1.5 Train Space Asset CSCRM throughout NATO Exercises

NATO should include space asset CSCRM in every NATO exercise, to support NATO’s forward leaning, collective defence approach (Vasen, 2020, pp. 21-23). Such a thorough joint training would enhance

“allied capacities to prevent, defend against, and recover from attacks on space infrastructure. In turn, these activities will demonstrate allied resolve to protect and leverage space systems in broader transatlantic security missions” (Silverstein, 2020, p. 9).

Measures should include “training for relevant stakeholders’ organization-wide, such as in the departments of SC, […] legal, as well as key suppliers” (NIST, 2020a, p. 16). Lister pledges to include therefore relevant private sector suppliers and warns that

“if the incident response to a cyber SC attack is not rehearsed by members of the space community beforehand, it is going to be too late to apply lessons learned or respond most efficiently and effectively when facing the first major cyber incident. Also, this allows NATO to understand all of the stakeholders of such an incident prior to responding to an incident, which can help save valuable response time during an actual incident” (Lister, 2020b).

Training the individual end user of space assets is key, as a lot of military staff are frequently redeployed (Wells & Sielaff, 2020). Such training will help to identify responsible NATO functions, audit suppliers and incorporate feedback and thus enhance the mutual and clear understanding of space assets’ potential contribution to operations, as required in AJP-3.2 (CISA, 2020, p. 1).

Furthermore, Heren and Caudill advocate for engaging white hat hackers to test for possible vulnerabilities throughout NATO training (Caudill, 2020).81 This may involve issuing rewards for hackers who hack a satellite and disclose their method. Some other training steps may involve phishing simulation exercises, mapping upcoming cyber SC threats and priorities, or tabletop exercises to determine appropriate stakeholders and their responsibilities throughout incident response. Subsequently, training and test reports should be appropriately shared not only to the military and intelligence community, but as well the commercial sector (Livingstone, 2020). Such collaboration will help to “closely collaborate with […] key suppliers; include key suppliers in […] resilience and improvement activities [and] assess and monitor throughout the supplier relationship [and] plan for the full lifecycle” (NIST, 2020b, p. 6).

6.2 Regulation

The significant need for security regulations on all space asset segments is aggravated by severe difficulties in resolving vulnerabilities once on-orbit assets are in space. Highest-level advocacy within NATO is needed to reach similar sophistication of written guidance for space as it exists for Air, Land, Sea and Cyber (Vasen, 2020, pp. 22-23). Hence, NATO should adopt a comprehensive regulatory and standardization framework for its SASC suppliers. This should include mandatory reports of all space asset cyber breaches, and guidance on prioritization and determination of critical components and responsibilities (Akoto, 2020, p. 7). Aim should be to substitute the principle of Security by Obscurity by a principle of Security by Design and Default both for technology and SCs, turning NATO into a cybersecurity-aware, constantly learning organization, analysing but not punishing incidences and celebrating good and best practices.

6.2.1 Streamline Data Standardization and Classification Levels

NATO MS should discuss “how national capabilities can work together with others, how they can provide national ISR for the common good and share that information with other MS” (Hill, 2020). Silverstein states that

“many NATO members are undeniably proficient in space technology and can contribute to sharing agreements [on] unique data and capabilities, and also build beneficial redundant layers within the NATO space ecosystem. These redundancies help bridge the gap between growing military reliance on satellites and the inherent fragility of space objects” (Silverstein, 2020, p. 7).

Wells points to standardized encryption of all data throughout the NATO SASC having to become obligatory, as “one has always to operate under the assumption that somebody tapped in” (Wells & Sielaff, 2020). However, as suggested by Falco (2020), not all systems and organizations may be able to afford the processing around this, especially when considering legacy systems. Thus, it is important to consider the prioritization of risk mitigation techniques, encryption being included. Furthermore, Vasen suggests introducing formatting standardization throughout NATO’s cyber SASC, such as through following specific frequencies for SATCOM or software, or streamlining data formatting such as for timing. This will simplify the integration of given data within NATO’s processing systems. Such formatting standardization should be continuously undertaken by each MS before forwarding data to NATO, to decomplicate its later use.

Additionally, classification levels for key members in the commercial sector should be streamlined, to reduce “barriers to sharing space systems and data” (Silverstein, 2020, p. 5). Therefore, NATO should invest in unified secure platforms for exchanging information with suppliers, allowing them to involve the military end-user in the development and production supply chain to give immediate feedback. As an example, the US Office of the Director of National Intelligence (ODNI) currently aims to declassify information such as through one-time read-ins for permitted SC members, influencing supplier conduct through contractual security requirements. Such streamlining may resolve military stove-pipe thinking through allowing for

“agile acquisition processes capable of absorbing innovative capabilities, commercial and military [,] more flexible, agile and resilient […] acquisition processes and faster command and control constructs to maintain the advantage in any conflict” (US Space Force & US Air Force, 2020, p. 8).

Finally, as stated by Yingst, streamlined “vetting of staff to avoid insider threats is critical to provide security and trust, whether it’s the service provider or those who are providing assets, hardware or software to the space infrastructure or the operators of the space infrastructure” (Yingst, 2020). Sielaff states that employees need to undergo stricter clearances and have a good operational understanding of interacting with commercial representatives and users. Thus, CCSDS suggests developing an enterprise security plan, which is an

“assurance that any shared resources (e.g., organizational processes, networks, and physical facilities) are adequate for the highest criticality and sensitivity handled [… which] should take into account regulatory authority, trust relationships, supply chain, and line management authority” (CCSDS, 2019, p. 16).

6.2.2 Enhance Procurement Contract Requirements

A standardized security framework for SASC cybersecurity should be created for NATO procurement processes to enhance contract requirements. As stated by Falco, “we need to move forward and increase accountability of manufacturers and space asset component developers for software and any other part of the SC” (Falco, 2020). This includes streamlining working terminology, external and internal assessments, incident reporting and communications across all partners and entities, as “there seems to be a lack of organised structure as far as regulation within the community” (Lister, 2020). Thereby, Timm states that “when you look at the actual SC cybersecurity itself, everything comes to play through a contract. You have to install controls in the contracts down the SC, to increase responsibility and knowledge about adverse effects” (Bander et al., 2020).

Hence, NATO should, at a strategic level, further focus on enhancing its supplier contracts to allow for more security, integrity, and quality of data delivered (CISA, 2020, p. 1). This should be done through integrating or partially adopting industry standards and procedures, to provide for an understandable and manageable structure of the SASC. Within NATO, Standardization Agreements (STANAG) or NATO Standardization Recommendations (STANREC) might be used as cover agreements. This would reduce disaggregated, smaller space asset contract series to a centralized industry procurement framework (Waterman, 2020, pp. 1-6). Thereby, as suggested by US Space Force and US Air Force, through creating “a single-entry point for all SATCOM requirements, enterprise SATCOM needs can be acquired in a deliberate and efficient manner, avoiding the stovepipes of the past […] using multi-year, pooled-resource contracts when possible” (US Space Force & US Air Force, 2020, p. 8). Finally, such an approach will simplify senior leadership’s oversight through a common playbook, single incident-handling processes, and will prevent duplications to the greatest possible extent. Appropriate regulation enhancement measures include:

1. Adopting a standards-oriented, streamlined supplier risk approach to SASC cyber risk assessment processes;

2. Incorporating strengthened insurances, such as for data confidentiality, into negotiations with suppliers;

3. Better monitoring progress, incidents and operations via customer and supplier assessments to determine SASC cyber risk assessment maturity.

However, NATO should as well ensure “that commercial contracts meet military protection standards, in order to mitigate the risk posed by the military’s use of commercial space assets” (Unal, 2019, p. 26). Commercial standards complying to those requirements, which could be partially or completely adopted by NATO, exist and are well-trusted (Wells & Sielaff, 2020).

### Solvency---U.S-NATO Key

#### Cooperation between U.S and NATO is key to robust space policy.

Frank Rose, 20 (Frank Rose was a senior fellow and the co-director of the Center for Security, Strategy, and Technology in the Foreign Policy program at Brookings Institution and served at the U.S. Department of State as the assistant secretary of state for arms control, verification, and compliance and the deputy assistant secretary of state for space and defense policy, 4-22-2020, accessed on 6-19-2022, Brookings, “NATO and outer space: Now what?”, <https://www.brookings.edu/blog/order-from-chaos/2020/04/22/nato-and-outer-space-now-what/>, HBisevac)

At the end of the day, NATO’s **ultimate effectiveness** in outer space will depend on its **cooperation** with the alliance’s **most important** space power: the **U**nited **S**tates. To date, U.S. leadership has been the key driver of NATO decisionmaking on outer space, and senior U.S. officials have actively engaged the alliance leadership. For example, in October 2019, General John Raymond, commander of U.S. Space Command and chief of space operations, briefed the NATO Military Committee on outer space security issues. These types of senior-level engagements between U.S. political and military leaders should continue and be expanded. In addition to senior-level engagements, there are a number of other actions NATO and the United States could take to improve **cooperation** and **coordination**. Specifically, they should establish **clear consultative mechanisms** between NATO, U.S. Space Command, and the U.S. Space Force. One relatively easy step that could be taken quickly would be to establish a NATO liaison officer at U.S. Space Command and/or U.S. Space Force headquarters. Indeed, a number of allied officers are currently attached as liaisons at several U.S. combatant commands like U.S. Strategic Command (STRATCOM).

The United States should also seek to incorporate **NATO representatives** into its outer **space**-related **wargames** where possible, especially the Schriever Wargame, the premier U.S. space wargame. According to a U.S. Air Force press release, several allies including Australia, Canada, New Zealand, the United Kingdom, France, Germany, and Japan, have participated in previous Schriever Wargames. The United States should invite NATO political and military officials to participate in the next Schriever Wargame.

COOPERATE WITH THE EU

NATO should also explore ways to cooperate with the **EU** on outer space, primarily because the EU has developed and deployed the **Galileo** global navigation **satellite system**, which like the U.S. Global Position System (GPS), provides accurate **positioning** and **timing** **info**rmation. In particular, Galileo includes a capability known as the **P**ublic **R**egulated **S**ervice (PRS), an encrypted navigation service for governmental authorized users and sensitive applications that require **high continuity**. In a crisis situation, PRS could provide NATO **important redundancy** against an adversary’s attempt to **jam** or destroy **GPS**. While many members of NATO are also members of the EU and have access to PRS, non-EU NATO members, and NATO as an organization, currently does not. Therefore, NATO should begin consultations with the EU about the possibility of **gaining access** to PRS for the alliance.

DON’T FORGET DIPLOMACY

Military solutions alone will not allow the United States and its allies to address the increasing anti-satellite threat. While I have generally supported many of the Trump administration’s space security initiatives like the re-establishment of U.S. Space Command, a key element missing from the Trump administration’s outer space security strategy has been the complete lack of a diplomatic component. Without a more comprehensive strategy that includes a strong diplomatic element, it will make it difficult for NATO to maintain enough political cohesion to pursue effective military policies. These tensions were highlighted in a recent article that noted: “With the exception of France and the United Kingdom, many Europeans countries are deeply uncomfortable with, or down right opposed to, the development and use of weapons in space.”

This is not a problem unique to outer space. Throughout its history, there has been constant tension within NATO over the appropriate balance between defense and diplomacy in its strategy. Since the late 1960s, with the approval of the Harmel Report, named after former Belgian foreign minister Pierre Harmel, NATO has sought to more effectively balance some of the inherent tensions between defense and diplomacy. One of the key findings from the Harmel Report was that “military security and a policy of détente are not contradictory but complementary.” Arms control was considered an essential element of this strategy. The general Harmel Report approach has shaped the key strategic decisions that the alliance has taken over the past 50 years, most notably the “Double-Track” decision in 1979 to deploy intermediate-range nuclear forces in Western Europe, while simultaneously engaging the Soviet Union in arms control negotiations.

As part of its overall strategy for outer space, NATO should develop options and recommendations on how it can advance diplomatic solutions to address the emerging threat to outer space systems. In particular, NATO should task the Arms Control and Disarmament Committee to examine what role the alliance could play in developing norms of behavior to encourage responsible use of outer space. And even though the Trump administration has generally been opposed to arms control, it has expressed openness to the development of norms for outer space. In an recent speech, Assistant Secretary of State Christopher Ford stated: “We clearly need to do more to develop non-legally–binding international norms of responsible behavior that are complementary to the existing legal regime.”

U.S. LEADERSHIP WILL BE KEY

With the **increasing role** that outer space is playing in **military operations**, and the **rise** of the **anti-satellite threat**, NATO was correct in its decision to declare space as an operational domain in December 2019. The question now is whether the alliance will be able to translate this broad political guidance into an effective strategy.

An effective NATO strategy for outer space will depend on the ability of the alliance to **build consensus** on the threat; **mainstream** outer space into NATO’s political and military institutions; find ways to **cooperate** with the EU; and **incorporate diplomacy** into that strategy. But at the end of the day, all of this will **require** clear, sustained, and consistent **U.S. leadership**.

### UQ---Intent---AT: Alt Causes

#### Adversaries perceive cyber-attacks as the most efficient and advanced way of nullifying US asymmetric advantages.

Steve Lambakis 7-5. Editor-in-Chief of Comparatives Strategy and a defense analyst at the National Institute for Public Policy. He is also a defense analyst at the Strategic Alliance Business Group and speechwriter for the Director of the Missile Defense Agency. “Space as a warfighting domain: Reshaping policy to execute 21st century spacepower”, Comparative Strategy vol. 41, Issue. 3, pp. 6-7. T&F. 07-05-2022. <https://www.tandfonline.com/doi/abs/10.1080/01495933.2022.2087419?src=&journalCode=ucst20>. //EM

Elevated threat risk to U.S. space systems

Over the past two decades, multiple threats have emerged to U.S. space systems. China and Russia have made strategic choices to develop their spacepower capabilities, to include conducting live anti-satellite tests in space and building capabilities that can damage or destroy U.S. space assets. According to former Secretary of Defense, Mark Esper, “China and Russia are weaponizing space through the development of anti-satellite missiles, directed energy weapons, and more, all designed to hold the United States and allied space systems at risk. They have turned a once peaceful arena into a warfighting domain.”14 Space access and space denial are critical components of Chinese and Russian national and military strategies.15 Both China and Russia perceive space systems as viable targets to nullify U.S. asymmetric advantages in other domains and gain a strategic foothold for future competition or counter a possible U.S. intervention during a regional military conflict.16

China has a robust network of space surveillance sensors capable of searching, tracking, and characterizing satellites in all Earth orbits. It is also developing electronic warfare, cyberthreat capabilities, sophisticated on-orbit capabilities, kinetic energy weapons (such as ground-based anti-satellite weapons), and possibly directed energy weapons in addition to other counterspace technologies.17 China also has an unmanned, reusable space plane program.18

China began its ASAT tests in 2005 and in 2007 destroyed a satellite in orbit that created significant space debris in low Earth orbit. Since then, it has conducted more than a dozen additional tests, including some in higher orbit, demonstrating the possibility of placing most U.S. satellites at risk. It has fired lasers at satellites and has five military bases capable of firing light to blind or destroy satellite optics. It also has incorporated cyberattack plans.19

For the past three years, China has fired more rockets into space than any other country and has had the most aggressive programs for other military and scientific efforts in space.20 As it develops the capability to destroy the U.S. Global Positioning System, it has constructed for itself a super-secure network of satellites and controllers for global communications, in addition to a 35-satellite highly precise navigation system. Despite the fact that China officially advocates for the peaceful use of space and pursues agreements on the non-weaponization of space, Beijing continues to improve its counterspace weapons capabilities and ability to fight wars in and through space.21

As part of its modernization efforts, Russia is expanding its space capability by investing significantly in a full range of capabilities, to include ASAT kinetic weapons, lasers, jammers, and cyber weapons.22 Early in 2020, the commander of U.S. Space Command commander, General Jay Raymond, highlighted the concerning behavior of two new Russian satellites with distinct similarities to other Russian satellites that launched a high-speed projectile in 2017.23 Russia continued its ASAT development activities in 2019 and 2020.24

Another aspect of the threat profile is the U.S. reliance on cyberspace and the electromagnetic spectrum. China, Russia, North Korea, and Iran are honing their cyber assault skills and putting them into practice.25 A cyberattack on space systems can result in data loss, widespread disruptions, and even permanent loss of a satellite and system shutdown. Denial of service or loss of system performance can mean denial or loss of capability, which means such attacks have the same impact as a kinetic assault on defense and economic assets that rely on digital systems.

Space systems, which are part of the information network that relies entirely on digital systems and data flow and on software and radio-frequency links, are especially vulnerable to electromagnetic pulse (EMP) attacks. An EMP might create havoc not only on Earth, but also within satellite systems. The United States has a variety of systems, including Nuclear Command and Control and missile warning capabilities, whose survival, despite significant technical survivability enhancements, might be challenged by a nuclear detonation in space.26 The threat of a cyber-attack on U.S. space assets is being viewed as the likely form of attack, at least in the near term.27

### UQ---Russia/China/NoKo

#### Increasing actors in space make escalation inevitable.

Stephen Ganote et al. 19 (Stephen Ganote is a Managing Director at Avascent where he serves clients in space communications and select defense tech markets and leads its commercial space practices, Janie Yurechko is a Strategic Development Specialist at Ball Aerospace and a MBA Candidate at Georgetown University, Diana Jack is a manager in Avascent's Space practice where she provides strategic guidance to major primes, New Space companies, and governments, Connor O’Shea is President and Co-Founder at Westgen Technologies Inc, a remote power generation and methane reduction technology company, 9-30-19, accessed on 6-19-2022, Atlantic Council Scowcroft Center for Strategy and Security, “Reenergizing Transatlantic Space Cooperation”, <https://issuu.com/atlanticcouncil/docs/reenergizing_transatlantic_space_cooperation>, HBisevac)

Today, a variety of space assets provide the **U**nited **S**tates and **Europe** with sizable economic and **security advantages**. However, the international terrestrial and outer-space contexts in which these systems operate are changing **more rapidly today** than at any previous point. The dynamics of use, the geopolitical and technological threat profile, and the innate challenges of space have all **surpassed** what the current structures were **designed** to **handle**, and this has been acknowledged by senior leadership on both sides of the Atlantic.

Perhaps the most dramatic contextual change from the era which produced the current mechanisms of space cooperation is the recent **diversification** of space **actors** and **applications**. Space has become “**democratized**,” with numerous companies, governments, and others using space to a **degree** **never seen before**. Investment in privately owned space assets has grown tremendously in the last five years, with companies such as SpaceX, OneWeb, Planet, Rocket Lab, Amazon, Orbital Insight, and others planning thousands of new satellites, launch vehicles, ground systems, and data-analytics offerings.16 Commercial industry also has ambitions in space exploration (including missions to both the Moon and Mars) and space mining, concepts that current mechanisms failed to consider, raising new **legal** and **sovereignty questions**. These new actors are introducing new technologies and processes—such as **line manufacturing**, **a**rtificial **i**ntelligence and **m**achine **l**earning—that are **disrupting space** as well. **Government**-**sponsored** space activities have grown just as **rapidly**, with nearly **sixty countries** now operating in space. Just in the past year, Australia and Saudi Arabia both announced the creation of new space agencies, the latter committing $5 billion, a sum almost equal to the entire budget of ESA.17 A diverse set of countries, from India to Indonesia to Nigeria to Norway, is investing in new space assets. In the future, space will be marked not by a scarcity of users and uses, but an abundance.

This immense proliferation of assets and actors brings with it a **new set** of **challenges**. Space is becoming **more crowded**: Over the next few years alone, **thousands** of satellites are projected to join the approximately **three thousand** currently in orbit.18 This explosion in spacecraft, and the introduction of hundreds of new, inexperienced space stakeholders, **complicates** the **management** and **protection** of space assets. When satellites and other space objects reach end-of-life, they often become **uncontrolled space debris**, which can destroy or **impede critical sat**ellite**s**. Space launches, satellite failures, anti-satellite (ASAT) tests, and other events are adding to a **growing sea of debris**, pieces of which can stay in orbit for thousands of years. Today, ESA and USSTRATCOM both track more than twenty-nine thousand objects in orbit, double the number two decades ago.19 Concerningly, this number is projected to grow to more than one hundred thousand over the next decade (see Figure 6).20 This congestion is **increasingly** causing **harm**: an Iridium satellite was destroyed by a collision with a defunct Russian satellite in 2016; Capella Space recently reported that one of its satellites narrowly avoided a catastrophic collision with a piece of space debris; and as noted above, debris from a 2019 Indian ASAT test now threatens the International Space Station. 21 Debris interference has even been suspected in the 2019 failure of Intelsat 29e.22

In addition to growing competition for physical space, more satellites are competing for finite (and crowded) radio-frequency spectrum. Space stakeholders express growing concern about **coordinating transmissions** from many thousands of new satellites reliant on similar or overlapping frequency bands, as to avoid jamming signals and degrading capabilities.23 The advent of 5G is further complicating this issue. This coordination is **no trivial matter**; the Department of Defense, the most sophisticated and well-resourced space actor in the world, inadvertently jams its own satellites dozens of times a month.24

### UQ---Russia---Attacks

#### Russia has the intent now to attack the West---escalates to war.

Brandon Weichert, 21 (Brandon Weichert is a geopolitical analyst who runs The Weichert Report and is a former Congressional staff member who holds a Master of Arts in Statecraft & National Security Affairs from the Institute of World Politics, 11-16-2021, accessed on 6-23-2022, Asia Times, “Russia threatening space war with US”, <https://asiatimes.com/2021/11/russia-threatening-space-war-with-us/>, HBisevac) \*\*edited for ableist language\*\*

Last week, US President Joe Biden’s administration briefed NATO members about the imminence of a Russian invasion of Ukraine. This came after months of increasing tensions between the North Atlantic Treaty Organization and Russia over Crimea, the small peninsula that juts out into the Black Sea from Ukraine, which Russia annexed in 2014.

Shortly after these caustic US intelligence warnings to Europe, Russia test-fired an anti-satellite (ASAT) weapon that created such a large debris field in orbit that the astronauts on the International Space Station (ISS) were forced to take refuge in the SpaceX capsule, in anticipation of having to abandon the station.

(As an aside, there were Russian cosmonauts on the ISS who were also forced to take refuge in the Soyuz capsule docked on the Russian side of the ISS.)

Western media reported the US intelligence community’s warning to NATO about an imminent Russian invasion of Ukraine and Russia’s testing of an ASAT that threatened the ISS as separate events. They are not separate.

The US government has been distracted by the absurdity of its domestic politics. Russian leaders have sensed weakness they seek to exploit. The US appears ~~paralyzed~~ [disoriented] by bad leadership and internal dissent. Now may be the time for Russia to strike hard against the West and rewrite the European regional order in its favor.

While Ukraine is not part of NATO, the United States and its European allies have consistently articulated their opposition to any further Russian military actions in Ukraine. Throughout former president Donald Trump’s administration, for example, the United States gave Ukraine’s besieged military much-needed lethal aid to assist in the defense of its territory from greater Russian aggression.

