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#### Congress is inching towards a funding deal—but, it’s a deliberate dance to keep them focused on funding while avoiding political complications

Romm 2/2 [Tony Romm is the congressional economic policy reporter at The Washington Post, tracking infrastructure reform, government spending and the financial impacts of federal decision-making nationwide, "Democrats, GOP inch ahead toward potential deal to fund government, avert shutdown", 2/2/22, https://www.washingtonpost.com/us-policy/2022/02/02/democrats-republicans-spending-shutdown-covid/]

Top Democrats and Republicans inched forward Wednesday in pursuit of a deal that could fund the federal government for the remainder of the fiscal year, hoping to stave off a shutdown while potentially pumping new spending into health care, education, science and defense.

The continued negotiations marked the second consecutive day of developments on Capitol Hill, as lawmakers who oversee the federal purse increasingly have come to express a measure of confidence that they can act before an upcoming Feb. 18 deadline — and overcome months of prior political disputes and delays.

Since President Biden took office, the U.S. government has operated under short-term measures that sustain key federal agencies and programs largely at their existing spending levels. The stopgaps have kept the government running, but they have also delayed Democrats from delivering on some of the White House’s top priorities, from expanding affordable housing to confronting climate change.

Republicans appeared content to continue in that vein, essentially dealing a political blow to Biden’s agenda in the process. But the two sides have come to see mutual benefit in striking a longer-term resolution, putting aside their differences at a moment when the United States continues to confront the pandemic at home and faces new diplomatic challenges abroad. The omicron variant of the coronavirus has sparked fresh discussions about the need for another round of federal aid, while the intensifying standoff between Russia and Ukraine has emboldened a Republican-led push to spend more on defense.

Both spending priorities could be appended to any new government funding measure, provided the two sides can reach a deal in the first place. In a sign of progress, Republicans on Wednesday presented a counter-offer for federal spending over the rest of the 2022 fiscal year, which Democrats are reviewing. The GOP move had the effect of temporarily delaying a planned afternoon meeting of the House and Senate’s top appropriators, but it still reflected a new seriousness among negotiators who until now hadn’t traded such proposals.

Yet new political fault lines also emerged Wednesday. Taking to the chamber floor earlier in the day, Senate Minority Leader Mitch McConnell (R-Ky.) foreshadowed what could be staunch GOP opposition to another round of pandemic relief, as he cited roughly $6 trillion in spending that has been approved since the start of the public health emergency in 2020.

“Let’s start the discussion by talking about repurposing the hundreds of billions already sitting in the pipeline,” McConnell said.

Lawmakers begin discussing government spending deal as Democrats eye virus aid, paid leave

The promises and platitudes nonetheless amounted to noteworthy progress on Capitol Hill, a place where partisan disagreements these days have come to transform all but the most basic debates into intractable conflicts.

Twice in recent months, the appropriations process has nearly brought federal agencies to a screeching halt, threatening to shut down the government and hamstring the country’s response to the pandemic. Republicans at the end of last year even held up a swift resolution to the funding fight to launch an ill-fated political campaign against Biden’s vaccination and testing mandates targeting businesses. The Supreme Court later struck down some of the administration’s policies.

This year, lawmakers from both parties have pledged to steer clear of the same brinkmanship that characterized negotiations in fights past. Instead they have aimed for a deal that covers spending through the fiscal year, which concludes at the end of September. But they already face a race against the clock to act by Feb. 18, the date by which lawmakers must adopt another short-term measure or broker the sort of compromise that has so far eluded them during Biden’s presidency.

With the clock ticking, Democrats huddled Tuesday morning to discuss their political strategy. Emerging from the gathering, House Speaker Nancy Pelosi (D-Calif.) and Senate Majority Leader Charles E. Schumer (D-N.Y.) each offered their public, formal blessings for the nascent talks around a longer-term spending deal. Schumer added that the party’s negotiators are “on the same page,” though he and Pelosi noted they had not yet received an official counteroffer from their GOP counterparts.

The leaders of the House and Senate’s top panels overseeing appropriations then gathered on their own late Tuesday to try to put pen to paper. One of the participants in the bipartisan session, Sen. Richard C. Shelby (R-Ala.), later told reporters that lawmakers are still seeking an “agreement on our principles, then the [spending] top line will follow.”

Shelby acknowledged at the time that a slew of policy gaps still separate the parties, including the balance between “social spending versus national security.” But he joined his Democratic counterparts in maintaining that “we all want to try to get to yes,” adding: “We’re not there yet.”