Various NATO countries have also helped Ukraine enhance its national defenses while Russia has intensified its commitment to expanding its threat to Ukraine.

Whether the West would risk direct military confrontation with Russia over a non-NATO member like Ukraine is another matter entirely. Given the constant declarations of support for Ukrainian sovereignty, though, Moscow cannot be certain that the Western alliance would not intervene if it decided to cleave away more of Ukraine.

Therefore, Moscow has likely initiated plans to neuter any potential threat of a NATO defense of Ukraine against any Russian invasion by going after sensitive American and NATO satellites.

The surprise Russian demonstration in orbit was probably an example of radical deterrence: Moscow is letting Washington, Brussels and London know just how far it is willing to go to achieve its strategic objectives in what it views as its “near abroad” (in this case, Ukraine).

The Kremlin is asking the West if it values the security and economic prosperity of Ukraine over its own security and prosperity. Moscow is likely banking on the West saying that, in fact, it does not put its own interests behind those of Ukraine (it doesn’t).

Washington is now in a strategic quandary: Failure to respond with at least an in-kind demonstration in orbit would lead Moscow’s leaders to conclude that they can have their way with Ukraine. This conclusion would lead to the inevitable annexation of more of Ukraine by Russia while reinforcing the claims of both Russia and China that the United States is a great power in terminal decline.

On the heels of the disastrous Afghanistan withdrawal, given how much moral and diplomatic capital the West has (~~stupidly~~) invested in Ukraine, the failure of Western powers to respond to this Russian provocation would lead to greater aggression directed against the West, not just in Europe but around the world – and in space.

The United States relies on satellites more than any other nation on Earth. Not only are satellites key for modern communications and economic transactions, but they are critical in modern military operations.

Satellites form the backbone for the most basic functions of America’s global military. Removing those key satellite interlinks would render the US military impotent, leaving America and its allies vulnerable to attack from a predatory power, such as Russia.

In space, the United States has more to lose than any other country – and the Kremlin knows this. That fact explains why Russia began a rapid military modernization in 2010 to reorganize its forces to better fight – and win – a space war against the United States.

To deter Russia, the US must immediately test its own ASAT capability while deploying swarms of smaller, “bodyguard” satellites designed to protect America’s sensitive satellites in Earth orbit from ASAT attack.

At the same time, Washington must clarify its position on Ukraine: Either it stands with the embattled country, or it does not. Strategic ambiguity, in this case, invites greater challenge from Moscow – which is most unwelcome currently.

Failure to draw red lines clearly will lead to a Russian strike on US satellites that might precipitate a war. Or worse, a US defeat.

### UQ---Solar Storms

#### Solar storms are coming now.

Tibi Puiu, 7-1 (Tibi Puiu is a science journalist and co-founder of ZME Science, 7-1-2022, accessed on 7-8-2022, ZME Science, “Solar storms are pushing satellites toward Earth. This might get ugly”, <https://www.zmescience.com/space/solar-storms-are-pushing-satellites-toward-earth-this-might-get-ugly/>, HBisevac)

“The solar cycle 25 that we are entering now is currently increasing **very steeply**,” she said. “We do not know if this means that it will be a very tough solar cycle. It could slow down, and it could become a very weak solar cycle. But right now, it’s **increasing fast**.”

Clean up on low orbit

There’s a silver lining to all of this. Sure, operators might lose billions worth of satellites, but this new and strong Solar Maximum could help address a **much worse** problem we’ve been having for some time and which has only gotten **worse** with time: [**space junk**](https://www.zmescience.com/other/feature-post/spack-junk-10112021/).

NASA is monitoring some of the biggest pieces of debris out there, including approximately 20,000 objects as big as or bigger than a baseball and 50,000 objects as big as a marble. Smaller pieces of debris, however, are virtually undetectable right now, but NASA estimates there are **millions** of objects that are 50 microns to 1 millimeter in diameter.

That might not seem like such a big deal but consider that these tiny pieces of debris travel at **17,500** **miles per hour**. At these velocities, even an object with a tiny mass can exert a **powerful kinetic energy** capable of **significant damage** upon impact. Everyone’s seen the movie Gravity, right?

### Add On---AI

#### Federal SSA models are key to integrating AI into warfighting.

Warrior Maven 2019, Masters @ Columbia University, served at the Pentagon as a Highly Qualified Expert with the Office of the Assistant Secretary of the Army, 29 November 2018, “Secret Weapon: How AI Will Help America Win a War in Space,” <https://nationalinterest.org/blog/buzz/secret-weapon-how-ai-will-help-america-win-war-space-100737>

Bogdan explained that Booz Allen Hamilton, along with a coalition of commercial AI leaders, has pioneered a commercial technology platform designed to facilitate and accelerate AI adoption at scale within the federal government. The enterprise AI system, called Modzy, has significant commercial and military applications.

“First things you need to know is what is going on up there.There are a lot of different catalogues and libraries of what is up there --- and they are not all combined. Space Command and DoD are trying to combine space catalogues so they can have a single unified data library where everything including adversary information gets catalogued,” Bogdan said.

Modzy can deliver AI models that assist commanders by analyzing vast datasets and enabling them to develop an integrated view and make better-informed decisions. These datasets can cover a wide range of variables to include sensor information, targeting data, navigational details, threat libraries of enemy weapons and capabilities and various enemy missile launch and flight trajectory characteristics. Should a collective AI-empowered system be able to use advanced algorithms to combine and instantly access all of this interwoven information critical to response-time decision making, commanders could receive a life-saving “fused” or integrated combat picture.

“Threat information has to be tied into one system. We need systems to talk to each other, which only works if they are on a common communications hub. If you have multiple systems that are not coordinated, defending forces may think they have 12 missiles coming at them even though they are all looking at the same missile,” the MDA official explained.

The more streamlined and accessible information is, the faster AI-driven algorithms can compare new data against seemingly limitless databases of crucial to combat information to perform analytics, solve problems, make determinations, draw comparisons and synergize information.

“You are going to need strong analytics and you will need to look back at previous data using AI and Machine Learning. You have an ability to figure things out quickly because you will have AI going through all the different possibilities for how to protect assets. The loop gets quick and short,” Bogdan explained.

It makes sense that pooled data access would massively improve computational processing speed...

“The models and the algorithms you create for AI are only as good as the data you put in there. It is a matter of access to the right pools of data and the quality of that data,” Bogdan said.

#### AI leadership is critical to setting norms for peer competitors.

Martijn Rasser 2019, Senior Fellow in the Technology and National Security Program at the Center for a New American Security, Megan Lamberth, Ainikki Riikonen, Chelsea Guo, Michael Horowitz and Paul Scharre, 17 December 2019, “The American AI Century: A Blueprint for Action,” https://www.cnas.org/publications/reports/the-american-ai-century-a-blueprint-for-action

We find ourselves in the midst of a technological tsunami that is inexorably reshaping all aspects of our lives. Whether it be in agriculture, finance, commerce, health care, or diplomatic and military activities, rapid technological advancements in fields like advanced computing, quantum science, AI, synthetic biology, 5G, miniaturization, and additive manufacturing are changing the old ways of doing business. And AI—the technologies that simulate intelligent behavior in machines—will perhaps have the most wide-ranging impact of them all.

This judgment is shared by many countries. China, Russia, members of the European Union, Japan, and South Korea all are increasing AI research, development, and training. China in particular sees advances in AI as a key means to surpass the United States in both economic and military power. China has stated its intent to be the world leader in AI by 2030 and is making major investments to achieve that goal.

The United States needs to respond to this technological challenge in the same way it responded to prior technology competitions, such as the space race. U.S. leadership in AI is critical not only because technology is a key enabler of political, economic, and military power, but also because the United States can shape how AI is used around the world. As this report explains, while AI can be used for incredible good by societies, it already is being abused by authoritarian states to surveil and repress their populations. And advances in AI technology are enabling future malign uses, such as launching sophisticated influence attacks against democratic nations. The United States must make sure it leads in AI technologies and shapes global norms for usage in ways that are consistent with democratic values and respect for human rights.

#### Otherwise murky norms around AI trigger international war.

James Vincent 2019, report on AI and robotics for the Verge, 6 February 2019, “China is worried an AI arms race could lead to accidental war,” https://www.theverge.com/2019/2/6/18213476/china-us-ai-arms-race-artificial-intelligence-automated-warfare-military-conflict

Experts and politicians in China are worried that a rush to integrate artificial intelligence into weapons and military equipment could accidentally lead to war between nations.

According to a new report published by US national security think tank Center for a New American Security (CNAS), Chinese officials increasingly see an “arms race” dynamic in AI as a threat to global peace. As countries scramble to reap the benefits of artificial intelligence in various domains, including the military, the fear is that international norms shaping how countries communicate will become outdated, leading to confusion and potential conflict.

### Add On---Cables

#### Only defense of space based assets protect allies and stop EMP attacks---those collapse the entire undersea cable network.

Peter Pry, 18 (Peter Pry, served as chief of staff of the Congressional EMP Commission, and on the staff of the House Armed Services Committee and at the CIA, 1-17-2018, accessed on 7-9-2022, The Hill, “Trump must realize Reagan’s vision for Star Wars defense — and soon”, <https://thehill.com/opinion/national-security/369185-trump-must-realize-reagans-vision-for-star-wars-defense-and-soon/>, HBisevac)

Space-based defenses offer **revolutionary advantages** over existing **N**ational **M**issile **D**efenses (NMD), that cannot protect **U.S. allies** or **bases overseas**, might be hard-pressed to defend the U.S. mainland against increasingly sophisticated North Korean threats, and cannot defend the U.S. from large-scale **nuclear missile threats** from Russia or China.

Space-based defenses potentially can do **all the above**.

SDI-type defenses can intercept missiles during all phases of flight: boost-phase, mid-course, and terminal-phase. Such a system could shield U.S. allies and troops overseas; much better protect Hawaii, Alaska, and distant U.S. territories; and could not as easily be attacked, overwhelmed, or fooled with decoys as NMD.

These advantageous characteristics of space-based defenses are all the more **important** because of the existential threat from nuclear electromagnetic pulse (EMP) attack. Even a **single warhead** successfully delivered against allies overseas or against the United States could black out an **entire nation** and kill **millions**.

Even a single weapon detonated for EMP at mid-course, over the ocean, would have catastrophic consequences for the world economy. Ambassador Henry Cooper warns: “Whether deliberate or accidental, the EMP from such high-altitude explosions could disable the world’s entire undersea cable network that reportedly carries about $10 trillion of financial transactions in a single day as well as huge volumes of data, from e-mails to classified government-to-government information.”

#### Cable disruptions obliterate the internet.

James Kraska, 20 (James Kraska, chair and professor of International Maritime Law at the U.S. Naval War College, visiting professor at Harvard Law School, distinguished fellow at Law of the Sea Institute, University of California Berkeley School of Law, permanent member of the Council on Foreign Relations, 7-10-2020, accessed on 6-24-2022, Lawfare, “Submarine Cables in the Law of Naval Warfare”, <https://www.lawfareblog.com/submarine-cables-law-naval-warfare#:~:text=Article%2054%20of%20the%201913,blockade%20of%20the%20enemy%20state>., HBisevac)

No technology is as profoundly important to the global economy as the internet, which is **dependent** on the security of a **vast network** of some 750,000 miles of **seabed cables** that criss-cross the oceans’ depths. The interdependence of global submarine communication systems means that a break in one cable can have **cascading effects** on internet access to **distant states**. While the rules to protect this critical infrastructure in peacetime should be refurbished, the need to further develop the rules to secure this global infrastructure during periods of armed conflict is perhaps even more compelling. Although several peacetime treaties protect submarine cables from disruption and criminal acts, albeit weakly, the rules that apply during naval war are even more antiquated. Because the law of naval warfare is principally based on custom and state practice rather than treaties, there is considerable uncertainty over how submarine cables would fare in conflict at sea.

#### Internet disruptions are existential risks.

Nick Merrill 21, Director of the Daylight Lab at the UC Berkeley Center for Long-Term Cybersecurity, 9/27/2021, “Like our planet, the Internet is in danger,” https://nickmerrill.substack.com/p/like-our-planet-the-internet-is-in?s=r

While users’ experience of the Internet is always local,1 Internet infrastructure is truly global. It unfolds across diverse material forms: light pulses under the sea, radio waves through the air, electricity through copper wires under the earth. There is nowhere on our planet where this infrastructure isn’t. You can get an Internet connection anywhere on the surface of the earth. For me, this image of the planet evokes both wonder and anxiety. It’s something incredible, but it’s also something that can destroy us. Like our planet, the Internet is in danger. And, like the planet, our species could go down with the ship.2 If the Internet were to destabilize, industrial collapse could well follow—locally, regionally, or globally. Without hyperbole, how we steward the Internet will determine the fate of our species. We cannot approach climate change without a global internet, let alone manage a global system of trade.3 A changing climate, aging infrastructure, and an increasingly multi-polar international stage has produced a recipe for disaster—or rather, for numerous disasters—which I expect would fall differentially along the usual lines of power and privilege.4 Footnote 3. 3 More people are aware of the existential risk of AI than the existential risk of Internet instability, even though the Internet is the medium through which AI operates! Footnote 4. 4 Global or repeated meltdowns (i.e., frequent, widespread, and prolonged periods of unexpected behavior) could cause systems of pricing, trade, logistics, and international finance to disintegrate in unpredictable ways across diverse geographies and timescales.

### Add On---Governance

#### Enhancing NATO cooperation over satellites bolsters U.S space governance.

Aaron Bateman, 20 (Aaron Bateman is pursuing a Ph.D. in the history of science and technology at Johns Hopkins University and previously served as a U.S. Air Force intelligence officer, 4-29-2020, accessed on 6-11-2022, War on the Rocks, “AMERICA NEEDS A COALITION TO WIN A SPACE WAR”, https://warontherocks.com/2020/04/america-needs-a-coalition-to-win-a-space-war/, HBisevac)

In February, Gen. Jay Raymond, the new chief of space operations and the head of U.S. Space Command, publicly stated that two Russian spacecraft were tailing a U.S. satellite. He said that Russia’s behavior was “highly unusual and disturbing.” On April 15, U.S. Space Command announced that Russia tested an anti-satellite weapon. Russia and China both recognize that American high-precision warfighting is **dependent** on **space systems**. According to the U.S. director of national intelligence, both Russia and China are developing capabilities to **destroy U.S. satellites** in all orbital regimes — at all altitudes. But, unlike in the past, the United States is not on its own. It has allies and partners to turn to.

During the Cold War, the United States and Soviet Union were the two dominant space powers and both worked diligently to develop space weapons. European allies, France in particular, decried efforts to create anti-satellite systems. Since the collapse of the Soviet Union, the number of spacefaring nations has markedly increased. And, as the world has become more dependent on space systems, attitudes about space security have changed. The United States has demonstrated its commitment to space security through the revival of U.S. Space Command and the establishment of the U.S. Space Force. Other countries have, too. France and Japan, for example, have announced the creation of their own military space commands. NATO has declared that space is an operational domain. Now, the United States has allies who are eager to create a more robust network for **monitoring adversary activity** on orbit and to establish a **unified space doctrine** to achieve a **resilient** space security **framework**. Washington can build a **coalition** with its **spacefaring allies** to effectively prepare for and win a war that extends into outer space. Indeed, the United States should **leverage** its allies to build a more **robust network** to **monitor** and track activities in space. While doing so, Washington should lead its allies and the world to **develop norms** and practices that prevent **destabilizing military activities** in space.

The Cold War

During the Cold War, the United States included allies in its national security space activities but only on a limited basis. America’s focus was on reconnaissance satellites, which were a closely held secret. The U.S. government did not even acknowledge the existence of the National Reconnaissance Office until 1992. Space reconnaissance activities were not publicly discussed in any detail. Cooperation in this sensitive area of U.S. space activity primarily involved the limited sharing of space-derived intelligence with select allies. Only the heads of NATO members were briefed on the existence of intelligence satellites. Beyond those heads of states, only the British had privileged access to American space capabilities. The United States shared raw images from imagery satellites with the United Kingdom as far back as the 1960s.

The importance of space systems did not reduce allies’ concerns about the weaponization of space, even when the Soviet threat became more pronounced. In the 1970s, the Soviet Union possessed a co-orbital anti-satellite weapon — a satellite designed to maneuver next to its target on orbit and destroy it — called Istrebitel’ sputnikov or “satellite killer.” The United States promptly responded to the threat. In 1976, then-CIA director George H.W. Bush sent a memorandum to the national security advisor, stating that the United States needed to re-evaluate the vulnerability of its overhead reconnaissance systems. Beginning in 1977, the United States reinvigorated its efforts to develop an operational anti-satellite capability.

In the late 1960s, the British had launched the Skynet-series communication satellites that provided secure communications across the European theater; the system is located in geosynchronous orbit — 22,236 miles from Earth. London was primarily concerned with discouraging the United States and Soviet Union from developing anti-satellite weapons that could reach geosynchronous orbit. The British worried that, if the United States developed anti-satellite weapons that could reach geosynchronous orbit, the Soviet Union would follow suit and threaten Skynet. The British did, however, support the United States in matching the existing Soviet anti-satellite capability.

Most European allies were, however, overtly critical — or lukewarm at best — about America’s efforts to develop an anti-satellite weapon. The French, in particular, were especially critical and called upon the United States and Soviet Union to prevent an arms race in space and implement arms control for anti-satellite weapons. Even as the allies began building their own space capabilities, they were not supportive of U.S. efforts to respond militarily to the Soviet space threat. Many NATO members were not fully aware of how dependent the alliance had become on information derived from space systems. Washington had grown accustomed to pursuing national security activities in space under a shroud of secrecy with minimal allied consultation. The Cold War legacy of U.S. dominance and secrecy has left many in the space community with the mistaken belief that the United States should again go it alone.

Ready Allies

In the post-Cold War era, the space environment has **markedly changed**. There has been a proliferation of both American and foreign **commercial space capabilities**, an expansion of the **number** of **spacefaring nations**, a greater **reliance** on space systems by not just the United States but also its allies, and a significant growth in the **number** and **sophistication** of **threat actors** in space. While the United States, China, and Russia are certainly the most capable spacefaring nations, Washington’s allies have much to offer to create **greater resiliency** for space systems and to win a war that extends into outer space. As the threats expand, U.S. cooperation with allies ought to expand as well. Gen. John Hyten, the vice chairman of the Joint Chiefs of Staff, has emphasized the necessity of expanding allied relationships in the space arena. Unlike during the Cold War, American allies are **willing** and **eager** to collaborate with the United States.

For example, last year, NATO declared space an operational domain. However, this announcement should be **followed** up with **doctrine**. In 2019, the U.K. Ministry of Defense published a document entitled “Towards a Defense Space Strategy.” The British government is intent on creating a cadre of space experts that can ensure the security of U.K. and allied national security space systems. Britain’s focus is on space-related training and collaboration with capable spacefaring allies.

Moreover, the United States already cooperates with Australia, Canada, New Zealand, the United Kingdom, France, and Germany at U.S. Space Command’s Combined Space Operations Center located at Vandenberg Air Force Base. Additionally, allies participate in the Schriever Wargames that examine “critical space and cyberspace issues in depth.”

Today, unlike during the Cold War, U.S. allies are more aware of the threats to space systems. The United Kingdom has made it very clear that it views space as a warfighting domain. America’s spacefaring allies, therefore, can serve as an important resource for ensuring **continued U.S. space dominance**.

Leveraging Allies

Current allied involvement is a good start, but more can be done to **prepare** for **war** extending into outer space — particularly in two areas: 1) **s**pace **s**ituational **a**wareness, now more commonly called space domain awareness; and 2) establishing **space-behavior norms**.

In January of this year, Japanese Prime Minister Shinzo Abe announced his country’s establishment of a Space Domain Mission Unit. Additionally, the Japanese Ministry of Foreign Affairs has a stated goal of providing high-quality space domain awareness and of “maintaining four information-gathering satellite systems.” While the unit will be located at Fuchu Air Base and use a radar “capable of monitoring space systems up to an altitude of 5,800 kilometers [3,600 miles],” the Japanese Ministry of Defense “will share information collected by the facility with U.S. forces.” Japan is providing a replicable model for other spacefaring nations.

Allies can make a particularly valuable contribution to space security in the realm of **space domain awareness**. As an increasingly diverse set of sensors are integrated with U.S. space domain awareness resources, a more accurate picture of **adversary activity** in space can be achieved. Fundamentally, to obtain better space domain awareness, terrestrial real estate matters. More ground-tracking stations allow the United States and its allies to better track threats on orbit. By using radar and optical systems spread out all over the Earth, it is possible to have much better coverage of potential threats in space. The United States can also work with allies who do not have any space capabilities to install **optical telescopes** and **radar systems** that can create a more robust and **global network** for **monitoring space threats**. Spacefaring allies, even in the most nascent stage of development, can play an invaluable role in this mission.

In early 2020, French President Emanuel Macron announced his country’s establishment of a space command that will be placed under the French Air Force. According to reports by the French Ministry of Defense, the French space command will develop a modified version of its Syracuse satellites that can observe threats on orbit and use on-board weapons to engage them if necessary. Even if France decides not to arm its satellites in the near term, its Syracuse system will have strong potential for expanding allied space domain awareness in space.

Though London has promised to present a formal U.K. space defense strategy, one has not yet materialized. During the Cold War, Britain was the only European ally that provided political support for America’s efforts to develop space weapons. Up until very recently, however, Britain has been largely silent on space security issues. Last year, then Defence Minister Gavin Williamson said the United Kingdom would remain at the forefront of the space domain. London is investing more in space intelligence capabilities, but it is not keeping pace with the threats from more sophisticated states.

Smaller allied countries might have limited but highly specialized services to offer a space coalition. Estonia, for example, has a reputation for high-tech innovation, especially in cyber security and digital services. Estonia has established its Space Office, which is working with universities and start-ups to develop a broad spectrum of satellites, especially micro-satellites. U.S. investment in countries like Estonia can help create space innovation eco-systems that can contribute to the overall resiliency of allied military space activity.

The integration of allied and international commercial space domain awareness and satellite systems is a necessary task, but there are substantial obstacles to overcome in the process. A RAND report stated that “U.S.-European military space activities suffer a plight equal if not worse than the slate of more traditional interoperability issues that arise among NATO allies.” As more countries contribute to space domain awareness, **uniformity** of data types will be of even **greater importance**. Many allied space programs are in a **nascent** stage and their potential has not been fully realized. Washington should actively encourage and work with European partners in their efforts to develop more capable space systems. As European allies develop more sophisticated capabilities for monitoring the space environment, Washington should push for interoperable systems that enable the **seamless sharing** of data across **NATO**.

The United States should work with European partners to develop a framework for monitoring and reacting to adversary threat activity such as a joint architecture for processing data from the many different allied space domain awareness sensors. A unified doctrine would focus on measures that enable foreign government and commercial systems to augment any loss of U.S. capability due to an attack. There are, however, potential legal obstacles and data-compatibility issues that will likely prevent the realization of an effective unified doctrine in the near term. Most importantly, Washington should work with its spacefaring allies to develop comprehensive plans for reacting to an attack on an allied space asset. However, a military response does not have to include an attack on an adversary space system. The fundamental need is having the ability to respond quickly and in a unified manner to any space attack. An integrated diplomatic response should be created for space crises as well.

Establishing Norms in Space

During the Cold War, the United States refused to establish public policies regarding threats to space systems. The State Department and Intelligence Community consistently advised the White House not to even publicly provide a definition of outer space. Refraining from establishing specific and clearly articulated policies is no longer an option in the post-Cold War era.

Allies — and potential allies — can assist the United States in **establishing norms** in space. If Paris moves ahead with deploying on-orbit weapons, the United States and all other **NATO** **members** should work with France to develop **specific rules of engagement** for the use of **space weapons**. Fundamentally, France is making it clear that Washington has a potential partner in a space war that is willing to use offensive weapons. It is essential, however, to ensure that there is an agreed-upon framework for using French offensive capabilities to respond to an attack against an allied system. Additionally, Washington should strongly urge Paris not to test any weapon systems against objects in space. Such testing could create debris that is a threat to other satellites and could encourage Russia and China to follow up with similar tests.

Because of greater access to space technology, the number of spacefaring nations will continue to grow while there will be an increase in the number of state actors that possess space weapons. The 2019 Indian anti-satellite weapon demonstration is a case in point. Iran, for another example, could construct a crude anti-satellite weapon in the near term. Therefore, it is imperative for the United States to work with Israel — the most capable spacefaring nation in the Middle East — in monitoring and deterring Tehran from entering the space weapons arena.

Russia’s recent anti-satellite weapon test and tailing of a U.S. satellite, and previous U.S. State Department statements about Moscow’s destabilizing behavior highlight the **lack** of **established norms** for military space operations. For example, how close is too close for a satellite? Clearly, establishing a code of conduct in space is something that the United States cannot do on its own. It should be a **joint effort** with spacefaring allies around the globe. Additionally, it is imperative that America and its allies publicly confront Russia, in particular, about its dangerous behavior in space.

Russia, China, and the United States are especially concerned about rendezvous and proximity operations such as maneuvering close to another space object. If a country conducts rendezvous and proximity operations without providing any warning or explanation, the action could be treated as a hostile military act. Just as an uncoordinated approach by a foreign vessel to a U.S. Navy ship would be treated as an aggressive act, so too should similar maneuvers that involve American and allied spacecraft. Therefore, it is vital for Washington to work with its allies to establish what specific **space behaviors** will be considered **unacceptable** and to **communicate** — and **enforce** — such standards with aggressive spacefaring nations like Russia and China.

The United States and its allies should work collectively to prevent the testing of weapons in space. The **debris** generated from these tests poses a **threat** to the **satellites** of all spacefaring nations. If more nations begin testing anti-satellite weapons, military space systems could be inadvertently damaged. This situation could lead to an overall **escalation** in **preexisting tension**.

The United States and its allies providing a **clearly defined code of conduct** for national security space activities is a **feasible** and **necessary step** to take in the immediate term.

Stronger Together

Certainly, though no one wants a war to begin in or extend into outer space, ignoring this possibility would be extremely negligent. The United States possesses highly sophisticated national security space systems that will be a prime target for capable spacefaring adversaries if a conflict should arise. In the past, the United States has presumed it can and will fight alone in space — but that is no longer necessary. Washington can better ensure its **dominance in space** if it more fully **embraces** its allies.

Washington would be wise to build a coalition that creates a more robust system for monitoring the space domain, reacting to space threats, and prevailing in a war that extends into outer space. Building a space coalition — especially one that includes allies from Europe, the Middle East, and Asia — is no simple task. But, working towards systems integration and also a common space doctrine is positive step forward towards increased resiliency of the space systems that are essential for precision warfighting. Of course, technical systems cannot be the only focus of the coalition; it should also devote attention to the development of norms for military space activity.

Hyten has stated that “**trying to fight alone in space would be a mistake**” — a mistake that we cannot afford to make.

#### That controls responses to every risk.

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We live in “a time of profound transformations to our global context,” stressed Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, during the presentation of the Global Risks Report 2015,4 in Davos, Switzerland. For him, mankind faces the accelerated effects of climate change and the increasing uncertainty about the global geopolitical context. Going further, the Bulletin of the Atomic Scientists Science and Security Board, in a recent analysis, pointed out that “ in 2015, unchecked climate change, global nuclear weapons modernization, and out-sized nuclear weapons arsenals pose extraordinary and undeniable threats to the continued existence of humanity.”5 That led its Doomsday Clock to be advanced by two minutes. Today it marks three minutes to midnight, the moment of the Earth's collapse.

There are many other reports and studies alerting to this catastrophe. Such an immeasurable disaster on Earth may affect all space activities, and their legal achievements. While focusing on outer space and space activities, international space law can be considered not only a probable victim of this disaster, but also an important instrument capable of preventing it. The fundamental 1967 Outer Space Treaty,6 as its Preamble points out, is inspired “ by the great prospects opening up for humanity as a result of man’s entry into outer space” and recognizes “ the common interest of all mankind in the progress of exploration and use of outer space for peaceful purposes.”

This obviously means that the fate of humanity is in the core of its attention. This paper attempts to demonstrate the ability and the need for international space law to face the critical situation of the Earth in extreme danger, including the legal examination and the use of juridical provisions presented in the recommendations of the main scientific documents already drawn up on this transcendental subject. In conclusion, some viable initiatives in the space law field are proposed as contributions to efforts to provide Earth with new guarantees of survival.

I. The Preventive Function of Law

The paper’s proposals raise the opportunity and the need to expand the scope and the objectives of international space law, including in it specific space issues of the Earth and of its life expressions. Furthermore, it is timely to underline that “ in today’s world, the preventive function of law is more vital than ever,” as observed Manfred Lachs (1914-1993) about 28 years ago. For him, it would be necessary for men around the world to feel this reality, “ in order to incite them to abandon something of the parish spirit and give them the feeling of the existence of a common interest, and of responsibility in application of law in the everyday life of nations, as well as to make them understand that, as usually is said, it is worth more act wisely together than commit follies separately,” At the same time, as a notable jurist and thinker, Lachs foresaw the dangers that the Earth is currently experiencing: “Today, it is required to work at a time when science and technology have placed in man’s hands weapons capable of creating a danger to life and even cause total destruction; when modern techniques create other dangers threatening the earth, water and air; when economic and political relations between the states require that a new order abolishes abyss between rich and hungry [...]” .7 If the world already was in great danger in the 1980s, what could be the magnitude of danger today?

II, Poly-Catastrophe

“Dark times [...] are not only not new, they are not a rarity in history,” as Hannah Arendt (1906-1975) observed.8 But today we are certainly living in often darker times. According to the Global Solidarity, Global Responsibility: An Appeal for World Governance - launched in Geneva, Switzerland, on 6 March 2012, and endorsed by the Collegium International members

"we are facing a conjunction of global crises that are unprecedented in history: depletion of natural resources, irreversible destruction of biodiversity, disruption of the global financial system, dehumanization of the international economic system, hunger and food shortages, viral pandemics and breakdown of political orders [...] none of these phenomena can be considered independently of the others. All are highly interconnected, constituting a single ‘poly-crisis’ that threatens the world with a ‘poly-catastrophe’ [...]”

The Appeal stresses that “ the great crises of the 21st century are planetary,” and that “ this is no butterfly effect, but the realization, grave and strong, that our common home is in danger of collapsing and that our salvation can only be collective.”9

III. Our World Today

The new Global Sustainable Development Goals - Transforming our World: the 2030 Agenda for Sustainable Development10 - have been adopted by Heads of State and Government and High Representatives, during the meeting at the United Nations (UN) Headquarters in New York from 25-27 September 2015 - with the UN celebrating its 70th anniversary. Paragraph 14 of this historic document presents the vision of the UN General Assembly (UNGA) on the world global situation today, as follows: “We are meeting at a time of immense challenges to sustainable development. Billions of our citizens continue to live in poverty and are denied a life of dignity. There are rising inequalities within and among countries. There are enormous disparities of opportunity, wealth and power. Gender inequality remains a key challenge. Unemployment, particularly youth unemployment, is a major concern. Global health threats, more frequent and intense natural disasters, spiraling conflict, violent extremism, terrorism and related humanitarian crises and forced displacement of people threaten to reverse much of the development progress made in recent decades. Natural resource depletion and adverse impacts of environmental degradation, including desertification, drought, land degradation, freshwater scarcity and loss of biodiversity, add to and exacerbate the list of challenges which humanity faces. Climate change is one of the greatest challenges of our time and its adverse impacts undermine the ability of all countries to achieve sustainable development. Increases in global temperature, sea level rise, ocean acidification and other climate change impacts are seriously affecting coastal areas and low-lying coastal countries, including many least developed countries and small island developing States. The survival of many societies, and of the biological support systems of the planet, are at risk.”

“ Climate change will amplify existing risks and create new risks for natural and human systems. Risks are unevenly distributed and are generally greater for disadvantaged people and communities in countries at all levels of development,” as Intergovernmental Panel on Climate Change (IPCC) says in Climate Change 2014 - Synthesis Report - Summary for Policymakers.11

IV. Care for Our Common Home

Pope Francis in his 2015 Encyclical Letter Laudato Si ~ On Care for Our Common Home - issued in 25 May - makes an “ urgent appeal for a new dialogue about how we are shaping the future of our planet.” According to Pope, “we require a new and universal solidarity,” as “ our present situation is in many ways unprecedented in the history of humanity.”

“ The Earth, our home,” - he stresses - “ is beginning to look more and more like an immense pile of filth,” because “ each year hundreds of millions of tons of waste are generated, much of it non-biodegradable, highly toxic and radioactive, from homes and businesses, from construction and demolition sites, from clinical, electronic and industrial sources.”

Pope Francis also warns:

“A very solid scientific consensus indicates that we are presently witnessing a disturbing warming of the climatic system [...} most of global warming in recent decades is due to the great concentration of greenhouse gases (carbon dioxide, methane, nitrogen oxides and others) released mainly as a result of human activity [...] The problem is aggravated by a model of development based on the intensive use of fossil fuels, which is at the heart of the worldwide energy system. Another determining factor has been an increase in changed uses of the soil, principally deforestation for agricultural purposes.”

“Warming has effects on the carbon cycle. It creates a vicious circle which aggravates the situation even more, affecting the availability of essential resources like drinking water, energy and agricultural production in warmer regions, and leading to the extinction of part of the planet’s biodiversity. If present trends continue, this century may well witness extraordinary climate change and an unprecedented destruction of ecosystems, with serious consequences for all of us,” as “ climate change is a global problem with grave implications: environmental, social, economic, political and for the distribution of goods.”

Moreover, Pope Francis remarks:

“We all know that it is not possible to sustain the present level of consumption in developed countries and wealthier sectors of society, where the habit of wasting and discarding has reached unprecedented levels. The exploitation of the planet has already exceeded acceptable limits and we still have not solved the problem of poverty. ”

“Caring for ecosystems demands far-sightedness, since no one looking for quick and easy profit is truly interested in their preservation. But the cost of the damage caused by such selfish lack of concern is much greater than the economic benefits to be obtained,” points out Pope Francis, And he adds that “ the alliance between the economy and technology ends up sidelining anything unrelated to its immediate interests.”

“The failure of global summits on the environment makes it plain that our politics are subject to technology and finance. There are too many special interests, and economic interests easily end up trumping the common good and manipulating information so that their own plans will not be affected.”

“ It is foreseeable that, once certain resources have been depleted, the scene will be set for new wars, albeit under the guise of noble claims. War always does grave harm to the environment and to the cultural riches of peoples, risks which are magnified when one considers nuclear arms and biological weapons [...] Politics must pay greater attention to foreseeing new conflicts and addressing the causes which can lead to them. But powerful financial interests prove most resistant to this effort, and political planning tends to lack breadth of vision.” 52

Wouldn’t these observations also applicable to outer space?

V. The Tragedy f Common Goods

To explain how we arrived to it at current bad situation of the common resources of Earth, Eduardo Felipe P. Matias recalls the article Tragedy of Common Goods, written in 1968 by American ecologist Garrett Hardin (1915-2003). Hardin recounts the case of a village of shepherds, whose sheep used a pasture in common. Each shepherd was engaged in putting more and more sheep in the pasture in order to increase his income. Over time, the pasture was saturated, and there was no pasture left to feed all the sheep. Most of them died. In sum, a tragedy. The shepherds abused the common good to increase their individual gains, ignoring the limits of nature. Although they gained more in short term, they lost out in long run. Already in 1999, it was recognized that “ a globalized world requires a theory of global public goods to achieve crucial goals such as financial stability, human security or the reduction of environmental pollution.” And that “many of today’s international crises have their roots in a serious under supply of global public goods.” 13

As to global human security as a public good, the 1994 Human Development Report has showed threats to world peace in transborder challenges: unchecked population growth, disparities in economic opportunities, environmental degradation, excessive international migration, narcotics production and trafficking and international terrorism,” It was equally said that the society would be “willing to pay for public goods that serve our common interest, be they shared systems of environmental controls, the destruction of nuclear weapons, the control of transmittable diseases such as malaria and HIV/AIDS, the preservation of ethnic conflicts or the reduction of refugee flows,” 14

Addressing the present question of common goods in his 2015 Encyclical Letter, Pope Francis points out:

“Whether believers or not, we are agreed today that the Earth is essentially a shared inheritance, whose fruits are meant to benefit everyone. Hence every ecological approach needs to incorporate a social perspective which takes into account the fundamental rights of the poor and the underprivileged. The principle of the subordination of private property to the universal destination of goods, and thus the right of everyone to their use, is a golden rule of social conduct He also notes that “ the natural environment is a collective good, the patrimony of all humanity and the responsibility of everyone. If we make something our own, it is only to administer it for the good of all. If we do not, we burden our consciences with the weight of having denied the existence of others.”

Antonio Cassese (1937-2011) commented that “ the concept of ‘common good’ is not yet felt by the members of the international society. Only state interests and their occasional convergence regulate international relations.” 15 The refugees tragedy in Europe today proves it.

VI. Uncertainty

According to Klaus Schwab, Executive Chairman of World Economic Forum, “ in the coming decade [...] our lives will be even more intensely shaped by transformative forces that are under way already. The effects of climate change are accelerating and the uncertainty about the global geopolitical context and the effects it will have on international collaboration will remain. At the same time, societies are increasingly under pressure from economic, political and social developments including rising income inequality, but also increasing national sentiment [...] [N]ew technologies, such as the Internet or emerging innovations will not bear fruit if regulatory mechanisms at the international and national levels cannot be agreed upon.”

The Global Risks Report 2015, in turn, stresses: “ 2015 differs markedly from the past, with rising technological risks, notably cyber-attacks, and new economic realities, which remind us that geopolitical tensions present themselves in a very different world from before. Information flows instantly around the globe and emerging technologies have boosted the influence of new players and new types of warfare [...] Past warnings of potential environmental catastrophes have begun to be borne out, yet insufficient progress has been made - as reflected in the high concerns about failure of climate-change adaptation and looming water crises in this year’s report.”

The Report sees three risk constellations that bear out its findings:

“ 1) The interconnections between geopolitics and economics are intensifying because States are making greater use of economic tools, from regional integration and trade treaties to protectionist policies and cross-border investments, to establish relative geopolitical power. This threatens to undermine the logic of global economic cooperation and potentially the entire international rulebased system;

2) The world is in the middle of a major transition from predominantly rural to urban living, with cities growing most rapidly in Asia and Africa. If managed well, this will help to incubate innovation and drive economic growth. However, our ability to address a range of global risks - including climate change, pandemics, social unrest, cyber threats and infrastructure development - will largely be determined by how well cities are governed; and

3) The pace of technological change is faster than ever. Disciplines such as synthetic biology and artificial intelligence are creating new fundamental capabilities, which offer tremendous potential for solving the world’s most pressing problems. At the same time, they present hard-to-foresee risks. Oversight mechanisms need to more effectively balance likely benefits and commercial demands with a deeper consideration of ethical questions and medium to long-term risks - ranging from economic to environmental and societal. Mitigating, preparing for and building resilience against global risks is long and complex, something often recognized in theory but difficult in practice.”

How to govern the emerging technologies and uncertainties?

VII. The Doomsday Clock

It is a symbolic clock face, marking countdown to doomsday. On 19 January 2015, it went on to score 23:57h, three minutes to midnight - the time of global catastrophe able to extinguish the human species inhabiting the Earth for many thousands of years. The decision to advance the clock by two minutes was taken after consultations with more than 20 scientists, including 17 Nobel laureates, among them famous physicists, such as the British Stephen Hawking, the Japanese Masatoshi Koshiba, pioneer in the study of neutrinos, and the American Leon Lederman. The clock has been maintained since 1947 - when the Cold War between the USA and the former USSR began - by the members of the Bulletin of the Atomic Scientists Science and Security Board. In 68 years, this sui generis indicator has been adjusted 22 times. Its worst moment came in 1953, triggered by American and Soviet tests with hydrogen weapons when the Clock scored 23:58h.

The Clock was conceived by the celebrated Chicago Atomic Scientists, that had actively participated in the Manhattan Project in the creation of the atomic bombs launched over Hiroshima and Nagasaki, Japan, in August 1945. Haunted with these bombings - that killed more than 100,000 people just on the first day, and many more in the following months - they started to publish a mimeographed warning newsletter and then the Bulletin. The closer they set the Clock to midnight, the closer the scientists believe the world is to a global disaster.

The Clock hangs on a wall in a Bulletin's office in the University of Chicago. Originally, it represented an analogy to the threat of global nuclear war. But since 2007 it has also reflected climate change, and new developments in the life sciences and technology that could inflict irrevocable harm to humanity.

The analysis of the Bulletin - addressed “to the leaders and citizens of the world” - says in sum: “ In 2015, unchecked climate change, global nuclear weapons modernizations, and out-sized nuclear weapons arsenals pose extraordinary and undeniable threats to the continued existence of humanity.” The group said in a statement: “ [Wjorld leaders have failed to act with the speed or on the scale required to protect citizens from potential catastrophe. These failures of political leadership endanger every person on Earth.” In 2014, with the Doomsday Clock at five minutes to midnight, the members of the Science and Security Board concluded their assessment of the world security situation by writing: “We can manage our technology, or become victims of it. The choice is ours, and the Clock is ticking.”

In 2015, with the Clock hand moved forward to three minutes to midnight, the Bulletin feels compelled to add, with a sense of great urgency: “The probability of global catastrophe is very high, and the actions needed to reduce the risks of disaster must be taken very soon.”

In face of the dangers affecting today civilization on a global scale, the Bulletin urges the citizens of the world to demand that their leaders, among other measures, "dramatically reduce proposed spending on nuclear weapons modernization programs” , as “ the USA and Russia have hatched plans to essentially rebuild their entire nuclear triads in coming decades, and other countries with nuclear weapons are following suit.”

At the start of 2015, nine States - the USA, Russia, the United Kingdom, France, China, India, Pakistan, Israel and Democratic People’s Republic of Korea (North Korea) - possessed about 15,850 nuclear weapons, of which 4,300 were deployed with operational forces. Roughly 1800 of these weapons are kept in a state of high operational alert, according to the Stockholm International Peace Research Institute (SIPRI). Launched on 15 June 2015, the SIPRI Yearbook 2015, which assesses the current state of armament, disarmament and international security, notes as one of its key findings that “ all the nuclear weapon-possessing states are working to develop new nuclear weapon systems and/or upgrade their existing ones.” 16

“There are too many nuclear weapons,” said Sharon Squassoni, an expert in nuclear weapons nonproliferation at the Center for Strategic and International Studies in Washington, USA. And she added: “The existence of these weapons takes a lot of time, effort, and money to keep them safe, and the bureaucracies are poised to keep these systems going indefinitely.” 17

For Hans M Kristensen, director of the Nuclear Information Project at the Federation of American Scientists, “ the projected costs of the nuclear weapons modernization program are indefensible, and they undermine the global disarmament regime.” 18

That is why another demand from Bulletin, addressed to world leaders, is to “ re-energize the disarmament process.” In practice it means that “ the USA and Russia, in particular, need to start negotiations on shrinking their strategic and tactical nuclear arsenals.”

The creation of “ institutions specifically assigned to explore and address potentially catastrophic misuses of new technologies,” is also a requirement proposed by the Bulletin.

The Bulletin’s appeals are also, to some extent, applicable to outer space, and some of its requirements can be objects of proper regulation by international space law.

VIII. Transparency and Confidence

The Earth being in danger, the transparency and confidence-building measures (TCBMs) are as vital as those of collective security. These actions are means by which Governments can share information aiming at creating mutual understanding and trust, reducing misconceptions and miscalculations and thereby helping both to prevent military confrontation and to foster regional and global stability. They played an important role during the Cold War, contributing to reducing the risk of armed conflict through mitigating misunderstandings on military actions, particularly in situations where States lacked clear and timely information.19 The need for such measures in outer space activities has increased significantly over the past 20 years, The world’s growing dependence on space-based systems and technologies and the information they provide requires collaborative efforts to address threats to the sustainability and security of outer space activities. TCBMs “ can reduce, or even eliminate, misunderstandings, mistrust and miscalculations with regard to the activities and intentions of States in outer space” , This is the conclusion of the Report of the Group of Governmental Experts on TCBMs in Outer Space Activities - a study adopted by consensus and issued on 29 July 2013.20

The Report adds that “ these measures can augment the safety, sustainability and security of day-to-day space operations and can contribute both to the development of mutual understanding and to the strengthening of friendly relations between States and peoples.”

It is acknowledged that “ the existing treaties on outer space contain several TCBMs of a mandatory nature. Non-legally binding measures for outer space activities should complement the existing international legal framework on space activities and should not undermine existing legal obligations or ham per the lawful use of outer space, particularly by emerging space actors.” The Group also discussed other measures, including those of a legally binding nature. The Group further agreed that “ such measures for outer space activities could contribute to, but not act as a substitute for, measures to monitor the implementation of arms limitation and disarmament agreements,” help States to enhance clarity of their peaceful intentions and create conditions for establishing a predictable strategic situation in both the economic and security arenas.

Similarly, included in the Report were "coordination and consultative mechanisms aimed at improving interaction between participants in outer space activities and clarifying information and ambiguous situations.” Likewise the Report recommended a coordination between the Office for Disarmament Affairs, the Office for Outer Space Affairs (OOSA) and other appropriate UN entities. Moreover, the Report drafted “ a series of measures for outer space activities, including exchange of information relating to national space policy such as major military expenditure in outer space, notifications of outer space activities aimed at risk reduction, and visits to space launch sites and facilities.”

The Group took note of the “Guidelines for appropriate types of confidencebuilding measures and for the implementation of such measures on a global or regional level” , as contained in the “ Study on the application of confidence- building measures in outer space”21

TCBMs for outer space activities are integrated in a broader context. The UN General Assembly endorsed, in its resolution 43/78 H, the guidelines on confidence- building measures adopted by the Disarmament Commission at its 1988 session. This resolution noted that “ confidence-building measures, while neither a substitute nor a precondition for arms limitation and disarmament measures, can be conducive to achieving progress in disarmament” .