Democrats seek significant boosts in federal domestic spending, now that the country for the first time in a decade is not bound to strict budget caps. Writing to her caucus last month, Pelosi endorsed the need for a “strong omnibus” that would “address critical priorities for our country, including for our national security and for communities at home.”

Yet some of the Democrats’ proposed spending increases and policy tweaks have troubled Shelby and his fellow Republicans. Beginning last year, they pointed to a series of “poison pills” — from Democratic plans to enhance the IRS to the party’s effort to loosen a long-standing ban on federal funding for abortion services — that could sink any talks on a deal. GOP lawmakers also have called for parity in defense and nondefense spending, a move that historically has troubled some Democrats, who have sought greater cuts to the Pentagon than even Biden has proposed.

“We’re looking for parity. We live in a troubled world and a lot of us think national security is important for this country,” Shelby, who leads the GOP on the Senate’s appropriations panel, stressed on Tuesday.

Democrats and Republicans otherwise appeared to downplay any potential disagreements following their flurry of meetings. Sen. Patrick J. Leahy (D-Vt.), the chairman of the chamber’s appropriations panel, described himself as “always optimistic.” Rep. Rosa L. DeLauro (D-Conn.), his counterpart in the House, declined to specify any timelines or expectations for the follow-up session set for Wednesday afternoon.

“The goal is to get an agreement,” DeLauro said.

But such a deal, known in congressional parlance as an omnibus, is likely to carry additional significance this year. The compromise could pave the way for billions of dollars to flow toward projects that would improve the nation’s roads, bridges, pipes, ports and Internet connections. Lawmakers approved the money as part of a bipartisan infrastructure law finalized in 2021, but the package requires them to complete the act of writing the check, so to speak, before the real work can begin.

The must-pass spending measure also could serve as a legislative vehicle for lawmakers to advance a slew of other critical priorities. That includes new disaster aid in response to recent hurricanes and the tornadoes in and around Kentucky last year, for example, along with billions of dollars to augment the country’s efforts to combat the coronavirus.

With cases still rampant from the omicron variant, Democrats in recent weeks have renewed their calls for more federal spending to boost testing, therapeutics and vaccine access, especially abroad. Others have sought to provide additional benefits to workers, including the revival of a program that offers limited, pandemic-related paid family and medical leave. And still other Democrats have joined with a small but growing crop of Republicans who hope to give the green light to new assistance targeting restaurants, gyms, stages and other small businesses.

Lawmakers begin talks on another round of coronavirus relief for businesses

Publicly, the White House has maintained in recent months that significant money remains as part of the roughly $1.9 trillion American Rescue Plan that Biden signed into law last spring. White House officials, meanwhile, have quietly started preparing a supplemental request focused on outstanding public health needs.

But the Biden administration by Tuesday afternoon had not transmitted any official request to the Capitol, Democratic leaders said. “We’re waiting for the administration to send us something. They haven’t sent us anything yet,” Schumer told reporters.

Some party aides acknowledged it had become a deliberate, delicate dance, reflecting an attempt to keep Congress focused on solidifying government funding levels without adding any other political complications.

#### Space policy causes immense partisan backlash that wrecks the delicate balance

Dreier 16 [Casey Dreier, Chief Advocate & Senior Space Policy Adviser for The Planetary Society, April 13, 2016. “Does Presidential Intervention Undermine Consensus for NASA?” https://www.planetary.org/blogs/casey-dreier/2016/0413-does-a-strong-president-help-or-hurt-consensus-on-NASA.html]