The Report indicates the following categories of TCBMs for space activities as relevant: “ a) General transparency and confidence-building measures aimed at enhancing the availability of information on the space policy of States involved in outer space activities; b) Information exchange about development programs for new space systems, as well as information about operational space-based systems providing widely used services such as meteorological observations or global positioning, navigation and timing; c) The articulation of a State’s principles and goals relating to their exploration and use of outer space for peaceful purposes; d) Specific information-exchange measures aimed at expanding the availability of information on objects in outer space and their general function, particularly those objects in Earth orbits; e) Measures related to establishing norms of behavior for promoting spaceflight safety such as launch notifications and consultations that aim at avoiding potentially harmful interference, limiting orbital debris and mini mizing the risk of collisions with other space objects; f) International cooperation measures in outer space activities, including measures aimed at promoting capacity-building and disseminating data for sustainable economic and social development, that are consistent with existing international commitments and obligations.

In fact, some TCBMs for outer space activities have already been enacted at the multilateral and/or the national level. They include pre-launch notifications, space situational awareness data-sharing, notifications of hazards to spaceflight safety and other significant events, and the publication of national space policies. But they need to be further developed.

IX. Common Law of Mankind and Earth

More than ever, it is time to think big. International space law is usually defined as dealing with outer space, celestial bodies - Moon and asteroids, Mars and other planets as well as with the space activities which so far are carried out only by the human species from the planet Earth, However, the very specific situation of Earth as celestial body responsible for the creation and development of the international space law is not taken into the due consideration. Earth is not recognized as one of the main objectives of this branch of law.

Ironically, in this context, we could say that the international space law takes care of the solar system and the universe as a whole, minus of Earth, although it is the cradle of the exploration and use of outer space in general, and, therefore, of international space law.

Let’s take just two examples. “At its broadest, space law comprises all the law that may govern or apply to outer space and activities in and relating to outer space,” write Francis Lyall and Paul B. Larsen.22 In the same sense, the Education Curriculum of Space Law, adopted by United Nations Office For Outer Space Affairs (UNOOSA), on March, 2014, states that “ space law can be described as the body of law applicable to and governing space related activities.”23

Nevertheless, the Outer Space Treaty, of 1967, has, at least, two extremely important norms for the security of Earth and its inhabitants in Articles IV and IX, respectively: 1) “not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction,” and 2) to avoid “harmful contamination and adverse changes in the environment of the Earth resulting from introduction of extraterrestrial matter.” The sky always has played a crucial role in the evolution of mankind and all life manifestations on Earth. However, today the importance of outer space to our planet and its common life has increased as never before. The data coming from satellites are absolutely fundamental for any efforts to assure the sustainability of Earth and all its life expressions. In this global reality it is sheer recklessness to ignore the imperative of protecting our planet and its population, based on inclusive international space legislation. Hence the necessity of a Common Law of Mankind24 and Earth, specially related with international space law.

More and more, outer space protection25 must be seen as an indispensable factor to Earth protection, and vice-verse. As the globalization of Earth - with the interdependence of physical, social and political events - is more than ever recognized as an undeniable fact, the universalization of outer space {its cosmic reach), with the interconnection of everything with everything, cannot be bypassed, as it has been in the past. As Ervin Laszlo remarks, “ the reality we call universe is a seamless whole, evolving over eons of cosmic time and producing conditions where life, and then mind and consciousness can emerge.”26 Or, as Edgar Morin says, “we carry inside of us all the cosmos” and “we are all children of the sun.”27

X. It Is up to International Space Law

If we are really determined to avoid a likely apocalypse visible on the horizon, one of the main tasks of the international space law that we must trigger is to help save the Earth from space, using the powerful scientific and technological resources we have installed there.

Centuries ago Earth ceased to be the center of the universe, as our ancestors thought. But in face of unprecedented global dangers that threaten our planet today, its place cannot be other than the center of our universal concerns. Probably, a collapse of Earth would deprive the universe of a specie of intelligent life.

In reality, as Jonathan Schell (1943-2014) pointed out, “ the vision that counts is the view from Earth, from life,” as “ from our strategic position on Earth different view opens, bigger even than the one taken from space. It is the vision of our children and grandchildren, of all future generations of mankind, stretching ahead of us into the future.”28

The question, as posed by Antonio Cassese, is that “ international society is still grounded in the mere juxtaposition of its subjects - not in their solidarity, let alone in their integration.” 29

In any event, “ from the microbes inhabiting the earth beneath our feet to environments of the universe unknown to us now, the next 100 years of ecological discoveries will influence our lives. We enter a time when society is armed with the scientific knowledge and ability to make responsible decisions,” as a recent editorial of Science affirms.30 And with “ a new human consciousness ” , as says Edgar Morin.31

So, “ the choice is our: form a global partnership to care for Earth and one another or risk the destruction of ourselves and the diversity of life,” according to The Earth Charter.32

The current global situation seems to be so serious that the titanic work of saving mankind and our planet can be seen as a kind of utopia, maybe the major utopia of all times. A dream still far from having a general support. Coincidentally we’ll commemorate in 2016 the 500 years since the English humanist and statesman Thomas More (1478-1535) published his Utopia„ considered “ a playfully serious social critique to a social reality deadly and tragically grave.”33

In this context, it is urgent to build a

### Add On---Governance---Space Col

#### Enhancing NATO cooperation over satellites bolsters U.S space governance.

Aaron Bateman, 20 (Aaron Bateman is pursuing a Ph.D. in the history of science and technology at Johns Hopkins University and previously served as a U.S. Air Force intelligence officer, 4-29-2020, accessed on 6-11-2022, War on the Rocks, “AMERICA NEEDS A COALITION TO WIN A SPACE WAR”, https://warontherocks.com/2020/04/america-needs-a-coalition-to-win-a-space-war/, HBisevac)

In February, Gen. Jay Raymond, the new chief of space operations and the head of U.S. Space Command, publicly stated that two Russian spacecraft were tailing a U.S. satellite. He said that Russia’s behavior was “highly unusual and disturbing.” On April 15, U.S. Space Command announced that Russia tested an anti-satellite weapon. Russia and China both recognize that American high-precision warfighting is **dependent** on **space systems**. According to the U.S. director of national intelligence, both Russia and China are developing capabilities to **destroy U.S. satellites** in all orbital regimes — at all altitudes. But, unlike in the past, the United States is not on its own. It has allies and partners to turn to.

During the Cold War, the United States and Soviet Union were the two dominant space powers and both worked diligently to develop space weapons. European allies, France in particular, decried efforts to create anti-satellite systems. Since the collapse of the Soviet Union, the number of spacefaring nations has markedly increased. And, as the world has become more dependent on space systems, attitudes about space security have changed. The United States has demonstrated its commitment to space security through the revival of U.S. Space Command and the establishment of the U.S. Space Force. Other countries have, too. France and Japan, for example, have announced the creation of their own military space commands. NATO has declared that space is an operational domain. Now, the United States has allies who are eager to create a more robust network for **monitoring adversary activity** on orbit and to establish a **unified space doctrine** to achieve a **resilient** space security **framework**. Washington can build a **coalition** with its **spacefaring allies** to effectively prepare for and win a war that extends into outer space. Indeed, the United States should **leverage** its allies to build a more **robust network** to **monitor** and track activities in space. While doing so, Washington should lead its allies and the world to **develop norms** and practices that prevent **destabilizing military activities** in space.

The Cold War

During the Cold War, the United States included allies in its national security space activities but only on a limited basis. America’s focus was on reconnaissance satellites, which were a closely held secret. The U.S. government did not even acknowledge the existence of the National Reconnaissance Office until 1992. Space reconnaissance activities were not publicly discussed in any detail. Cooperation in this sensitive area of U.S. space activity primarily involved the limited sharing of space-derived intelligence with select allies. Only the heads of NATO members were briefed on the existence of intelligence satellites. Beyond those heads of states, only the British had privileged access to American space capabilities. The United States shared raw images from imagery satellites with the United Kingdom as far back as the 1960s.

The importance of space systems did not reduce allies’ concerns about the weaponization of space, even when the Soviet threat became more pronounced. In the 1970s, the Soviet Union possessed a co-orbital anti-satellite weapon — a satellite designed to maneuver next to its target on orbit and destroy it — called Istrebitel’ sputnikov or “satellite killer.” The United States promptly responded to the threat. In 1976, then-CIA director George H.W. Bush sent a memorandum to the national security advisor, stating that the United States needed to re-evaluate the vulnerability of its overhead reconnaissance systems. Beginning in 1977, the United States reinvigorated its efforts to develop an operational anti-satellite capability.

In the late 1960s, the British had launched the Skynet-series communication satellites that provided secure communications across the European theater; the system is located in geosynchronous orbit — 22,236 miles from Earth. London was primarily concerned with discouraging the United States and Soviet Union from developing anti-satellite weapons that could reach geosynchronous orbit. The British worried that, if the United States developed anti-satellite weapons that could reach geosynchronous orbit, the Soviet Union would follow suit and threaten Skynet. The British did, however, support the United States in matching the existing Soviet anti-satellite capability.

Most European allies were, however, overtly critical — or lukewarm at best — about America’s efforts to develop an anti-satellite weapon. The French, in particular, were especially critical and called upon the United States and Soviet Union to prevent an arms race in space and implement arms control for anti-satellite weapons. Even as the allies began building their own space capabilities, they were not supportive of U.S. efforts to respond militarily to the Soviet space threat. Many NATO members were not fully aware of how dependent the alliance had become on information derived from space systems. Washington had grown accustomed to pursuing national security activities in space under a shroud of secrecy with minimal allied consultation. The Cold War legacy of U.S. dominance and secrecy has left many in the space community with the mistaken belief that the United States should again go it alone.

Ready Allies

In the post-Cold War era, the space environment has **markedly changed**. There has been a proliferation of both American and foreign **commercial space capabilities**, an expansion of the **number** of **spacefaring nations**, a greater **reliance** on space systems by not just the United States but also its allies, and a significant growth in the **number** and **sophistication** of **threat actors** in space. While the United States, China, and Russia are certainly the most capable spacefaring nations, Washington’s allies have much to offer to create **greater resiliency** for space systems and to win a war that extends into outer space. As the threats expand, U.S. cooperation with allies ought to expand as well. Gen. John Hyten, the vice chairman of the Joint Chiefs of Staff, has emphasized the necessity of expanding allied relationships in the space arena. Unlike during the Cold War, American allies are **willing** and **eager** to collaborate with the United States.

For example, last year, NATO declared space an operational domain. However, this announcement should be **followed** up with **doctrine**. In 2019, the U.K. Ministry of Defense published a document entitled “Towards a Defense Space Strategy.” The British government is intent on creating a cadre of space experts that can ensure the security of U.K. and allied national security space systems. Britain’s focus is on space-related training and collaboration with capable spacefaring allies.

Moreover, the United States already cooperates with Australia, Canada, New Zealand, the United Kingdom, France, and Germany at U.S. Space Command’s Combined Space Operations Center located at Vandenberg Air Force Base. Additionally, allies participate in the Schriever Wargames that examine “critical space and cyberspace issues in depth.”

Today, unlike during the Cold War, U.S. allies are more aware of the threats to space systems. The United Kingdom has made it very clear that it views space as a warfighting domain. America’s spacefaring allies, therefore, can serve as an important resource for ensuring **continued U.S. space dominance**.

Leveraging Allies

Current allied involvement is a good start, but more can be done to **prepare** for **war** extending into outer space — particularly in two areas: 1) **s**pace **s**ituational **a**wareness, now more commonly called space domain awareness; and 2) establishing **space-behavior norms**.

In January of this year, Japanese Prime Minister Shinzo Abe announced his country’s establishment of a Space Domain Mission Unit. Additionally, the Japanese Ministry of Foreign Affairs has a stated goal of providing high-quality space domain awareness and of “maintaining four information-gathering satellite systems.” While the unit will be located at Fuchu Air Base and use a radar “capable of monitoring space systems up to an altitude of 5,800 kilometers [3,600 miles],” the Japanese Ministry of Defense “will share information collected by the facility with U.S. forces.” Japan is providing a replicable model for other spacefaring nations.

Allies can make a particularly valuable contribution to space security in the realm of **space domain awareness**. As an increasingly diverse set of sensors are integrated with U.S. space domain awareness resources, a more accurate picture of **adversary activity** in space can be achieved. Fundamentally, to obtain better space domain awareness, terrestrial real estate matters. More ground-tracking stations allow the United States and its allies to better track threats on orbit. By using radar and optical systems spread out all over the Earth, it is possible to have much better coverage of potential threats in space. The United States can also work with allies who do not have any space capabilities to install **optical telescopes** and **radar systems** that can create a more robust and **global network** for **monitoring space threats**. Spacefaring allies, even in the most nascent stage of development, can play an invaluable role in this mission.

In early 2020, French President Emanuel Macron announced his country’s establishment of a space command that will be placed under the French Air Force. According to reports by the French Ministry of Defense, the French space command will develop a modified version of its Syracuse satellites that can observe threats on orbit and use on-board weapons to engage them if necessary. Even if France decides not to arm its satellites in the near term, its Syracuse system will have strong potential for expanding allied space domain awareness in space.

Though London has promised to present a formal U.K. space defense strategy, one has not yet materialized. During the Cold War, Britain was the only European ally that provided political support for America’s efforts to develop space weapons. Up until very recently, however, Britain has been largely silent on space security issues. Last year, then Defence Minister Gavin Williamson said the United Kingdom would remain at the forefront of the space domain. London is investing more in space intelligence capabilities, but it is not keeping pace with the threats from more sophisticated states.

Smaller allied countries might have limited but highly specialized services to offer a space coalition. Estonia, for example, has a reputation for high-tech innovation, especially in cyber security and digital services. Estonia has established its Space Office, which is working with universities and start-ups to develop a broad spectrum of satellites, especially micro-satellites. U.S. investment in countries like Estonia can help create space innovation eco-systems that can contribute to the overall resiliency of allied military space activity.

The integration of allied and international commercial space domain awareness and satellite systems is a necessary task, but there are substantial obstacles to overcome in the process. A RAND report stated that “U.S.-European military space activities suffer a plight equal if not worse than the slate of more traditional interoperability issues that arise among NATO allies.” As more countries contribute to space domain awareness, **uniformity** of data types will be of even **greater importance**. Many allied space programs are in a **nascent** stage and their potential has not been fully realized. Washington should actively encourage and work with European partners in their efforts to develop more capable space systems. As European allies develop more sophisticated capabilities for monitoring the space environment, Washington should push for interoperable systems that enable the **seamless sharing** of data across **NATO**.

The United States should work with European partners to develop a framework for monitoring and reacting to adversary threat activity such as a joint architecture for processing data from the many different allied space domain awareness sensors. A unified doctrine would focus on measures that enable foreign government and commercial systems to augment any loss of U.S. capability due to an attack. There are, however, potential legal obstacles and data-compatibility issues that will likely prevent the realization of an effective unified doctrine in the near term. Most importantly, Washington should work with its spacefaring allies to develop comprehensive plans for reacting to an attack on an allied space asset. However, a military response does not have to include an attack on an adversary space system. The fundamental need is having the ability to respond quickly and in a unified manner to any space attack. An integrated diplomatic response should be created for space crises as well.

Establishing Norms in Space

During the Cold War, the United States refused to establish public policies regarding threats to space systems. The State Department and Intelligence Community consistently advised the White House not to even publicly provide a definition of outer space. Refraining from establishing specific and clearly articulated policies is no longer an option in the post-Cold War era.

Allies — and potential allies — can assist the United States in **establishing norms** in space. If Paris moves ahead with deploying on-orbit weapons, the United States and all other **NATO** **members** should work with France to develop **specific rules of engagement** for the use of **space weapons**. Fundamentally, France is making it clear that Washington has a potential partner in a space war that is willing to use offensive weapons. It is essential, however, to ensure that there is an agreed-upon framework for using French offensive capabilities to respond to an attack against an allied system. Additionally, Washington should strongly urge Paris not to test any weapon systems against objects in space. Such testing could create debris that is a threat to other satellites and could encourage Russia and China to follow up with similar tests.

Because of greater access to space technology, the number of spacefaring nations will continue to grow while there will be an increase in the number of state actors that possess space weapons. The 2019 Indian anti-satellite weapon demonstration is a case in point. Iran, for another example, could construct a crude anti-satellite weapon in the near term. Therefore, it is imperative for the United States to work with Israel — the most capable spacefaring nation in the Middle East — in monitoring and deterring Tehran from entering the space weapons arena.

Russia’s recent anti-satellite weapon test and tailing of a U.S. satellite, and previous U.S. State Department statements about Moscow’s destabilizing behavior highlight the **lack** of **established norms** for military space operations. For example, how close is too close for a satellite? Clearly, establishing a code of conduct in space is something that the United States cannot do on its own. It should be a **joint effort** with spacefaring allies around the globe. Additionally, it is imperative that America and its allies publicly confront Russia, in particular, about its dangerous behavior in space.

Russia, China, and the United States are especially concerned about rendezvous and proximity operations such as maneuvering close to another space object. If a country conducts rendezvous and proximity operations without providing any warning or explanation, the action could be treated as a hostile military act. Just as an uncoordinated approach by a foreign vessel to a U.S. Navy ship would be treated as an aggressive act, so too should similar maneuvers that involve American and allied spacecraft. Therefore, it is vital for Washington to work with its allies to establish what specific **space behaviors** will be considered **unacceptable** and to **communicate** — and **enforce** — such standards with aggressive spacefaring nations like Russia and China.

The United States and its allies should work collectively to prevent the testing of weapons in space. The **debris** generated from these tests poses a **threat** to the **satellites** of all spacefaring nations. If more nations begin testing anti-satellite weapons, military space systems could be inadvertently damaged. This situation could lead to an overall **escalation** in **preexisting tension**.

The United States and its allies providing a **clearly defined code of conduct** for national security space activities is a **feasible** and **necessary step** to take in the immediate term.

Stronger Together

Certainly, though no one wants a war to begin in or extend into outer space, ignoring this possibility would be extremely negligent. The United States possesses highly sophisticated national security space systems that will be a prime target for capable spacefaring adversaries if a conflict should arise. In the past, the United States has presumed it can and will fight alone in space — but that is no longer necessary. Washington can better ensure its **dominance in space** if it more fully **embraces** its allies.

Washington would be wise to build a coalition that creates a more robust system for monitoring the space domain, reacting to space threats, and prevailing in a war that extends into outer space. Building a space coalition — especially one that includes allies from Europe, the Middle East, and Asia — is no simple task. But, working towards systems integration and also a common space doctrine is positive step forward towards increased resiliency of the space systems that are essential for precision warfighting. Of course, technical systems cannot be the only focus of the coalition; it should also devote attention to the development of norms for military space activity.

Hyten has stated that “**trying to fight alone in space would be a mistake**” — a mistake that we cannot afford to make.

#### Lack of space governance prevents space colonization.

Marko Kovic, 18 (Marko Kovic, PhD from the University of Zurich and co-founder president of the Zurich Institute of Public Affairs Research, 12-4-2018, accessed on 7-8-2022, Aeon, “Rules in space”, <https://aeon.co/essays/we-urgently-need-a-legal-framework-for-space-colonisation>, HBisevac)

The answer is no. There is **no meaningful space**-colonisation **governance framework** to speak of. As of now, in 2018, space colonisation is a veritable free-for-all. And this absence of a forward-looking space-colonisation governance framework could have **disastrous consequences**.

Almost any kind of modern-day human activity is embedded within one or multiple governance frameworks, and the greater the scale of the activity, the more comprehensive and complex the governance framework tends to be. Building a private house for yourself is relatively simpler in terms of governance rules than building a large commercial high-rise, and building a high-rise is relatively simpler than building a transcontinental bridge, and so forth. Even though people tend to dislike the labyrinthine ways of bureaucratic procedure and the frustrating reality of red tape, governance is both necessary and a blessing. Rules that govern **human activity** reduce **transaction costs**, create **planning security**, and **increase** the **probability** of **good outcomes** in uncertain decision-making contexts. The epistemic and moral progress of human civilisation seems to, at the very least, correlate with progress in collective governance. We live in a rules-based world, and we are better off for it.

Space colonisation will create a new set of governance challenges. Even though these challenges are not fundamentally different from existing governance problems, they are on a scale never before seen in human history. That is why space-colonisation governance should be a **global priority** even today, before colonisation is technologically viable. If we fail to create an adequate governance framework for space colonisation, we risk **bad outcomes** (such as **slowing down colonisation efforts**), **very bad outcomes** (such as **failing** to **colonise at all**), or even **catastrophic outcomes** (such as a galaxy populated by warring and suffering people).

#### Colonization solves inevitable extinction.

Marko Kovic, 19 (Marko Kovic, PhD from the University of Zurich and co-founder president of the Zurich Institute of Public Affairs Research, March 2019, accessed on 7-8-2022, Zurich Institute of Public Affairs Research, “The Future of Energy”, <https://osf.io/preprints/socarxiv/aswz9/download>, HBisevac)

Existential risks are risks that might lead to the extinction of humankind [1]. Natural **existential risks** (such as **asteroids** that might **crash into Earth**) are basically constant. The **risks** of a **giant asteroid** crashing into Earth today is the same as it was **500 years** ago. **Anthropogenic**, ~~man-made~~ **existential risks**, on the other hand, are **growing** in **number** and **severity**. They are a **side-effect** of **technological progress**: The more we develop technologically, the greater man-made existential risks become. Nuclear weapons, to name only one example, are a **direct consequence** of scientific and technological **progress**.

There are different approaches to existential risk mitigation. One approach is to develop targeted strategies for specific existential risks. If we want to reduce the existential risk posed by nuclear weapons, then we can and should develop specific strategies for that risk.

Another approach is to develop and pursue what can be called **meta-strategies** that target **all** existential risks **at once**. One of **most effective** meta-strategies for tackling existential risks in general is **space colonization**: If we manage to establish permanent and self-sustainable human habitats **beyond Earth**, then our **proverbial existential eggs** are **not all in one basket** anymore. For example, if **disaster strikes** on Earth, but there are **billions** of humans living on **Venus** and **Mars**, humankind would **continue to exist** even with Earth-humans gone.

Because of existential risks, a **long-term future** in which humankind still exists almost **certainly** has to be a future in which humankind has **succeeded** in **colonizing space**. Today, even though we regularly venture into space, we do not yet have space colonization capabilities. There are a number of technological challenges that we need to overcome in order to become capable of space colonization. One of those challenges is energy. There are several reasons why.