To see how this happens, I recommend reading the book “[Beyond Ideology](http://smile.amazon.com/Beyond-Ideology-Politics-Principles-Partisanship/dp/0226470768/ref=smi_www_rco2_go_smi_g2243582042?_encoding=UTF8&*Version*=1&*entries*=0&ie=UTF8)” by Frances Lee. The author’s larger premise is that issues having no intrinsic relation to stated party ideology have become increasingly polarized in recent years. This is a function of the two party nature of our political system. If your party coalition wins, the other one loses. It’s [It is] zero-sum. Your party can win in one of two ways: you can make a better pitch to voters by demonstrating the superiority of your agenda; or you can undermine and stymie the agenda of the opposition party, making them unpopular with voters, and pick up the seats that they lose. Since you’re the only other political party, you gain in either scenario. I’m not sure if you’ve noticed, but the “undermine and stymie” approach has been popular for quite some time now in the U.S. Congress. Given this situation, the President and their policies naturally become the symbolic target of the opposition party. Anything promoted by the President effectively induces opposition by association. Lee demonstrates the magnitude of this induced polarization on various types of issues. For highly polarized issues like the role of government in the economy, or social issues, the impact is minimal—the opposition has already been clearly defined and generally falls into clearly defined ideologies of the Republican and Democratic parties. But for issues that do not fit readily into a predefined political ideology—like space—the induced polarization by the President can be significant. In fact, Lee showed that space, science, and technology issues incur the greatest increase in partisanship based on their inclusion in the Presidential agenda. One need only look to at the responses by political operatives of the opposing party to the strong human spaceflight proposals by [Barack Obama in 2010](http://www.shelby.senate.gov/public/index.cfm/mobile/newsreleases?ID=25F3AD2E-802A-23AD-4960-F512B9E205D2), [George W. Bush in 2004](http://www.nbcnews.com/id/3950099/ns/technology_and_science-space/t/bush-sets-new-course-moon-beyond/#.Vw3UMRMrKHo), and [George H.W. Bush in 1989](http://www.nytimes.com/1989/07/21/us/president-calls-for-mars-mission-and-a-moon-base.html) to see this reflected in recent history. This isn’t to say that Presidents can’t have a significant impact on the space program. Clearly they can. But the broad consensus needed for stability after their departure from office may be undermined by the very priority they gave it during their tenure. It what amounts to a mixed blessing for NASA, the U.S. space program does have an unusually strong bipartisan group of politicians who support the program due to NASA centers in a variety of states throughout the union. Berger notes this throughout his article, and it does, in a way, act as force that is resistant to change for good and bad. This mitigates somewhat the pure polarization seen on other science and technology issues. But for a Journey to Mars—a major effort that would, at best, require stability and significant funding over many Presidential administrations—that may not be enough. Perhaps the solution is for the next President to maintain a light touch on space. Maybe they should speak softly through the budget process, and avoid the Kennedyesque speeches and declarations to Congress that induce the types of partisanship we so dearly need to avoid.

#### Bipart’s key—otherwise, yearlong CR ruins defense industrial base and military modernization

Gould 1/22 [Joe Gould is senior Pentagon reporter for Defense News, “Defense industry frets as funding talks crawl”, 1/21/2022, https://www.defensenews.com/congress/budget/2022/01/21/defense-industry-frets-as-funding-talks-crawl/]

Despite repeated warnings from uniformed Pentagon leaders and lawmakers of both parties that a full-year continuing resolution will hurt national security, some defense industry advocates are still worried about an impasse.

On Thursday, both chambers of Congress left town on recess until the week of Jan. 31, after making scant progress on a deal for an omnibus federal spending package. Amid partisan divisions over funding levels and policy provisions, House Speaker Nancy Pelosi, D-N.Y., warned that a full-year CR would create a national security crisis ― in an effort to pressure Republicans.

“It is a national security issue of the highest priority, with the threats that exist out there. To go to a continuing resolution instead of a decision-making omnibus bill is to weaken our security and our stability,” Pelosi told reporters Thursday. “The Republicans should know that, so we hope we will be able to bring that legislation to the floor before [the current CR] expires.”

With fiscal 2022 spending bills four months overdue, lawmakers and the Pentagon have warned against a yearlong CR that would freeze defense spending at the level of 2021 appropriations. CRs continue funding at the previous year’s level, preventing the Pentagon from starting new acquisition programs and ramping up production quantities.

And without a 2022 spending deal to set a new baseline, the president’s budget submission is in limbo and expected to come months late, which is sowing uncertainty for the military and its vendors.

President Joe Biden signed a defense policy bill that boosts his $753 billion national defense budget request for FY22 to $778 billion, a 3% increase. But Republicans have said they want more for defense, less than the 16% increase proposed by Democrats and an agreement on some politically charged policy riders.

By the reckoning of National Defense Industrial Association Chairman Arnold Punaro, lawmakers could meet somewhere in the middle with 8% increases for both defense and nondefense, but that’s far from a certainty. Democrats have raised fears some Republicans see budget gridlock as an advantage heading into midterm elections and don’t want a deal at all.

“We’re still in budget chaos,” Punaro told Defense News this week. “China’s on the march, Russia’s on the move and North Korea’s on the advance, and yet Congress is sitting on their duff, not passing a spending bill. It’s disgraceful.”