### Add On---Meltdowns

#### Disasters will destroy nuclear power plants---keeping intelligence satellites online is key to respond and adapt.

Carla Crandall 10. J.D. Candidate at the J. Reuben Clark Law School at Brigham Young University, “Why Aren't We Using that Intel Stuff? Using Reconnaissance Satellite Imagery in Domestic Disaster Prevention and Response”, Brigham Young University Law Review, 2010 B.Y.U.L. Rev. 1831, Lexis

By providing disaster planners and responders with a common operational picture, n4 satellite imagery plays an important role in both ~~manmade~~ and natural disaster prevention and response. Former Director of Central Intelligence (DCI) John Deutch explained, for example, that "within hours after a disaster strikes [analysts] can assess and report the nature and scope of the damage - conditions of roads, airports, hospitals, and the status of potential secondary [\*1832] threats such as dams and nuclear facilities." n5 Unfortunately, however, some of the U.S. government's most sophisticated assets and capabilities are being underutilized - due in large part to a lack of clarity and understanding as to how these resources can appropriately be used within the United States. n6 According to one study, "the ultimate effect is missed opportunities to collect, exploit and disseminate domestic information critical to ... preparing for, responding to, and recovering from" both manmade and natural disasters. n7 Arguably, these opportunities have been lost due to inadequate transparency - driven by a culture of secrecy - and an unclear legal framework surrounding the domestic use of reconnaissance satellite imagery. n8 Indeed, from the time of its inception, the domestic imagery program has been mired in concern and uncertainty as to its legitimacy and precise parameters. This uneasiness stems largely from the fact that most of the legal constructs that have been established were developed exclusively within the executive branch, leading to doubts as to the sufficiency of programmatic oversight. Perhaps nothing has highlighted these legal inadequacies more than the recent debacle surrounding the National Applications Office (NAO) - an office within the Department of Homeland Security (DHS) that was designed to facilitate wider domestic use of [\*1833] reconnaissance satellite capabilities, but which closed before it even opened because of concerns related to civil liberties and the involvement of the Department of Defense (DoD) in civil affairs. n9 In light of this background, this Comment highlights the critical role reconnaissance satellite imagery can play in disaster planning and response and proposes reforms to address the concerns that currently impede its wider use. Specifically, Part II provides background about the utility of satellite imagery in domestic disaster prevention and response and discusses the comparative advantages of imagery from reconnaissance satellites over that provided by commercial sources. Part III analyzes the development of the current legal framework surrounding the domestic use of reconnaissance satellite assets and argues that a lack of transparency and clear legal guidance contributes to the underutilization of these vital capabilities within the homeland. Part IV explores the recent proposal to create the National Applications Office and discusses the challenges to using satellite imagery that were exposed by that plan. Part V proposes reforms designed to facilitate wider exploitation of reconnaissance satellite imagery for disaster prevention and response. Finally, Part VI concludes. II. Background and Context Imagery collection via satellites has a long pedigree and contributes to the resolution of a wide array of challenges across the globe. Its utility extends from monitoring the proliferation of nuclear weapons n10 to managing refugee camps. n11 This Part focuses on the value of satellite imagery specifically to disaster prevention and response. Beyond explaining satellite imagery's general utility in the disaster context, this Part also highlights the relative advantages of using reconnaissance satellites over those operated by commercial vendors. [\*1834] A. Satellite Imagery in the Disaster Context Though it is perhaps most recognized for its value after disasters, satellite imagery also plays a significant role in disaster prevention. In fact, it has proven valuable in responding to virtually every type of disaster. For example, analysts can examine imagery for signs of topographic faulting to generate tectonic maps n12 that can aid planners in earthquake zones with land-use decisions. Imagery is also useful in demarcating watersheds and potential flood zones. n13 Indeed, the Federal Emergency Management Agency (FEMA) uses satellite imagery to create flood maps that determine risk premiums for the National Flood Insurance Program. n14 Infrared imaging satellite systems can also be used to assess potential volcanic activity, n15 thereby allowing officials to evacuate vulnerable citizens prior to an impending eruption. Finally, satellite imagery has also been used to prevent manmade disasters, such as those created by terrorist attacks. The National Geospatial-Intelligence Agency (NGA), for instance, is charged with analyzing satellite imagery in support of national security objectives, including the prevention of terrorist attacks. n16 NGA accomplishes this mission by, among other things, analyzing imagery to provide officials with information about "vulnerabilities to [the country's] critical infrastructure and national assets" that "can be the basis for planning and responding to threats or natural disasters." n17 Current customers of NGA's domestic products include not only federal agencies such as FEMA and the [\*1835] United States Geological Survey (USGS), but also the National Guard and local government officials. n18 As important as satellite imagery is to disaster prevention, its utility during disaster relief efforts is immeasurable. After a catastrophic disaster, one of the most challenging problems facing responders is that the damage is often so overwhelming that it is difficult to know where to begin recovery operations. n19 Satellite imagery can help combat this problem by providing damage assessments that guide first responders to areas where their efforts will be most fruitful. After an earthquake, for instance, imagery analysts can direct search and rescue teams not only to areas with the highest concentration of collapsed buildings, but also to those with the highest number of potential survivors. More specifically, imagery interpreters can provide information to rescuers as to which collapsed structures were previously multistory, n20 and thus would be more likely to have voids necessary for survival after a collapse. Moreover, in response to wildfires, analysts can identify hot spots using infrared imaging satellites so that firefighters can appropriately direct their suppression efforts. n21 During floods and tsunamis, satellite imagery can be used to assess damage to infrastructure, such as bridges and roads, to effectively direct the movement of aid into a disaster area. n22 Finally, in response to manmade disasters such as those created by terrorist attacks, satellite imagery can be used to determine the extent of destruction. For instance, after the 2001 World Trade [\*1836] Center attacks, NGA used satellite imagery and high-resolution elevation data to create models of the damaged area, providing responders with better situational awareness with which to carry out their missions. n23 B. The Comparative Advantages of Using U.S. Reconnaissance Assets Though satellite imagery can thus clearly play a significant role in disaster preparation and response, it does not necessarily follow that U.S. reconnaissance assets should be used for its collection. While historically imagery systems within the United States were government-controlled, privatization efforts that began during the Reagan Administration have since created a multi-billion dollar commercial satellite industry. n24 Today, the average person needs nothing more than an Internet connection to acquire at least some form of satellite imagery. Even NGA - the government agency charged with exploiting imagery from reconnaissance satellites - routinely contracts with commercial imagery providers to acquire their products. n25 This raises the question of why reconnaissance assets should be used at all. While reconnaissance satellites were developed to monitor activities in foreign areas where the U.S. government could not procure on-ground information, their unique capabilities also offer advantages over commercial satellites in the domestic disaster context. First, though the precise resolution of reconnaissance satellites is classified, it clearly surpasses that available from commercial sources. n26 There is speculation, for example, that the [\*1837] current spatial resolution of reconnaissance satellites is less than four inches. n27 By contrast, one of the most sophisticated commercial satellites is only capable of capturing images at a resolution of sixteen inches. n28 Further, due to concerns about security, U.S. government regulations require that commercial vendors downgrade imagery available to the public to a resolution of approximately twenty inches. n29 While these differences in resolution may seem inconsequential, the higher resolution of reconnaissance satellites can be critical, for instance, in identifying collapsed buildings or damaged infrastructure. n30 Beyond the differences in resolution, another benefit of using reconnaissance imagery for disaster planning and response is that it is cost-free to the requesting organization. n31 Commercial satellite imagery, on the other hand, is very expensive. Costs vary widely depending on the vendor, the resolution and age of the imagery, and the geographic extent of the imaged area. It is not uncommon, however, to see prices in the range of $ 8,000 per image for current imagery from high-resolution sensors. n32 Because activities related to [\*1838] disaster preparation and response are often inadequately funded, this expense can be prohibitive to those charged with such missions. n33 To be sure, there are efforts underway, such as the International Charter on Space and Major Disasters, n34 to combat this problem. But while the Charter's aim is to provide free or low-cost imagery to those affected by disasters, the reality is that its impact is somewhat limited - at least insofar as U.S. contributions are concerned - by the fact that the imagery donated at no-cost by U.S. companies is archived rather than newly acquired. n35 For disaster response, having up-to-date imagery is obviously vital to ascertaining the extent of recent damage.

#### Causes extinction.

Christopher Allen Slocum 15, VP @ AO&G, “A Theory for Human Extinction: Mass Coronal Ejection and Hemispherical Nuclear Meltdown,” 07/21/15, The Hidden Costs of Alternative Energy Series, http://azoilgas.com/wp-content/uploads/2018/03/Theory-for-Human-Extinction-Slocum-20151003.pdf

With our intelligence we have littered the planet with massive spent nuclear fuel pools, emitting lethal radiation in over-crowded conditions, with circulation requirements of electricity, water-supply, and neutron absorbent chemicals. The failure of any of these conditions for any calculable or incalculable reason, will release all of a pool’s cesium into the atmosphere, causing 188 square miles to be contaminated, 28,000 cancer deaths and $59 billion in damage. As of 2003, 49,000 tons of SNF was stored at 131 sites with an additional 2,000-2,400 metric tons produced annually. The NRC has issued permits, and the nuclear industry has amassed unfathomable waste on the premise that a deep geological storage facility would be available to remediate the waste. The current chances for a deep geological storage facility look grim. The NAS has required geologic stability for 1,000,000 years. It is impossible to calculate any certainty 1,000,000 years into the future. Humanity could not even predict the mechanical failures at Three Mile Island or Chernobyl, nor could it predict the size of the tsunami that triggered three criticality events at Fukushima Daiichi. These irremediable crises span just over 70 years of human history.

How can the continued production and maintenance of SNF in pools be anything but a precedent to an unprecedented human cataclysm? The Department of Energy’s outreach website explains nuclear fission for power production, providing a timeline of the industry. The timeline ends, as does most of the world’s reactor construction projects in the 1990s, with the removal of the FCMs from Three Mile Island. One would think the timeline would press into the current decade, however the timeline terminates with the question, “How can we minimize the risk? What do we do with the waste?” (The History of Nuclear Energy 12). Nearly fifteen years into the future, these questions are no closer to an answer. The reactors at Fukushima Daiichi are still emitting radioisotopes into the atmosphere, and their condition is unstable. TEPCO has estimated it could take forty years to recover all of the fuel material, and there are doubts as to whether the decontamination effort can withstand that much time (Schneider 72). A detailed analysis of Chernobyl has demonstrated that nuclear fall-out, whether from thermonuclear explosions, spent fuel pool fires, or reactor core criticality events are deleterious to the food-chain. Cesium and strontium are taken into the roots of plants and food crops, causing direct human and animal contamination from ingestion, causing cancer, teratogenicity, mutagenesis and death. Vegetation suffers mutagenesis, reproductive loss, and death. Radioactive fields and forest floors decimate invertebrate and rodent variability and number necessary to supply nature’s food-chain and life cycles. The flesh and bones of freshwater and oceanic biota contribute significantly to the total radiation dose in the food-chain. Fresh water lakes, rivers and streams become radioactive. Potable aquafers directly underlying SNFs and FCMs are penetrated by downward migration of radioisotopes. Humans must eat to live. Humans must have water. No human can survive 5 Sv of exposure to ionizing radiation, many cannot survive exposure to 1 Sv.

Realizing the irremediable devastation caused by one thermonuclear warhead, by one Chernobyl, by one Fukushima Daiichi, it remains to be said that the earth can handle as many simultaneous loss of coolant failures as nature can create. Humanity cannot. It is not good enough to lead by relegating probable human wide extinction phenomena to an appeal to lack of evidence. Policy cannot indefinitely ignore responsibility by requiring further study. Nor can leadership idle into cataclysm by relying on the largest known natural phenomena of the last 200 years. Permitting construction and continued operation of malefic machinery, based on 200 years of cataclysmic experience is a protocol for calamity. Of coronal mass ejections, Hapgood warns, that we need to prepare for a once-in-1000-year event, not just simulate infrastructure safeties by the measure of what we have seen in the past. The same is true for all natural phenomena. The future of humanity is too precious to operate with such insouciance. The engineering is not good enough. It never will be. Nature is too unpredictable, and nuclear power is too dangerous.

### Add On---Naval Readiness

#### Space assets are key to Naval readiness---awareness in space is linked to threat mitigation in international waters, else Russian and Chinese aggression.

Jon Harper, 21 (Jon Harper, 8-26-2021, accessed on 7-9-2022, National Defense Magazine, "SPACE SYMPOSIUM NEWS: Navy, Marines Gearing Up for Space Warfare", https://www.nationaldefensemagazine.org/articles/2021/8/26/navy-marines-gearing-up-for-space-warfare, HBisevac)

The Navy is **highly dependent** on **space assets** for everything from situational awareness to communications to targeting and positioning, navigation and timing. But U.S. systems are **threatened** by potential enemies such as China and Russia, officials noted at the confab, which was held in Colorado Springs, Colorado.

“Those adversaries have **rapidly expanded** their national objectives to hold **at risk** our space capabilities,” said Rear Adm. Michael Bernacchi, director of strategy, plans and policy J5 at U.S. Space Command. “We have observed them **test** and **deploy** direct ascent and co-orbital **anti-satellite weaponry**.”

Orbital debris also poses dangers to spacecraft, he added.

“Space is **absolutely** a place where the **Navy** is going to be **fighting**,” said Rear Adm. Gene Price, vice commander of naval information forces.

Going forward, Bernacchi said commanding officers will have to focus more on the space dimension of military operations.

“They're going to have to understand how they're going to have to **protect** their ships, their crews, their submarines” from **space**-**related threats**, he said. “The enemy continues to build **very capable systems**, and pretty soon it will be a matter of **self-defense from a space dimension**. And that's just another thing that the commanding officer … is going to be responsible for. And so it will be our job to educate, train [and] develop officers who can do that.”

The service plans to leverage upgrades to its Aegis air-and-missile defense systems to boost its space situational awareness capabilities. The systems’ sensors will help detect, characterize and counter adversary offensive capabilities, he said.

“Over the next couple of years, both our ships and Aegis Ashore are going to have those upgrades, which allow for independent space domain capability, tracking of objects in the background, which doesn't take away from any of its other capabilities,” he said. “That is a huge upgrade.”

Over the coming years, there will be more than 30 ships equipped with the technology, he noted.

In the future, the Navy could employ its own counter-space weapons, Bernacchi suggested.

“If you're talking future systems — jammers, reversible effects, non-reversible effects, directed energy weapons, etc. … [deployed on] mobile platforms that move quickly and can be all over the world, that significantly complicates an adversary’s decision-making,” he said.

“Imagine putting space-control capabilities … on a submarine or [unmanned underwater vehicle], and then the adversary is trying to figure out where that's coming from,” he added.

Price said space wasn’t a high priority for the Navy during the post-9/11 wars. But things have changed as concerns have grown about high-tech peer competitors.

“Unfortunately, within the Navy, space became a **backwater** for awhile,” Price said. But now, the service is “doubling down” in many areas and “sprinting” to catch up.

A key focus going forward will be developing space expertise at all levels, from combatant commands such as U.S. Space Command to the tactical edge, officials said.

“There's a lot of demand signal and we don't have enough [space-focused personnel], but we are running fast and we are catching up quickly,” Price said.

The Marine Corps also wants in on the action.

Marine Corps Forces Space Command was recently activated to support U.S. Spacecom, the joint force and Fleet Marine Forces.

“It is currently a small footprint, but like in other domains, we hope to punch well above our weight,” said Maj. Gen. Ryan Heritage, commander of MARFORSPACE. “It's a true recognition of what the fight tomorrow will look like.”

One of the biggest changes underway is the standardizing of space billets within the Navy and the creation of the maritime space officer designation, so that personnel are much better trained, Price noted.

In the past, “you would go to a space billet as an aviator or as a ship driver or submariner or information warfare officer, and you would learn space and then you would move on to another job within your community and you might not ever touch space again,” he said.

In the future, maritime space officers will be “doing space 24/7, 365” days a year, Price added. “They're going to be getting some of the same training that you've been seeing Air Force space officers go through for years and their career path has … been defined, and they're going to have lots of career opportunities that will enable them to stay for the long haul.”

The development of new space capabilities through the requirements and acquisition processes is another major area of focus for the sea services.

"It's key that ... we also have a corps of acquisition professionals that understand system design, Navy operations and space capabilities, so we can get the right mix of requirements into the right place at the right time,” said Rear Adm. Stephen Donald, reserve deputy commander for 10th Fleet. **Failure** in this regard will result in the Navy **not having capabilities** that it will **need** for **future fights**, he said.

#### Naval power stops great power conflict – pursuit is inevitable, but operational effectiveness determines global force projection

Cropsey and McGrath 18 [Seth Cropsey is the Director of the Center for American Seapower at the Hudson Institute, former assistant to the Secretary of Defense and naval officer; Bryan McGrath is the former Deputy Director of the Center for American Seapower at the Hudson Institute and naval officer, M.A. in Political Science from the Catholic University of America; January 2018; “Maritime Strategy in a New Era of Great Power Competition”; <https://s3.amazonaws.com/media.hudson.org/files/publications/HudsonMaritimeStrategy.pdf>; Hudson Institute; Recut-Lowell-TT]

Introduction

As a maritime nation, naval power is the U.S.’s most useful means of responding to distant crises, preventing them from harming our security or that of our allies and partners, and keeping geographically remote threats from metastasizing into conflicts that could approach our borders. A maritime defense demands a maritime strategy. As national resources are increasingly strained the need exists for a strategy that makes deliberate choices to connect ends (security) with means (money and the fleet it builds). This paper examines the need for a maritime strategy, discusses options, and offers recommendations for policy makers.

After several decades of unchallenged world leadership, the United States once again faces great power competition, this time featuring two other world powers. China and Russia increasingly bristle under the constraints of the post-World War II systems of global trade, finance, and governance largely created by the United States and its allies, systems that the United States has protected and sustained to the economic and security benefit of its citizens and the citizens of other nations. Both China and Russia are demonstrably improving the quality of their armed forces while simultaneously acting aggressively toward neighboring countries, some of which are US treaty allies. Additionally, both nations are turning their attention to naval operations far from their own coasts, operations designed to advance national interests that are often in tension with those of the United States.1

For the past several decades, US national security strategy has not had to contend with great powers. Instead, it has concerned itself primarily with building alliances designed to manage regional security more efficiently by proxy, while devoting increasingly more resources to homeland defense and intelligence aimed at stemming acts of terror by Islamic radical organizations and their followers. To the extent that the US position of leadership in the world was not threatened, this strategy was reasonable, if imperfectly pursued.

Such a strategy will no longer suffice in a world of great power competition, especially one in which powers of considerable—but unequal—strength are opposed. Unbalanced multi-polarity is an especially unstable condition, and the United States is not effectively postured to manage that instability. Henry Kissinger divides the concept of world order into two parts: a normative system that defines acceptable action, and a ‘balance of power’ arrangement that punishes the breach of such conventions2. As the underlying balance of forces shifts, states with different ideas of international order gain the power to reshape the system. Thucydides’ ancient insight holds true – the rise in power of one actor threatens all others. Where such threat exists and if the balance of power between states or coalitions approaches equilibrium, a “Cold War” between competing ideological camps occurs.

In an unbalanced system, the stronger side is tempted to strike its weaker opponent while the balance of forces is favorable. Unbridled competition for supremacy defined Europe during its bloodiest periods. Europe’s 16th and 17th century religious wars between Catholics and Protestants and the global 20th century struggles between totalitarian ideologies and democracy both represent the natural end-state of unbalanced multipolar systems. Without norms to restrain states and force to uphold these norms, violence is very likely.

Today’s international system is moving toward unbalanced multi-polarity. Unfortunately, the United States is not currently prepared to manage such an international environment. If Americans want to preserve their nation’s secure and prosperous position as the world’s great power, the United States must begin now to prepare strategically for what it will inevitably face. Otherwise, it will ultimately be forced into an increasingly limited number of unattractive options to sustain its position of leadership.

There is little evidence that the people of the United States wish to see our position in the world diminished. The 2016 Presidential Election raised important questions about the degree to which globalization has served the interests of everyday Americans (and their perceptions thereof), while the two dominant US political parties have moved toward more protectionist policies, at least as articulated by their nominees. Opinion polling indicates the divided nature of the American public on issues like free trade and sustained foreign commitments.3 However, Americans remain cognizant of threats to the United States, and favor maintaining America’s position as a great power by sustaining a strong military.4 Moreover, it would be difficult to identify meaningful numbers of Americans who would sacrifice national security in favor of increased social spending, despite the continuing rise in non-discretionary spending in the federal budget. Americans understand that the US position of world leadership benefits the nation’s economy, its security, its allies, and the international order that has been the object of US foreign and defense policy for over a century. They know that their lives would be diminished if this position of global leadership were surrendered to an adversary or group of them. The paradox of the American experience is that the US is not simply a great power – it is an exceptional power, for which ideals count as much as strength. The American public, despite its aversion to foreign commitments, can rise to the occasion and respond to clear threats, as it has in both World Wars, the Cold War, and after September 11th. The job of the policymaker, therefore, is to ensure America remains a great power, so that when the occasion arises, it can act as an exceptional power.

It is critical then, for US political leaders to begin thinking more strategically about protecting and advancing America's position in the face of growing great power competition. This monograph asserts that a strategy to support such a goal would necessarily be maritime in nature, leveraging this nation’s great geographical advantages in the service of its national power.

Sharing land borders with only two nations—both of whom are friendly to the United States—and separated from other great powers by vast oceans, the United States enjoys a security position quite unlike that of any other nation. For over a century, it has been the unspoken (but doggedly pursued) national security aim of the United States to ensure that no power rise to prominence in Asia or Europe so as to occupy a position there as dominant as the United States’ position in the Western Hemisphere. Were this to occur, not only could that nation then lock the United States out of the resources and activity of that region, but it could also then eventually turn its attention to challenging our position in the Western Hemisphere.5

Underlying this approach is the reality that most the world’s activity does not occur in our own hemisphere, but in Asia and Europe. American interests in these regions— political, diplomatic, economic, and military—are considerable and growing. Protecting and sustaining those interests must remain a priority of American policy, and maritime strategy is an effective tool in doing so.

Maritime strategy is a subset of grand strategy, and the relationship between the two is ably defined by Professor John B. Hattendorf of the Naval War College:

“In its broadest sense, grand strategy is the comprehensive direction of power to achieve particular national goals. Within those terms, maritime strategy is the direction of all aspects of national power that relate to a nation’s interests at sea. The navy serves this purpose, but maritime strategy is not purely a naval preserve. Maritime strategy involves the other functions of state power that include diplomacy; the safety and defence of merchant trade at sea; fishing; the exploitation, conservation, regulation and defence of the exclusive economic zone at sea; coastal defence; security of national borders; the protection of offshore islands; as well as participation in regional and world-wide concerns relating to the use of oceans, the skies over the oceans and the land under the seas.6

It is wholly appropriate for the world’s dominant naval power—separated from its widely-flung interests by thousands of miles of open ocean—to develop and execute coherent maritime strategy. In a time of re-emerging great power competition, it is essential. The nation’s current maritime strategy 7 is, unfortunately, not up to the task. It focuses insufficiently on great power competition; it does not recognize the rise in importance of conventional forces in deterring great power war; it does not provide a theory of conventional deterrence appropriate to great powers and their likely objectives; it does not suggest a posture for naval forces that acts as an effective deterrent; its derived force structure is too small and short on effective logistic support; it does not place sufficient value on naval partnerships with geographically important nations which may not be traditional partners; and it is silent on the need for the nation to invest in a maritime industrial base that can enable an appropriate strategy.

This monograph urges new thinking about maritime strategy, a strategy compatible with the United States’ responsibilities as the leader of the free world, as well as the world’s premier political, military, economic, and diplomatic power. Such a strategy would seek to protect and sustain those leadership positions in the face of renewed great power competition, competition that largely subsumes other, lesser security concerns. There will be those who view this approach as a return to “Cold War” strategic thinking, and we do not shy from this comparison. The United States acted for decades as a coherent strategic actor when faced with expansionist Soviet totalitarianism, and it must act with equal coherence and resolve to contest China and Russia’s brands of aggressive mercantilism, regional expansion, and contempt for established global order.

There will be those who evaluate our suggestions in this paper and conclude that the nation cannot afford it, that the expense associated with moving to a maritime grand strategy would imbalance the traditional “ends, ways, means” approach to the making of strategy. And while the ends, ways, means approach is generally relevant to military and operational strategy, it is unsuited to the making of grand strategy for one very important reason. Unlike subordinate levels of strategy, grand strategy re-allocates, realigns, and re-orients a nation’s “means” to serve strategic “ends”. Military strategy starts with the proposition that there is a certain resource level available to pursue its ends. Grand strategy starts with the sum of the nation’s output capacity, and then determines how it can most effectively be allocated to the achievement of strategic goals.

Short of war itself, there is nothing in American history that causes strategic realignment more reliably than a change in Administration, and we wish to be part of that dialogue. We argue here for a new theory of deterrence, one that revises the Cold War approach in which the Soviet Union was deterred from large-scale conventional attack by the threat of nuclear escalation. Under that rubric, one could justifiably say that America’s conventional deterrent was dependent on its strategic deterrent. Today, the decapitating “bolt from the blue” strike is even more remote than it was in the Cold War, and to the extent that nuclear exchange between great powers is conceivable, it is far more likely to flow from conventional conflict that has gone awry. Therefore, to deter nuclear war, we must deter conventional war. No aspect of American military power will be more critical to deterring either nuclear or conventional super-power war than seapower.

#### [ ] Space capabilities are necessary for global power projection.

Elbridge Colby 16. Robert M. Gates Senior Fellow at the Center for a New American Security (CNAS). Previously he served for over five years in the U.S. government, primarily in positions focusing on nuclear weapons, arms control, and intelligence reform. He has also served as a staff member or advisor to several governmental commissions, including the 2009 Congressional Strategic Posture Commission and the 2014 National Defense Panel, and serves as a consultant to a variety of U.S. government entities on a range of defense and intelligence matters. “FROM SANCTUARY TO BATTLEFIELD: A Framework for a U.S. Defense and Deterrence Strategy for Space”. https://www.files.ethz.ch/isn/195913/CNAS%20Space%20Report\_16107.pdf.

The United States is profoundly reliant on the ability to use space for its security. Though little appreciated outside of professional and expert circles, space – or, more precisely, U.S. assets in and using space – are vital to U.S. defense and intelligence communications with and among national leaders, military forces, and others; command and control; positioning, navigation, and timing (PNT); intelligence, surveillance, and reconnaissance (ISR); and a host of other functions. While these may seem rather like “back office” functions to a lay reader, they are actually the stuff of which American global military primacy is made. The U.S. military is not currently superior to its potential adversaries because it has stronger soldiers, bigger guns, or more tanks. Rather, it has the upper hand because it can understand better what is taking place in the midst of conflict, what its own forces are doing, and what those of an enemy are doing amidst the “fog of war.”2 The United States can therefore employ force around the globe more rapidly, more precisely, and more intelligently – and thus more effectively.3 Together, this “smarter” and more agile U.S. military is therefore uniquely capable of applying decisive power against an adversary.4 Exploitation of space is particularly critical to effective U.S. power projection, as it provides the U.S. military with the ability to operate effectively over global distances, beyond the reach of what U.S. ground-based and aerial assets, limited by range and endurance, can provide. As General John Hyten, Commander of U.S. Air Force Space Command, recently said on CBS’ 60 Minutes, because of space “we can attack any target on the planet, anytime, anywhere, in any weather.”5 Thus Washington’s ability to project credible and effective military power to key regions such as the Western Pacific, Europe, and the Middle East – which is elemental to the U.S. national security strategy of forward engagement – relies on space. And this reliance is increasing. Furthermore, while space is crucial for U.S. power projection and an effective military posture in key regions, it is also vital for crucial homeland defense and deterrence functions. Space-based assets provide early warning of missile attacks against the United States (and others) and serve as a crucial component in the command and control system for U.S. nuclear forces in the event of war – including a nuclear war.6 As the 2011 U.S. National Security Space Strategy, a document bearing the signatures of the Secretary of Defense and the Director of National Intelligence, summarized, “[s]pace capabilities provide the United States and our allies unprecedented advantages … create a decision advantage … [and are] vital to monitoring strategic and military developments … Maintaining the benefits afforded to the United States by space is central to our national security.”7 Space, then, is vital for America’s military preeminence and the national strategy it underwrites. But this reliance is becoming increasingly problematic. This is because potential U.S. adversaries have noticed the degree of U.S. reliance on its space architecture and the advantages that the United States has accrued from it and have been assiduously working to find ways to threaten U.S. space and space-related systems. Indeed, many observers have noted that these potential opponents judge the U.S. space architecture to be the “Achilles’ heel” of U.S. military power, in light of the depth of American reliance on these systems and the vulnerability of the U.S. satellite architecture.8 As General Hyten put it, without access to space the U.S. military would be a greatly reduced force. As he put it, in such a circumstance the U.S. military would return to a model of “World War II” or “industrial age” warfare.9 Nor is this merely a peril for the future. Rather, after many years in which this problem seemed safely ensconced over a distant horizon, it is now coming increasingly into view that threats to U.S. space assets are real and pressing – and indeed are likely to worsen, probably significantly.10 Countries like Russia, China, and even nations with more modest capabilities and resources are gaining the ability to hold U.S. satellites at risk not only through kinetic direct-attack methods such as anti-satellite (ASAT) missiles, but also through non-kinetic and more limitable techniques such as jamming, “dazzling,” cyber and other electronic attack, and other novel methods.11 Some of these approaches can destroy or disable satellites, whereas others offer the option of blinding or otherwise interfering with the effective functioning of space assets.12 The result is that the U.S. space architecture is becoming increasingly vulnerable, with U.S. satellites in low Earth orbit already targetable by a nation such as China and with U.S. satellites in deeper space very likely to become similarly exposed soon.13 China’s 2007 destruction of a satellite in low Earth orbit demonstrated its ability to hit satellites at that range.14 And its 2013 test of an anti-satellite weapon reportedly propelled a missile approximately 18,600 miles into space, just shy of the 22,236 miles at which U.S. satellites in geosynchronous orbit – including essential missile warning and communications satellites – are located.15 As Air Force Lieutenant General John Raymond, then the Commander of the 14th Air Force and the Joint Functional Component Command for Space for Strategic Command, testified in March 2015: “We are quickly approaching the point where every satellite in every orbit can be threatened.”16 In sum, then, the United States is highly reliant on its space architecture for the full range of military operations – and that architecture is vulnerable and becoming more so.

### Add On---Wildfires

#### Domain awareness is key to preventing rouge wildfires.

Alicia Victoria Lozano, 21 (Alicia Victoria Lozano is a reporter for NBC News focusing on climate change and wildfires, 7-24-2021, accessed on 7-9-2022, NBC, "Using satellites and AI, space-based technology is shaping the future of firefighting", https://www.nbcnews.com/news/us-news/using-satellites-ai-space-based-technology-shaping-future-firefighting-n1274807, HBisevac)

Using satellites, drones and artificial intelligence, emerging technology is changing the way **firefighting** agencies and governments battle the **ever-increasing threat of wildfires** as hundreds of thousands of acres burn across the western United States.

New programs are being developed by startups and research institutions to predict fire behavior, monitor drought and even detect fires when they first start. As climate change continues to increase the intensity and frequency of wildfires, these breakthroughs offer at least one tool in the growing arsenal of prevention and suppression strategies.

“This is not to replace firefighting on the ground,” said Ilkay Altintas, a computer scientist with the University of California, San Diego, who developed a fire map for the region. “The more **science** and **data** we can give firefighters and the public, the **quicker** we’ll have **solutions** to combat and mitigate **wildfires**.”

More than 80 large fires and complexes have scorched more than 1.3 million acres across 13 states this year as of Friday, according to the National Interagency Fire Center, and additional fires are breaking out almost every week. The country’s largest inferno, the Bootleg Fire in southern Oregon, has forced thousands of residents to evacuate since lightning sparked it July 6. Smoke from the Western blazes is so thick that East Coast residents were treated this week to a spectacular, if worrisome, fiery sunrise and hazy skies.

“As the risk for **catastrophic wildfire** grows, so should our **ability** to **forecast wildfires** and to **mitigate fire risk**,” Rep. Zoe Lofgren, D-Calif., said last month during a House Committee on Science, Space, and Technology hearing.

#### Extinction.

Peter Kareiva & Valerie Carranza, 18 (Peter Kareiva is the former director of the Institute of the Environment and Sustainability at UCLA, Pritzker Distinguished Professor in Environment & Sustainability and Chair, Doctorate of Environmental Science and Engineering program; Valerie Carranza, Ph.D. Candidate at University of California, Riverside, researcher at UCLA; 1-4-2018, accessed on 11-5-2021, University of California, Los Angeles, "Existential risk due to ecosystem collapse: Nature strikes back", https://doi.org/10.1016/j.futures.2018.01.001, HBisevac)

Climate change often also increases the risk of forest fires, as a result of higher temperatures and persistent drought conditions. The expectation is that forest fires will become more **frequent and severe** with climate warming and drought (Scholze, Knorr, Arnell, & Prentice, 2006), a trend for which we have already seen evidence (Allen et al., 2010). Tragically, the increased severity and risk of Southern California wildfires recently predicted by climate scientists (Jin et al., 2015), was realized in December 2017, with the largest fire in the history of California (the “Thomas fire” that burned 282,000 acres, https://www.vox.com/2017/12/27/16822180/ thomas-fire-california-largest-wildfire). This catastrophic fire embodies the sorts of **positive feedbacks** and **interacting factors** that could catch humanity off-guard and produce a **true apocalyptic event**. Record-breaking rains produced an extraordinary flush of new vegetation, that then dried out as record heat waves and dry conditions took hold, coupled with stronger than normal winds, and ignition. Of course the record-fire released CO2 into the atmosphere, thereby contributing to future warming.

## AT: CP/Ks

### Counterplan---AT: EU---Military

#### The EU fails:

#### 1. MILITARY POSTURE---it’s just too uncredible for sufficient deterrence.

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A weak European military

European defense spending, specifically related to nations falling short of the NATO 2% of GDP target, has been a major issue in U.S.-EU relations. While Barack Obama’s administration exerted diplomatic pressure, Donald Trump’s engaged in open confrontation on this issue. Neither administration obtained significant results, however; and as Afghanistan has shown, Europe is still far too reliant on the military protection of the United States — an issue that weakens NATO’s posture. Over the past few years, the EU has strengthened both its legal and financial mechanisms to be more competitive on the security side. In December 2017, under articles 42.6 and 46 of the Lisbon Treaty, the European Council established a Permanent Structured Cooperation mechanism to deepen cooperation between willing member states. These states have agreed to binding commitments on investment, planning and management to advance their defense capabilities in the service of both national and multinational operations (including those of NATO and the UN). PESCO currently has 46 projects in several domains, from training to maritime and land exercises to cyber and military mobility.33 Through the European Defense Fund, the EU also has allocated 7.9 billion euros (roughly $9 billion) for the 2021-2027 period to research innovative defense products and technologies through collaborate development projects.34

But while these initiatives represent a step toward better European coordination on defense issues, they are completely reliant on political will and inter-governmental coordination — as security is not a competence of the EU but an inalienable prerogative of its member states. In fact, many of the PESCO projects appear to be severely delayed.35

U.S. experts interviewed for this research also point out the bad shape of European defense and more broadly its dependence on the United States for even more reachable defense objectives. A report from the Center for American Progress mentions the example of France’s anti-terrorism operation in the Sahel, where the U.S. ended up supporting basic air-refueling and surveillance flights.36 A detailed study by the Clingendael Institute points out that if the EU wants to be a credible actor in crisis management, primarily in its neighborhood, then it should be able to operate crossspectrum in the air, land, sea, cyberspace, and space domains — which cannot be done without more serious investments in European defense.37 The case of Afghanistan — where Europeans decided to leave after the U.S. withdrawal despite the predictable consequences on migration and political instability — offers a concrete example of such shortcomings.38 As Brookings expert Michael E. O’Hanlon points out, Afghanistan operations did not require high-tech equipment or massive resources; but the fact that European countries involved in NATO operations in Afghanistan did not step up to preserve a military presence in a crucial theater for European security speaks to their unpreparedness in terms of stockpiles of equipment and inability to conduct such operations without the help of the United States.39 Germany’s defense capabilities are also emblematic: Despite having more fiscal leeway and being at the forefront of European technological innovation, Berlin has not invested in its military, which still lacks critical equipment such as body armor, night vision gear, and helicopter spare parts.40 In this regard, evidence suggests that integrating and strengthening European defense would undoubtedly offer more openings for specialization, boost resource allocation and more broadly improve readiness. Yet such opportunities are highly contingent on building trust between allies and increasing political will, which will inevitably take time and be achieved in different ways.

Recently, some inter-governmental initiatives outside of the EU and NATO frameworks were taken to tackle these shortcomings. In 2018, French President Emmanuel Macron launched the European Intervention Initiative (E2I) with the aim of deepening military cooperation between like-minded European governments sharing a strategic culture. Through intelligence sharing, scenario planning, joint planning and exercises, its 13 participants are working to strengthen their military cooperation so that they can offer rapid responses in case of a crisis. The E2I is particularly relevant because one of its members is the United Kingdom, which is not currently part of any PESCO projects.

The U.K’s involvement signals the importance of the relationship and responsibilities that the it shares with European partners on security. While limited, the initiative is an example of how Europe and the U.K. can strengthen their security cooperation. As the U.K. has left the EU, stronger defense cooperation between the U.K. and the EU would also positively impact NATO through fostering synergies and interoperability. However, while relevant, these initiatives are insufficient for Europe to play a credible role as a security actor in its eastern and southern neighborhoods. And such weaknesses endanger the deterrence power of the NATO alliance against Russia and ultimately reduce the opportunities for the EU more broadly to defend its security interests.

#### 2. OVERLAP---NATO-EU duplication creates confusion leading adversaries to exploit relations.

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Complicating matters further, as described above, the two organizations’ activities have started to overlap, with NATO embracing capacity-building and cyber operations and the EU stepping up on crisis management. More recently, during preparation of its strategic concept, NATO has been questioning its role in the fight against climate change and in countering China’s multifaceted influence in the trans-Atlantic space. And following the AUKUS deal, the EU has been reflecting on developing a stronger military to be able to respond to crises directly impacting its security. NATO opposes any form of duplication, from command to resources, which is quite telling in terms of its soul-searching for the definition of its objectives and its range of action vis-à-vis global challenges.28

Recent events in Afghanistan offer a very good opportunity to reflect on the role of NATO and EU aspirations. After the Taliban took back Kabul, NATO called for an assessment of the accomplishments and failures of ISAF and Resolute Support.29 But instead the EU — not directly involved in Afghanistan as an organization but rather through individual member states — and the United Kingdom reflected on their excessive dependence on the United States in areas of paramount importance to European security. As evacuation operations started in Kabul, with devastating images traveling around the world, Borrell defined Afghanistan as a “wake-up call” for the strengthening of European defense.30 Allies complained about the United States’ lack of coordination and communication on the withdrawal, its unwillingness to extend the deadline for evacuations. For its part, the United Nation Security Council rejected a French-U.K. proposal to establish of a U.N.-controlled safe zone around the Kabul airport.31 While it is debatable whether or not the EU would have used its hypothetical army to secure Kabul’s airport, the Afghanistan experience exposed Europeans’ vivid vulnerabilities in the security domain and their dependence on the U.S. military’s logistical and technological capabilities.

In short, while NATO is rethinking its military engagement and reflecting more on capacity building and missed opportunities in the diplomatic field, the EU is reflecting on its military power. Interestingly, this simultaneous chasm and overlap between the two organizations’ activities and projections is yet another sign of two major needs: First, the West needs to strengthen both its military and non-military tools, and second, there must be more coordination between the U.S. and Europe and by extension between NATO and the EU. These improvements will be essential to prevent malign actors from taking advantage of security crises against the West. China and Russia, for example, have already seized the opportunity that Afghanistan offers to double down on their anti-Western propaganda. Both Moscow and Beijing immediately sought to establish contacts with the Taliban and will likely try to exert more power through their economic influence and other means; eventually they may gain leverage by tapping into Afghanistan’s rare earth reserves32 or potentially by meddling with migration flows to put pressure on Europe.

#### 3. COMMUNICATION---they have nada---resulting in distrust, hindering intelligence sharing.

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Limited communication channels

Although personnel exchanges and joint exercises have helped to set up a framework and a mindset for more integrated operations, officials interviewed for this paper under the condition of anonymity pointed out that information sharing and the results achieved have been very limited. The lack of a secure communication system to share information between the two organizations severely hinders their ability to work together on a daily basis but most importantly to coordinate in a real crisis scenario and consequently to put in place a joint response. As of now, there is no direct inter-institutional secure lines of communication between the EU and NATO. All communications take place between each member state and either within NATO or within the EU. This also is particularly relevant when it comes to sharing best practices or handing over tasks from one organization to the other.25

Political tensions and different strategic priorities

Adding to this communication difficulty, political tensions have multiplied within both NATO and the EU, triggering a climate of distrust that prevents intelligence sharing. Turkey’s purchase of Russian S-400 surface-to-air missiles26 and its invasion of northern Syria after U.S. troops withdrew raised security concerns in the alliance, while the Northern Cyprus question and Ankara’s activities in the eastern Mediterranean waters have created tensions with Greece.27 Relations between France and the U.K. have also significantly worsened since the AUKUS deal, which could ultimately impact the functioning of NATO.

### Counterplans---AT: EU---Fails

#### EU’s space sector lacks the funds necessary and can’t compare to U.S industries.

Alessandro de Concini & Jaroslav Toth, 19 (Alessandro de Concini; Senior Advisor in Advisory Services at European Investment Bank, Jaroslav Toth; Senior Investment Advisor at European Investment Bank, 2019, accessed on 7-7-20222, Europe Commission, “The future of the European space sector”, <https://www.eib.org/attachments/thematic/future_of_european_space_sector_en.pdf>, HBisevac)

4.1. The European space sector experiences similar **funding hurdles** to other tech companies, particularly during the **scale-up phase**

European space start-ups, despite their unique features, are subject to the same macroeconomic dynamics and trends as their peers in other industries. Although the EU is fertile ground for scientific research, technology and innovation, European start-ups are struggling to reach the same **maturity levels** as their **American counterparts**. As of 2016, Europe had produced only 26 “***unicorns***” (i.e. start-up companies with a market valuation over USD 1 billion), compared with **109** in the **US** and 59 in China.90

The financial and sovereign debt crises across the globe have contributed to a suboptimal investment climate since 2008.91 Since this period, SMEs and start-ups, the backbone of the European economy, have become **especially topical**. In a report on the public consultation that preceded the EC’s Start-up and Scale-up Initiative, 71% of the respondents identified access to finance as the major barrier to European start-ups scaling up their business.92 Indeed, despite other hurdles, such as **excessive bureaucracy**, **risk aversion** or **high compliance costs** with regard to employment and tax regulations, the growth of European start-ups’ is mainly **constrained** by the **funding gap** between their needs and the **availability** and accessibility of **funds**.93 & 94

The space sector companies surveyed **reaffirmed this** hypothesis; when asked about their view on access to finance for the European space sector in general, their perception remained **quite negative** (Figure 45, even though they perceived their own access to finance as quite positive, see Figure 44).

Start-ups’ funding needs depend on their maturity (Figure 46). Enterprises in the early stage are generally cash-flow negative without any sizeable track record, and therefore require a high risk tolerance from potential investors, typically venture capitalists. In addition, the high issuance and compliance costs, legal fees and administrative requirements lower the accessibility of public equity capital. As a result, IPOs are not an ideal scenario for European early stage companies. Between 2000 and 2008, there was an annual average of 200 small IPOs, counting for 8 % of the total number of IPOs. After 2009, these figures dropped to an average of 120 IPOs and 5 %, respectively.95

At the same time, bank loans are difficult to obtain for early stage start-ups. Deutsche Bank Research even observed a considerable deterioration in bank loan and credit line availability between 2010 and 2015 for SMEs that are less than two years old.96 This is due to the perceived lack of transparency in the evaluation of their credit risk, but also the strengthened balance sheet requirements for banks, accompanied by prudent risk and capital management. The EU addressed this by implementing an SME Supporting Factor (SF), reducing banks’ capital requirements for credit risk on exposures to SMEs, but research has shown that micro/small firms were not able to benefit from this measure.97

As a consequence, early stage start-ups resort to alternative financing solutions. These include internal financing (family, friends, fools), crowdfunding, business angels or VC. In particular, VC funds, which focus on investments in early-stage start-ups with growth potential, are often the only option for these enterprises. The European VC market is, however, lagging the United States, whose market is deeper and more developed, as exemplified by Figure 47. In the 2016 public consultation on the EC’s Start-up and Scale-up Initiative, stakeholders suggested that “the lack of scale of EU-based venture capital funds is a significant issue for companies attempting to scale up”.99 Despite the exceptional growth rates of European VC money over the last 10 years, supported by a significant capital inflow from the US and Asia, the absolute amount of **v**enture **c**apital **funding** in Europe has remained **low**.100 The demand for equity risk financing among Europe’s SMEs and mid-caps considerably exceeds the available supply, with an estimated annual gap of up to EUR 70 billion (recent estimates suggest annual EU-based demand between EUR 50 billion and EUR 80 billion and place supply at approximately EUR 11.5 billion).101 As the space industry accounted for approximately 2.4 % of the global investments in 2017,102 and the EU accounted for 10.7 % of the global investments,103 we can deduce the annual gap in the European space industry is between EUR 0.9 billion and **1.6 billion**.

Promising European start-ups consequently face a **trade-off** between **cutting growth** and **reducing expenses**, an early IPO or acquisition (the average mergers and acquisitions (M&A) valuation in Europe is significantly lower than in the US) or moving to better VC ecosystems such as the US, which is what many eventually do.104 The reasons for this impasse are manifold.

First, Europe’s less developed VC-landscape may be rooted in the **risk-averse mindset** of its **investment culture**. As mentioned before, early stage start-ups require a high risk tolerance from their investors due to their opaqueness, limited track-record and a high degree of technological, regulatory or market risk. This is especially the case for hardware technology start-ups or those targeting emerging but immature markets, and is particularly applicable to space start-ups, as confirmed by the respondents in our interviews. The public consultation under the Start-up and Scale-up Initiative supports this view—respondents advocated a cultural change by banks and financial institutions concerning access to finance for bankrupt entrepreneurs looking for a second chance, who currently maintain a negative credit score for a long time.105

#### Legal and VC fund barriers wreck EU industries.

Alessandro de Concini & Jaroslav Toth, 19 (Alessandro de Concini; Senior Advisor in Advisory Services at European Investment Bank, Jaroslav Toth; Senior Investment Advisor at European Investment Bank, 2019, accessed on 7-7-20222, Europe Commission, “The future of the European space sector”, <https://www.eib.org/attachments/thematic/future_of_european_space_sector_en.pdf>, HBisevac)

Third, the **regulations**, **terms and conditions** for **investment** are **not standardised** across the different Member States, creating a hurdle and **compromising** the **potential** for upscaled, EU-wide venture capitalists to **develop**. In the public consultation under the Start-Up and Scale-Up Initiative, 40 % of entrepreneurs reported that scaling up their company across borders was **harder than expected** due to **legal**, **regulatory** and **administrative barriers**. Some respondents stated that Member States’ national legislation and tax regimes concerning investment, stock options, profits and company structure hinder the optimal use of cross-border VC within the European Union.113

However, early stage start-ups are not the only beneficiaries from VC. Enterprises in their growth stage, who have generated their first revenues and built up a certain customer base, need to scale up and require capital to do so. In Europe, such growth capital is particularly hard to find compared with seed or early-stage capital. 65 % of the respondents in the public consultation for the Start-Up and Scale-Up Initiative indicated that **financing hurdles** were the **main barrier** to their **scale-up process**.115 This perception is endorsed by a letter from 18 European CEOs, who called on the EC to support start-ups in their growth phase, rather than supporting innovators. According to the entrepreneurs behind the initiative, later stage growth financing, including access to IPOs and investments from pension funds and sovereign wealth funds, should be improved, while EU money should be given to venture capital funds, which are better placed to select companies to back.116 & 117 The apparent lack of growth capital is shown in Figure 48, where the percentage of **growth stage deals** is **considerably higher** in the **US** than in the **EU**, which is a result of the **limited scale** and **capacity** of European VC funds as discussed above.118

Furthermore, the mobility of individual professionals between entrepreneurship, corporate and investment roles is **more limited** in **Europe** than in the **U**nited **S**tates, due to its **younger VC industry** and the **constrained exit opportunities** for entrepreneurs. Facilitating this triangle between investment, corporate and start-up could open up new funding opportunities for start-ups in their growth stage, as entrepreneurs who exited can take the role of business angels or develop their own VC funds. It may also allow easier interactions between start-ups and corporates, with an increased understanding of each other’s business culture and functioning (e.g. decision-making processes).

### Counterplans---AT: Turkey PIC---Deficit

#### Turkey is key for space deterrence.

Cenk Kaan Salihoğlu 21. Associate Professor and a current David R. Cheriton Faculty Fellow at University of Waterloo's Cheriton School of Computer Science. “Geopolitical significance of Turkey's space spurt.” Daily Sabah. 2-9-2021. https://www.dailysabah.com/opinion/op-ed/geopolitical-significance-of-turkeys-space-spurt //EM

A step forward

Ankara's proper geopolitical positioning and foreign and security policies lie behind those achievements. Turkey has managed to step out of the Atlantic system, meet the U.S. on equal footing and upgrade its geopolitical position with regional or global players such as Iran, Russia, and China to become an important regional actor.

However, for further and lasting success, Turkey must now grow out of itself, strengthen its regional alliances, reaffirm its economy and trade volume, fully achieve its technological and military independence and come to terms with itself and its history.

For a robust foreign policy and a thriving international appearance, it is time to settle all internal disputes and reconcile with Turkish history. The National Space Program is here to be able to accomplish all of this.

First, the space program is fascinating to the entire younger generation – regardless of their political views – as Turkish people are intrinsically enthusiastic about space exploration.

Secondly, new career prospects are now opening up for young Turks as the once "American dream" for space is now becoming a reality.

The program builds on the findings of early Turkish astronomers and space researchers such as Farghani in the Middle Ages, whom Erdoğan had presented at the program's ceremony.

The aim is to further develop their achievements. That can maybe be achieved with inspiring stories of Turkish space researchers such as Arsev Eraslan (with the help of whom the Apollo 11 mission could be completed) or the Özmen-couple, who runs a space corporation named the Sierra Nevada.

Meanwhile, the National Space Program also fulfills the wish of founding leader Mustafa Kemal Atatürk, who once said "the future is in the skies," to pursue sky and space exploration. That may help bring together conservative and Kemalist circles in the country.

The program is also expected to create new faculties and increase human capital with incentives being a pull factor for a highly qualified workforce. This, in turn, will go along Turkey's expanding technical capability in space and military areas, which go hand in hand, as NASA has shown us.

Regional perspectives

Furthermore, Turkey will draw on other states' existing know-how and install a launchpad for its rockets in an alliance state near the equator.

Agreements are to be signed with Russia, China, the U.S. and other countries to enable joint space missions and exploration and space-related joint production.

Turkey will reaffirm its regional cooperation with countries vital to it.

The mutual exchange of technology will enable Ankara to meet the same states on an equal footing. The partnership will strengthen Turkey's geopolitical position since joint and close collaboration in such an essential and expensive research field will influence all participating states in their political decisions.

Similarly, the production of high-tech satellites will open up new markets for Turkey both at home and abroad as numerous procurement and sales markets will emerge and as many developing and allied countries will rely on Turkish products.

There will be an overall windfall profit that will increase Turkey's gross domestic product (GDP) and its foreign trade volume and strengthen its geopolitical position further.

States hostile to Turkey will be deterred by Ankara's foreign policy and economic potential and its allies such as Azerbaijan which will likely buy these products just as it had bought Turkish drones that played an essential role in the Nagorno-Karabakh conflict.

As a consequence, the program will provide Turkey with a geopolitical counterweight to regional alliances such as those of Greece, Israel and Greek Cyprus, which, with the help of the West, seek to corner Ankara in the Eastern Mediterranean, the Aegean, northern Syria, Iraq and even western Thrace.

In addition, the bilateral relations with the European Union will also change as a new balance will be established in the accession negotiations and trade relations.

The core aim

Most importantly, Turkey will complete its independence movement in its security policy and defense industry.

By exploring space, Ankara not only wants to gain knowledge of military engineering systems but also plans to build GPS satellites and send them into the atmosphere.

Consequently, Turkey would be able to use these satellites for intelligence, civil and military purposes such as conducting operations without being hacked, militarily tracked or without Ankara having to rely on information from U.S. GPS networks.

If Turkey succeeds in this, it will soon be able to compete with global players. Likewise, it will then be able to consistently defend all the rights to which it is internationally entitled in the region and effectively combat terrorism in and around Turkey.

Undoubtedly, this will primarily affect the region, which, in turn, will further increase Turkey's deterrent potential.

### Kritiks---Reps/Space Defense

#### Space scenario planning – independent of fiat – is valuable.

Albright, 12—M.A. candidate in China-U.S. Relations, University of Hawai’i (Scott, “Demilitarizing Space: How Media and Non-State Powers Can Restrain U.S. and PRC Military Activities in Outer Space,” Spring 2012, ProQuest, dml)

Global action networks, NGOs, social activists, small businesses, multinational corporations, and other groups and organizations who have a stake in how outer space is governed have the ability to reframe U.S. and PRC military agendas and project both hard and soft power that influence how decisions are made from the local level up. In turn, these stakeholders can crisscross throughout the regulated and unregulated areas of social, political, and military affairs in ways which interconnect the globe and question the traditional methods used to govern people’s activities. Advancements in new technologies help these individuals and organizations to communicate, travel, and coordinate in ways which were unimaginable just fifty years ago and further create new questions about the traditional ways of governing while reshaping the evolution of global affairs. Although the debate over what forms of government are best suited to manage cyberspace, outer space, or any other kind of space will probably continue for many years to come, there is no doubt that during the debate non-state actors will have a significant role in deciding the final outcome. Through protest and other forms of political participation organizations working outside of the state can help to develop strategies and goals for governments to prevent the type of weapons proliferation that make outer space less hospitable to human activities. It is important for these organizations to have common and specific goals that are acceptable for states who continue to see the value in using outer space for national security purposes. These organizations can push states to sign on to treaties that prohibit the placement of weapons in space such as the PPWT, or insist that governments establish better transparency and confidence building measures (TCBMs) that make outer space less militarized and more hospitable for all of humankind. Although both treaties and TCBMs are important, neither can address the problem of militarization if there is no way to enforce any agreements negotiated. This is why it is important for non-state organizations to reconsider their own role in the enforcement process for agreements that prevent or reduce the militarization of space. The U.S. has consistently been reluctant to sign on to any agreement that prohibits ASAT testing or the placement of weapons in outer space because, the U.S. argues, there is no way to verify that other countries are abiding by the terms of the agreement. There is no doubt that verification procedures are an extremely tricky business, but it is an area where non-state powers can help.83 There are already organizations working outside of government which provide monitoring and live tracking data for satellites orbiting the Earth. This data is published on websites like n2yo.com, which helps to increase transparency regarding government and commercial space activities, while also providing some security for those concerned about debris falling to Earth; however organizations like this can go even further in making governments more transparent and accountable for their actions. By teaming up with other organizations and networks like the GN, Reporters Without Borders, or the Union of Concerned Scientists new strategies can be developed to help make verification more plausible. When trying to come up with solutions as to how to better govern the commons Elinor Ostrom tells us in her book Governing the Commons that public-private partnerships which encourage agreed upon normative behavior and self-monitoring can be part of the solution.84 I agree with this assessment, but am wary of any type of partnership that prevents non-state powers from acting independently of the state. One reason the news media has failed in being objective is precisely because of its often cozy relationship with governments and corporate enterprise. Agreements can be made through legislation that allow for partnerships to exist where both non-state and state actors work together to enforce verification procedures, but when these partnerships grow too close it can be assumed that objectivity and the role of the non-state actor as a government watchdog will fall by the wayside. As GANs, NGOs, and other organizations fill the void where governments and corporations have failed they will realize that they alone cannot ensure the global space commons remains accessible to all, nor provide the assurance that it will be used only for providing global goods and maintaining international peace and stability. They can, however, help to ensure there are more means of ensuring that people and organizations in powerful positions can be held accountable for their actions within the space commons. In the long term it may not be a treaty or TCBM that safeguards outer space, but rather the restoration or creation of a collective moral imagination that views human activity in outer space, not from the narrow perspective of national security and defense, but through a ‘mental model’ which envisions each individual as part of a whole, yet diverse system that is much bigger than national borders or regional boundaries.85 By encouraging the development of a collective moral imagination non-state powers will better be in a position to provide suggestions as to how the rules of the road are created and enforced. Accidents will occur and rules will still be broken, but when new possibilities are created that allow for diversity within a set of expected normative behaviors there will be a greater chance that countries like China will accept civilian control of their space agency, while also making international cooperation between state and non-state actors more appealing. Instilling morality in the collective imagination is not enough to ensure that in the future outer space is not just another battle space environment. Rules of the road do have to be established and international treaties and national laws do have to be agreed upon and enforced, but before these rules can be set in stone it is necessary to first re-evaluate previous rules that have been abandoned or ignored. Before any treaty or code of conduct in outer space is negotiated non-state actors should encourage space-faring nations to revisit the 1967 Outer Space Treaty and question whether the international community is indeed abiding by the principles laid out in it. Article III says “States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the Moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international cooperation and understanding.”86 Is the use of space for military purposes really in the interest of maintaining international peace and security? The U.S. might argue that it is, but for those who are targets of satellite guided munitions, missiles, or electronic attack from the heavens, the answer is no. As other countries become more capable of using space for military purposes the U.S. may decide that the answer is also no, but the reality is that no matter how just one considers the use of force to be, the use of force is not the same as maintaining peace. Violence does not equal peace. There should be no argument against this, but humans tend to rationalize violence in a way that makes this argument somehow valid, and therefore it can be expected that violence will continue to be used so long as citizens accept the moral justification for the use of force. Article IV of the Outer Space treaty says, “States Parties to the Treaty undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.”87 Here the question is what constitutes a weapon of mass destruction? Is a chemical or biological weapon in outer space any more capable of causing mass destruction than a constellation of lasers or an orbiting electromagnetic pulse bomb? Probably not, which is why before states continue to agree to this article they may want to reconsider what the definition of a weapon of mass destruction is and how new technologies can continue to change that meaning from time to time. Also in Article IV it states, “The Moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden.”88 Here one might ask how can the Chinese National Space Agency legally operate on the moon if the agency is militarily controlled? Also, how do dual-use technologies fit into this? Is the mining of helium-3 exclusively for peaceful purposes, and how will anyone know if it is not? These questions should be answered before any new treaty or international agreement can be made. Instead of only coming up with a new code of conduct the international community should also look at the treaties already in place and ask how those treaties can better be implemented, and how non-state actors can help to enforce their implementation. Also, there are other Earth-bound arms control agreements that may be useful for demilitarizing outer space. For instance the ABM treaty which the U.S. abrogated from deals specifically with missile defense which has been the cause of so much frustration and tension between the U.S., Europe, China, and Russia. What is prohibiting the U.S. from revisiting this treaty? How can non-state actors influence policymakers so this treaty comes back into the limelight? What can be done to ensure the deployment of missile defense systems does not increase asymmetric countermeasures to these defenses, and how does missile defense provide more security if the deployment of this defense causes other states to build and deploy more missiles and countermeasures to overwhelm the system? These are not easy questions to answer, and so far no one has been able to come up with a viable solution, but if humans truly want to make the world a safer place and the outer space environment more accessible and more hospitable for humans, than surely non-state actors should be welcomed by the international community to help make it happen. Conclusion Global action networks, NGOs, small businesses, social activists, multinational corporations, and other stakeholders in space security have a special role in creating an environment of cooperation between governments, as they are able to work both within and outside of the established system and are capable of bringing together individuals from different sectors of society who can make international projects succeed where governments fail. As global power becomes diffused these non-state actors will be more capable of investing in the types of projects that states refuse to participate in. While U.S. and Chinese officials debate over whether or not the two countries should cooperate in outer space, GANs, NGOs, activists, and firms can seep through the loopholes and begin cooperation before governments even have the opportunity to question whether cooperation is in a country’s best interest or not. Although it may be difficult for non-state actors to tackle the big projects that require cooperation both on Earth and in space, they can still take some small steps that move the level of cooperation up notch by notch. As non-state actors prove that cooperation between individuals from adverse nation-states is possible they will be more able to convince governments that large projects like the creation of an international space agency or a truly international space station or lunar research park is attainable. When governments begin to understand the type of mutual benefits international space projects can bring they may begin to work closer together in ways which not only reconsider how outer space is used by the military and intelligence communities, but in ways which integrate space systems so that destruction of such systems becomes a less viable option for all parties involved. For instance Russia, China, the U.S., and the European Union can integrate navigation satellites in ways which reduce redundancy and encourage the sharing of data and assets so that all parties have a stake in one another’s systems to the point that interfering, disrupting, or destroying a system or component of the system becomes self destructive and unnecessary. Soviet-American cooperation on the Apollo-Soyuz Test Project in 1975 provide a good a example of how hostile countries can work together for peaceful purposes in outer space, and the continued cooperation between Russia and the U.S. after the fall of the Soviet Union on projects like the Mir Space and International Space Stations show that national rivalry and security concerns can be overcome in the long run.89 China, who seeks to be an ISS partner, will continue to develop and modernize its military-run space agency whether or not the U.S. is on board with this advancement. As China continues to carry a successful record in its outer space activities, while leapfrogging technologies and moving independently of the U.S., it may eventually find itself as a leader in outer space while the U.S. falls behind. Because the Obama administration has chosen to refocus its military efforts on the Asia-Pacific region China has even more of an incentive to continue pursuing military activities in outer space to counter these efforts. This in turn creates the type of environment that encourages the proliferation of space-based weapons systems by countries throughout the region and has the potential to become a conflict neither China nor the U.S. can afford. For this reason GANs, NGOs, and other non-state actors must be active in finding those areas in which cooperation between Chinese and American individuals, organizations, and corporations on civilian outer space projects is possible. By demanding states be more transparent in how they conduct space security and by encouraging more participation in the decision making process of space governance, non-state actors can pressure governments in ways that force them to reconsider further militarizing space or acting in unilateral nationalistic ways that have so far reduced security on Earth and outer space, rather than enhancing it. Small and large firms which encourage the commercialization and democratization of the space industry will help to increase access to outer space to more people who, when free from the often narrow and imaginatively constraining military mindset, can provide new creative and multibeneficial ways for utilizing the space commons and the global goods it has to offer. As more people are given more access to space it will become impossible for governments to not work with non-state actors to create a better system for governing it and ensuring it remains a peaceful place to work and even live. Traditional news media, grassroots and alternative news media, academic media, and science fiction and entertainment media can all be used to further ensure space is used for peaceful purposes by helping to reframe the agenda of the military and intelligence communities through continuous and persistent dissemination of content which encourages cooperation and civilian utilization of outer space. By doing so these and other media groups can help in the process of developing a morally injected collective imagination that envisions all of humankind working together without regard to the borders nation-states bind their citizens to. Throughout this thesis I argue that a more holistic and multi-faceted approach to arms control should be taken to not only demilitarize space, but to also create a more cooperative and peaceful international environment on Earth. This approach can be further broadened to include many more aspects that help to not just cure the symptom of weapons proliferation, but that also addresses the root cause of the problem. History has shown that powerful leaders are influenced by media and non-state actors who can and do impact their future actions, which in too many cases have led to conflict and war rather than peace and cooperation. It is time to take note of this history and ensure that the lessons learned from it are not lost so that humans do not continue to repeat the same mistakes that have lead generation after generation through the continuous cycle of war and weapons development. There are no winners to such a cycle, except perhaps for the weapons themselves which are becoming so powerful and dangerous that they not only threaten all of human existence, but also the ecosystems in and outside of Earth’s atmosphere which are necessary for all of the planet’s life forms. There may never be a permanent solution that ensures the space commons continues to be utilized for the global goods it offers, but as long as more people are educated about the problems militarization creates, the more access they have to information on how these problems can be resolved, and the more they are able to use those facts to influence defense policy through collaborative transnational efforts, the better they will be able to come up with a solution for future generations who may one day live, work, and play in outer space together as a global community that seeks to maintain a lasting and sustainable peace for all of humankind.

#### The 1AC’s tactical repurposing of data logics transgresses the imperial embargo on non-expert decision-making in military space policy. This turns techniques of imperial mapping against themselves.

Elwood and Mitchell, 13—Professors of Geography at the University of Washington (Sarah and Katharyne, “Another Politics Is Possible: Neogeographies, Visual Spatial Tactics, and Political Formation,” Cartographica 48:4, 2013, pp. 275–292, dml)

New forms and applications of Internet-based spatial media continue to rise in number and diversity, with these technologies increasingly present in various forms of civic engagement and activism. Multimedia data collection, compilation, and mapping toolkits such as those provided by Ushahidi are being deployed for citizen monitoring of ethnic violence, election fraud, and disaster relief needs and resources (Okolloh 2009; Goodchild and Glennon 2010; Roche, Propeck-Zimmermann, and Mericskay 2011). A growing number of urban governments now use online and mobile geo-services that allow residents to submit their observations of infrastructural problems and other local needs via a geo-tagged text message or photograph or by adding an object to a map interface (Foth and others 2009; Elwood and Leszczynski 2013; Johnson and Sieber 2012). Citizens have used the high-resolution imagery of virtual globes like Google Earth to monitor military buildup or reveal supposedly secret sites and facilities (Aday and Livingston 2009; Perkins and Dodge 2009). These examples extend a vibrant history of civic applications of the earliest interactive mapping tools, including map mashups of Chicago crime data or post-hurricane evacuation and relief needs in New Orleans (Miller 2006; Crutcher and Zook 2009).

The technologies and practices that underlie these applications of Internet-based spatial media have become known by a dizzying array of new terms in the past several years. Volunteered geographic information (VGI) refers to spatial data sets compiled from the contributions of many individuals, such as citizen reports to a disaster relief map interface (Goodchild 2007; Elwood, Goodchild, and Sui 2012). The geospatial Web originally referenced only the centrality of geographic location as a means of organizing and retrieving online content (Scharl and Tochtermann 2007). The term ‘‘geoweb’’ is now used more broadly to identify this location-mediated Internet content and the hardware and software that enable its production, such as GPS-enabled handheld devices or freely available mapping APIs (Elwood and Leszczynski 2013). ‘‘Neogeography’’ has been used to refer to what some users do with interactive online mapping tools – namely to the production of maps and other visual spatial artefacts through various geoweb resources, often by laypersons, activists, artists, grassroots groups, and other ‘‘non-expert’’ actors (Eisnor 2006; Turner 2007; Wilson and Graham 2013).

Geographers’ interest in these phenomena is wide-ranging, including core GIScience questions about ontologies, data quality, and data integration (De Longueville and others 2010; Grira, Bedard, and Roche 2010; Haklay 2010); disciplinary concerns about the future of cartography and related arenas (Gartner 2009; Kraak 2011; Goodchild and Turner 2013; Kitchin and Dodge 2013); and questions about their social and political implications (Crampton 2009; Dodge and Perkins 2009; Elwood 2010). In the latter arena – the social and political implications of neogeography – we see divergent concerns and predictions. Some scholars trace trends of increasing surveillance and state/ private-sector control over the production and circulation of geospatial imagery, maps, and the resources needed to produce and share them (Perkins and Dodge 2009; Gerlach 2010; Leszczynski 2012). Others suggest that neogeography constitutes new spaces of civic engagement or resistance and begins to level access to cartography, geovisual imagery, and deliberative or decision-making forums in which they are used (Madden and Ross 2009; Okolloh 2009; Meier 2011). In particular, as scholars have debated this empowerment/marginalization dialectic (Sheppard 2005), there has been a great deal of interest in whether and how neogeography might enable the participation, influence, and agency of less powerful actors. The existing literature offers two kinds of propositions for how they might do so – by offering less powerful actors greater access to conventional spheres/practices of deliberative decision making and cartography (see Tulloch 2008; Hall and others 2010; Gryl and Jekel 2012), or by enabling them to create their own alternative spheres of deliberation/engagement and cartographic praxis (cf. Kingsbury and Jones 2009; Okolloh 2009; Lin 2013).

These different propositions are, at heart, arguments about the forms of politics that are or might be constituted through the practices associated with neogeography, and it is this concern that will take centre stage in our discussion here. By ‘‘politics’’ we are not referring to the specific realm of electoral politics but rather to a much broader range of individual and collective practices which act on or engage structurally mediated inequalities, the social and material relations of everyday life, and negotiations over identity (Kofman and Peake 1990; Brown and Staeheli 2003). This wider definition of politics is critical for theorizing neogeography, given that it has from inception tended to be pluralist, processual, and rooted in everyday life. For all the discussion of participation, empowerment, democratization, or even liberation with respect to neogeography praxis, there has been comparatively little direct theorization of the forms of politics that are or might be advanced via neogeography, save for two recent papers that draw on Michel de Certeau’s (1984) notions of ‘‘strategy’’ and ‘‘tactics’’ (Gryl and Jekel 2012; Lin 2013).

For de Certeau, ‘‘strategy’’ is constituted through the spaces and practices of hegemonic actors/institutions and forms of knowledge. Voting, presenting a map and oral testimony at a public hearing, staying out of an area framed in local discourses as a ‘‘bad’’ neighbourhood, or analysing local needs through community development’s ubiquitous strength, weaknesses, opportunities, threats (SWOT) technique are all examples of strategy. In contrast, tactics rework (or at least refuse to cooperate with and reproduce) the norms, representational practices, and spatial meanings of strategy. Going walking in a neighbourhood commonly said to be dangerous challenges this spatial imaginary of danger through the action of occupying the space, and it transgresses a tacit prohibition against going there. ‘‘Walking’’ this neighbourhood in the virtual space of a neogeography platform such as Google Maps is a visual spatial tactic (Lin 2013) that transgresses the same prohibitions in a digital environment. Of course, these two examples of spatial tactics are not identical experiences, given that one occurs in a material space and the other in a virtual space. But the broader point to be taken from Lin’s notion of visual spatial tactics is that such digital practices can constitute a transgression or reworking of the spatial norms and restrictions of strategy.

As we will develop further in the next section, much of the existing literature on the societal significance of neogeography is already tacitly structured around this concept pair. Some work focuses upon the potential of neogeography as a practice of strategy (or a politics ‘‘from within’’), and others emphasize neogeography as an arena for tactics (the means and practice of a ‘‘politics from outside’’ by disempowered and excluded actors). Yet on both sides, this work has to date focused primarily on neogeography as a practice or site of political action or engagement. We will argue here that neogeography practices – specifically visual spatial tactics – are significant not only because they constitute a space for political action or engagement by less powerful actors, but also because they can function as key sites of political formation. In what follows we show how the visual spatial tactics of neogeography can foster the formation of political subjects, the formation of collective action frames (which may spur these political subjects to action), and collaborative formation of shared knowledge. Thus, visual spatial tactics in neogeography are significant not just as practices of alternative political engagement or action by actors ‘‘from below’’ but even more so as practices constituting critical antecedents to such action. Tactical neogeography practices constitute subjects as critical thinkers, mobilized actors, and active agents in collaborative knowledge-making.

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We develop these arguments from research conducted with young teens ages 10–13 at two Seattle schools from 2009 to 2012. School A is a public middle school enrolling approximately 500 students, 95% of whom are racial or ethnic minorities and 75% of whom come from low-income families. It is located in one of Seattle’s areas of highest poverty, with comparatively high rates of unemployment, foreclosure, crime, and violence. School B is a private middle school of 100 students, 35% of them racial or ethnic minorities and 40% of whom receive financial aid for their tuition. Its surrounding neighbourhood grapples with many of the same concerns facing School A’s neighbourhood, but arguably to a somewhat lesser degree.

Our action research with these two schools examined the potential roles of interactive mapping platforms in fostering civic engagement, collaboration, and place-based teaching and learning. In each of the three years, we conducted a 7- to 15-session module of interactive mapping activities, designed to complement the school’s or teacher’s existing efforts to have students learn from and about their city. In year 1, in a class we offered as part of the educational after-school program at School A, sixth and seventh graders created interactive maps of their “everyday geographies.” In creating and sharing their maps, they represented and reflected upon the opportunities, constraints, and patterns in the places and movements of their own daily lives and those of their classmates. In year 2, as part of our activities with a seventh grade social studies class at School B, students created interactive multimedia maps exploring key sites and spatial processes in the urban histories of racial and ethnic minority groups in Seattle. In year 3, we conducted our mapping activities in the “environmental stewardship” curriculum of a fifth grade science class at School B. Students researched and mapped the environmental and cultural histories of two river systems in the Puget Sound area.

In each of these three mapping units, participating students created their interactive maps in an open-source mapping platform developed for this project. Offering a simpler set of tools than many existing commercial mapping web-sites, our platform enables students to create a map object (point, line, or polygon), position this object on a base map, give the object a name or title, and add text, images, URLs, or video in a textbox. When a map object is selected, this associated content appears in the window to the right of the map view (Figure 1). Another key feature of our platform is an interactive commenting function that allows users to select a map object and add (or respond to) comments, questions, or additional information. These comment streams appear beneath the map view and are accessed by clicking the map object (see Figure 1). The students primarily created their maps in this platform, but many of them knew about and used Google Maps in parallel, to access some of its additional services.2 Specifically, they used its search engine to find particular addresses or place names and its street view service to explore photographic street-level panoramas of specific areas.

While our three mapping units were quite different in substantive theme, we structured all three around a similar cycle of individual and collaborative mapping, exploration of content, and critical reflection. Using Kolb’s (1984) “experiential learning” cycle, this process moved from observing, sharing, or learning about concrete activities, events, or places in the “real world” to understanding the more abstract processes that generate them. As students mapped sites or spatial processes they deemed important (to the theme of each of the three units), our goal was for them to learn about and critically reflect upon the social, political, and economic processes and relationships [End Page 277] that produce these geographies. Unsurprisingly, they also gained cartographic skills and experience with digital spatial technologies, but this was not our primary pedagogical objective. Further, while this research has generated contributions to scholarship in geography education and youth geographies (Elwood and Mitchell 2012; Mitchell and Elwood 2012a, 2012b, 2012c, 2013), our purpose here is to use evidence from this project to illustrate a more theoretical contribution to ongoing efforts to articulate the forms of politics that are or might be advanced in neogeography practice. With their emphases on examining and engaging social and spatial processes and relationships, especially vis-à-vis the past histories and present conditions of places in which they live, the youth neogeographies generated as part of our project are a rich source of evidence through which to consider these questions.

The pedagogic practices described above generated the empirical basis of our research on neogeography, children’s politics, and citizenship education. Our research design follows Burawoy’s (1998) extended case method, an inductive approach for generating theory from qualitative ethnographic research (as opposed to deductive research designs structured around testing hypotheses). In this approach, a case is selected on the basis of its ability to illuminate the conceptual questions of the research – for us, questions about the forms of politics that are possible for neogeographers who operate from positions of disempowerment and exclusion. Our questions about the political potential and significance of neogeography for less powerful actors further demand an inductive analysis of evidence that can illuminate processes, meanings, and social relations. To this end, our evidence included the students’ multimedia maps; map comments from teachers, parents, and peers; and field notes produced by all members of our research team after each class session. Our inductive analysis involved iterative interpretive review of the data to generate and refine propositions about the nature and forms of politics advanced through the children’s neogeographies. We validated our emerging findings through triangulation across multiple sources of evidence, aimed at identifying tensions, contradictions, and commonalities in the data. The specific examples presented below are illustrative demonstrations of the forms of politics practised by our young neogeographers but are not the only instances in which these practices occurred in the project.

Neogeography and the political

Recent scholarly work on neogeography has moved in several different directions. Some scholars have begun to trace the conditions of its emergence, particularly the hardware and software developments enabling it (Goodchild 2007; Haklay, Singleton, and Parker 2008). Others examine the shifting political-economic relationships around the production of spatial data and maps signalled by neogeography, with particular interest in the changing roles and relations of state and private-sector actors in this enterprise (Goodchild 2007; Harvey 2007; Radcliffe 2009; Boulton [End Page 278] 2010; Kinsley 2010; Leszczynski 2012). Others have focused on the substantive content produced through neogeography practices, with particular interest in how people, places, or phenomena are represented (or not) and implications of these presences and absences for the (re)production of social difference, inequality, and the digital divide (Zook and Graham 2007; Crutcher and Zook 2009; Graham 2010; Graham 2011; Graham and Zook 2011).

Another key debate has been the implications of neogeography for cartography, GIScience, and geography. Some have characterized the roles of academic and professional cartographers and geographers as diminished, whereas others argue they are transformed but still essential (Gartner 2009; Goodchild 2009; Goodchild and Turner 2013). Map quality and public cartographic and spatial literacies have also sparked concern. For instance, the head of the British Cartographic Society recently worried that neogeographers (or “lay cartographers”) will diminish the quality of maps (Crampton 2010), a concern mirrored in criticisms of neogeographers’ cartographic design (Das and Kraak 2011; Kraak 2011). Perhaps prompted by these concerns, a number of recent interventions offer pedagogies aimed at using neogeography platforms to foster spatial literacy, principles of cartography and GIS (Patterson 2007; Allan 2008; Campbell 2008; DeMers and Vincent 2008; Papadimitriou 2010), and active citizenship and civic participation (Milson and Earle 2008; Harris, Rouse, and Bergeron 2010; Gryl and Jekel 2012).

Finally, this ever-growing literature has examined the social and political significance of neogeography by considering the purposes for which individuals and social groups engage these platforms. Some have considered the potential and limits of neogeography for public involvement in local government planning and decision-making (Rouse, Bergeron, and Harris 2007; Tulloch 2008; Johnson and Sieber 2012; Sieber 2012) or for citizen participation in activities such as redistricting (Crampton 2013). Several studies consider the rising use of neogeography interfaces to elicit and circulate citizens’ observations of on-the-ground needs and conditions in natural disasters and other crises, with particular emphasis on the extent to which these applications may enhance the effectiveness of government and NGO relief efforts (Liu and Palen 2010; De Longueville and others 2010; Zook and others 2010). Some studies examine the ways that activist groups, NGOs, and other citizen groups use neogeography to connect with diasporic communities, disseminate counter-narratives, or mobilize diverse forms of action by members or potential advocates (Corbett 2012; Elwood and Leszczynski 2013; Lin 2012, 2013). Many of these counter-hegemonic neogeographies have included forms of recreation or art, ranging from “spot the black helicopter” games that “surveil back” on the state to digital map art that troubles traditional cartographic rationalities (kanarinka 2006; Cobarrubias and Pickles 2009; Crampton 2009; Kingsbury and Jones 2009; Lauriault and Wood 2009; Perkins and Dodge 2009).

Threading throughout this work on neogeography applications is a strong interest in their potential to foster inclusion, agency, and empowerment, especially for disempowered/excluded social groups or the context of deeply asymmetrical state-society relationships. Yet they tend to seek these outcomes in two very different arenas. Some focus on how neogeography has been or might be used in conventional spheres of deliberative politics, such as participatory governance schemes or the negotiations of NGOs/citizen organizations with state actors and institutions (Elwood and Leszczynski 2013). Others examine how neogeography may constitute an alternative site for citizens’ articulations, deliberations, and cartographies (Kingsbury and Jones 2009; Lin 2012, 2013) – a way for citizens to advance counter-narratives, cartographic representations, or forms of (political) speech unlikely to be recognized or included in conventional deliberative spheres. These two approaches are implicitly differentiated by where and how they situate the realm of the political neogeography practice, and they do so in ways that draw on de Certeau’s (1984) notions of “strategy” and “tactics.” One emphasizes a “politics from within” – neogeography as a means to gain access to existing structures of deliberative democracy – whereas the other emphasizes a “politics from outside,” neogeography as an alternative realm for citizen voice.

As an example of neogeography politics conceived as strategy, Gryl and Jekel (2012) argue that collaborative online “geo-media” (which has been termed neogeography in this article) can be sites for the development and practice of critical spatial citizenship. They argue that this critical spatial citizenship depends upon citizens’ abilities to engage in “strategic practices” (de Certeau 1984), such as having the cartographic and spatial thinking skills necessary to use geo-media in ways that will be recognized by policymakers or other citizens and to use these platforms to disseminate their own spatial narratives or challenge those put forth by others. A more inclusive public sphere will emerge, Gryl and Jekel argue, when citizens are able to use interactive geo-media to engage in the representational and deliberative practices of “strategy.”

Yet conceiving of the political potential of neogeography through notions of strategic practice has inherent limits. Critical cartography and GIS scholarship have long underscored that access to the bounded disciplinary practices of cartographic “strategy” is by definition partial and that many forms of spatial knowledge cannot be represented as “geographic information” nor expressed through conventional cartographic representation (Pickles 1995, 2004; Crampton and Krygier 2005). Feminist critiques remind us that structural inequalities and even definitions of “the political” exclude some social groups from the realms and practices of deliberative politics (Fraser 1990; Howell [End Page 279] 1993). Indeed, de Certeau’s effort to recognize the actors, practices of politics, and forms of knowledge that remain outside the realms of “strategic practice” are at the heart of his concept of “tactics.” Because of these inherent limits, theorizations of the political significance and possibilities of neogeography must also include tactics.

Though not theorized as such, tactics are in evidence in many initiatives that use neogeography platforms for performance, art, and other counter-cartographic practices (kanarinka 2006; Kingsbury and Jones 2009; Perkins and Dodge 2009).3 These performative/artistic neogeographies are characterized as political on the basis that they parody notions of cartographic omniscience or expose the inability of their representational practices to fully capture human experience/perception, or that they challenge state control over spatial data production and circulation by revealing (and making fun of) what is supposed to be secret or concealed. Lin (2013) engages the notion of tactics directly in her study of Chinese neogeographers fighting rapid urbanization, forced demolition, and illegal expropriation. In this context, the sites and practices of a politics of ‘‘strategy’’ simply do not or cannot exist – online activities are tightly controlled and monitored, and citizens have little access to formal decision-making structures. Yet citizens concerned with forced urban removal have developed neogeography tactics that contest dominant narratives and institutions and restrictions on activities and mobilities in particular places. For example, in one of their Googlebased map mashups, users can ‘‘stroll’’ an off-limits lakeshore or share artistic representations of it, virtually reclaiming and reimagining a space that cannot be occupied in real life.4

These examples show the potential of neogeography as the basis for a politics of tactics – a site for citizens to produce new spaces and share counter-narratives in a context where direct confrontation is not possible and for actors who are excluded from a politics of ‘‘strategic practice.’’ As Lin (2013) and others suggest, attention to tactics as an important part of the political repertoire of neogeography greatly expands the forms of politics (and by extension, the range of political actors) we can recognize. Yet our research with young teens’ neogeographies suggests that the significance of visual spatial tactics extends beyond their potential as a form of political action or civic engagement. The visual spatial tactics profiled in much of the literature on counter-hegemonic neogeographies are largely performed by already existing political subjects, already mobilized by their concerns about various inequalities, injustices, or social, political, economic, and environmental conditions. Neogeography serves as the site or space in which these mobilized subjects perform their resistance. Our evidence suggests that visual spatial tactics in neogeography can have an even more foundational significance, serving not just as a site of political action but as a site of political formation. That is, we will show how visual spatial tactics of neogeography can be sites for (1) the formation of political subjects, (2) the formation of interpretive frames that can mobilize these subjects for action, and (3) the formation of shared knowledge through collaborative cartographies. Neogeography praxis has the potential to constitute political subjects, mobilized political collectivities, and shared knowledge – the critical antecedents to any form of political engagement.

#### Researching space policy develops institutional skills and combats violence—but doesn’t trade off with radical energies.

Weeks, 12—Adjunct Professor of International Relations Online Program, Webster University (Edythe, “OUTER SPACE DEVELOPMENT: THE SOLUTION FOR GLOBAL INEQUALITY,” *Outer Space Development, International Relations and Space Law: A Method for Elucidating Seeds*, Chapter 7, pg 171-174, dml)

This is the time to discuss equality. Once societies in outer space are established it will be too late. The first wave of outer space development in the last half of the 20th century changed the world. This process included establishing a satellite telecommunications infrastructure in the geostationary orbit along with the globalization of new high-tech products and services. The retirement of the NASA space shuttle program symbolized the start of the second wave of outer space development, which is likely to be propelled by the privatization of space tourism and space mining. This type of space industrialization will undoubtedly result in extreme wealth for a few who know what is happening, while those who have no knowledge will be left behind. Decision makers, scholars, trouble-shooters, and others worry constantly about existing inequality gaps, lack of development, poverty, and economic hardship. This chapter suggests a method for preventative maintenance prior to humankind’s next development project. It argues that education, information, and sharing knowledge can become tools for generating perpetual equality as we embark on our journey to colonize the final frontier. Those historically disenfranchised can gain a fresh advantage through preparation and education to develop an expertise aimed at providing valuable knowledge useful for space endeavors. In addition, in these times of crashing economies, job loss, high unemployment rates, and school system failures, people are searching for ways to create prosperous futures for themselves and their families. Outer space could prove to be a way for many to find their answer.

Newly Emerging Trends Relevant for Outer Space Development

The passage of the NASA Authorization Act of 2010 demonstrates a willingness by the U.S. to fund a stepped-up phase of space activities. During bad economic times, this Act provides $58,400,000,000 for various space-related programs from 2011 to 2013. In 2010/2011, media reports constantly alerted the general public to be ready for the retirement of the NASA Space Shuttle program. This initiative complemented the New Vision for U.S. Space Exploration Policy (2004), as well as various other laws and policies initiated by the United States and discussed in previous chapters. When read together, it is fair to assume the newly emerging space industries will be related to achieving advanced space transportation systems, private spacecraft development, commercial space habitats, space stations, space settlements, commercial space mining, spacecraft trajectory optimization techniques for landing on near-Earth asteroids, commercial spaceport construction, interplanetary telecommunications, and space exploration missions. The thing for teachers, students, and members of the general public to do in order to prepare to take advantage of these linked opportunities is to imagine how these goals are likely to play out, and what types of goods, services, and skill-sets will be needed.

Education as the Solution

Outer space development historically has been the purview of skilled professionals in the science, technology, engineering, and math (STEM) fields. The STEM-oriented opportunities for those proficient in physics, astrophysics, space medicine, engineering, calculus, etc., have always been limited to a few select students. But now global society is calling for something, more since the STEM fields have failed to attract diverse people on an equal footing.186 A bridge can be created by using social and behavioral sciences curricula, thereby to attract people from a wider range of backgrounds to learn about outer space development and newly emerging industries.

New education paradigms can help ensure equity and enable wider citizen participation throughout the international community. Curricula using the new paradigm can be used to motivate and inspire a new generation of scholars who can play a key role in the process of outer space development. In effect, an educational system that unleashes human creativity and curiosity will empower students with the knowledge and competencies not only for the second wave of outer space development, but also for the global engagement necessary for the 21st century and beyond (Weeks and Tamashiro, 2011).

It is never too early to begin cultivating a person’s intellectual and academic talents. Most children are naturally curious. As part of the curriculum, students of all ages can be shown how to do research, how to write a research paper, to compile and present data, perform critical analytical thinking, and to anticipate and develop relevant skill-sets for newly emerging industry trends. Learning these skills will enable more people to develop an expertise aimed at supplying talent that will be in demand as future industries emerge. This can change people’s lives. Students can learn how to anticipate and prepare for future emerging industries while they are at the K-12 level. Students can also learn at young ages how to get recognized by publishers, editors, the mass media, and others.

In situations where the resources necessary for teaching science are unavailable, space studies can be introduced through the social and behavioral sciences and the arts. For many years, space studies has remained the exclusive purview of engineers, scientists, and technology experts. However, there is room at the table for social and behavioral sciences students to join in and develop a specialty area of expertise. Key actors within the outer space development community have expressed an interest in advancing space studies to a broader audience. Orchestrating such a process carries with it the power to improve international relations, education, inspiration, dreams, and creativity, and to boost the global economy by creating a myriad of new jobs and degree programs. We can open an additional door to allow a broader range of knowledge into the minds of more people by introducing outer space development studies through the social and behavioral sciences (Hammond and Weeks, 2011). Unlike engineering, an interdisciplinary social and behavioral sciences lens enables us to interpret the meaning behind sets and patterns of human behaviors—this includes the behavior of individuals, institutions, groups, presidents, members of congress, business and other organizations, mass media, international organizations, and lawmakers.

Humankind can progress beyond the “STEMs = space studies” model by including, encouraging, involving, and preparing a new breed of social and behavioral sciences geniuses. These would be people who are naturals in international relations, conflict resolution, and peace studies, as well as versed in international law, politics, social psychology, critical analysis, discourse analysis, international communication, artistic architecture, race and ethnic studies, gender studies, religious studies, economics, finance, business and entrepreneurship, history, and political economy, while also being concerned with inequality gaps, oppression, subjugation, revolts, uprisings, revolutions, and various other social and behavioral phenomena. People who understand the issues concerning human beings now have a way of participating in future emerging space industries. The audience of learners scheduled to receive cutting-edge knowledge of fields relevant for outer space development will be expanded by online learning techniques and sharing of information through the open-source technologies of the Internet.

Shaping Ideology

Imagine teaching students about the newly emerging trends related to outer space development. This would give students permission to envision and carve out their role in designing future space societies. Students from all disciplines can be taught to see what’s coming next by learning to research and interpret economic policies, laws, and international relations. This will enable them to detect newly emerging industries and to anticipate the elements likely to be in demand. Students can then shape their skill-sets and prepare to satisfy these emerging needs. Students can be taught to perform this type of interdisciplinary analysis and to research combined dynamics—government hearings and transcripts, policy statements and speeches, laws, economic initiatives, and international treaties. They can also be taught to combine this type of primary data with theoretical understandings of historical, ideological, institutional, political, economic, psychological, and structural phenomena.

### Misc---AT: Turkey-Russia Collab

#### Russia’s revisionism drives Turkey towards the West---prevents Turkey-Russia collaboration.

Galip Dalay, 5-20 (Galip Dalay is an Associate Fellow of the Middle East and North Africa Programme at the Chatham House and a Richard von Weizsäcker Fellow at the Robert Bosch Academy, 5-20-2022, accessed on 7-7-2022, German Institute for International and Security Affairs, “Deciphering Turkey’s Geopolitical Balancing and Anti-Westernism in Its Relations with Russia”, <https://www.swp-berlin.org/en/publication/deciphering-turkeys-geopolitical-balancing-and-anti-westernism-in-its-relations-with-russia>, HBisevac)

Russian Revisionism Drives Turkey Closer to the Geopolitical West

While discontent with the West and anti-Westernism have facilitated cordial and cooperative relations between Moscow and Ankara, Russian geopolitical revisionism has almost invariably **pushed Turkey closer** to the **West**. The logic here is **straightforward**. First, Russian revisionism poses **direct security threats** to Turkey. Historically, the centre of gravity of Turkish-Russian rivalry has been the **Black Sea**. From the Turkish perspective, Russia’s actions – from the war in Georgia to annexation of Crimea and the invasion of Ukraine – all decisively tilt the **balance of power** in this region in **Russia’s favour**. Although Russia’s policy in each of these cases might have specifics and con­textual nuances, taken together they point to one **unmistakable outcome**: Russian revisionism in the post-Soviet space and an aspiration to turn the region into a sphere of domination. This will only **aggravate** the **Turkish threat perception** vis-à-vis Moscow.

Second, the post-Soviet space is also Turkey’s immediate neighbourhood. If successful, the Russian policy will restrict Ankara’s geopolitical room for manoeuvre in this region, and **undermine** its **standing** from the Black Sea to the Balkans and the South Caucasus to Central Asia. Additionally, **Turkish** and **Western** **interests** are in **broad alignment** in these regions, so Moscow’s geo­political revisionism is likely to bring Turkey and the West relatively **closer together**.