The lack of a 2022 deal as a baseline for defense amid escalating inflation presents a huge challenge for Pentagon planners crafting the FY23 budget request, Punaro said. He worried the administration could make a flat budget request, potentially costing the Pentagon billions of dollars in buying power.

Meanwhile, a full-year CR would yield $11 billion of lost growth, while 7% inflation would mean another $50 billion in lost buying power, according to defense consultant Jim McAleese, the founder of McAleese & Associates.

Though the current CR runs out on Feb. 18., recent negotiations in Congress have sparked some optimism.

Lead appropriators in the Senate met Jan. 13 with Senate Majority Leader Chuck Schumer and Senate Minority Leader Mitch McConnell to set the guidelines for negotiations. From there, lead House and Senate appropriators met to kick off talks, and Pelosi has said she’s been in discussions with House Appropriations Committee Chairwoman Rosa DeLauro, D-Conn.

Asked Thursday whether it’s realistic to get an agreement by Feb. 18, as Congress was about to leave town Senate Appropriations Committee Vice Chairman Richard Shelby, R-Ala., said: “That’s a good question. It’d be hard to get it by the 18th, but if we can make huge progress, we can probably get done soon.”

It’s unclear whether looming international crises with Russia and Ukraine, China and Taiwan, and North Korean missile tests would add pressure to pass defense spending. When asked about Pelosi’s comments, Shelby seemed to dig in.

“She’s right on that, but to underfund defense as some people would like to do, that would be a bigger challenge,” he said.

At a House Appropriations Committee hearing Jan. 12 about the effects of a potential full-year CR, the top officers of the Army, Navy, Air Force, Marine Corps and Space Force warned such a move would sabotage the military’s efforts to compete with China by stalling new weapons like hypersonic missiles.

“CRs effectively prevent modernization at speed,” said Marine Corps Commandant Gen. David Berger. “We actually stand to be outpaced by China — not because of their speed but because of our failure to comply with our own budgetary processes.”

The president and CEO of the Aerospace Industries Association, Eric Fanning, has warned that budget unpredictability is inefficient for the defense industry, which has to idle while the Pentagon waits for its projects to be funded. Amid the Capitol Hill activity, Fanning said he is “hopeful that the momentum continues.”

“The hearing painted a concerning picture of additional and unnecessary costs, as well risks to capabilities and to the industrial base in the short and long-terms. There was bipartisan agreement on how devastating a year-long CR could be,” Fanning said in a statement Thursday. “Over the last few days, there are positive signs that the message is getting through and the top appropriators from both parties are coming to the table.”

Lead Pentagon officials have talked for years about the need to harness the innovation of small tech firms. But CRs stifle those efforts, an executive at one of those firms, Anduril Industries, wrote in an essay this week.

#### Impact’s cyber and deterrence crash

Manchester ’19, [Josh, Founder of Champion Hill and General Partner at Foundation Capital, Venture-backed Startups Will Build the Defense Technology the Free World Needs Right Now, https://medium.com/@joshmanchester/venture-backed-startups-will-build-the-defense-technology-the-free-world-needs-right-now-d2cefa2b2196]

With U.S. defense spending exceeding $700 billion per year, how could the United States be on the brink of a national security emergency? Simply put, America’s national security competitors are outflanking an Industrial-Age U.S. military machine that, like a lumbering dinosaur, is not adapting fast enough to its changing environment. The Pentagon desperately needs rapid innovation. Yet the current defense industry structure is not compatible with U.S. venture capital and high-growth technology industries for several reasons: · The U.S. military’s industrial base is centered on a few huge oligopoly suppliers known within the Beltway as “the Primes” — Lockheed Martin, Boeing, Raytheon, General Dynamics, and Northrop Grumman. These companies, ancient by tech startup standards, have optimized themselves to sustain a 20th century Industrial Age World War II-style force structure which supports the political decision-makers across the country who appropriate the funding that industrial base receives. The Primes are great at building very large platforms that cost billions of dollars and take 15–30 years to field. The Primes are also historically heavy on hardware talent and much lighter on software talent. · The Primes receive the vast majority of defense spending. Defense budgets have historically not unlocked for startups. While a defense private equity industry exists to aggregate small companies and flip them downstream to the Primes, venture capital investors, who have a much higher return threshold, know that it’s hard to have venture outcomes (in other words, to make money) when a company can’t win large market share or survive as a stand-alone business. · Venture-backed tech industries have matured as an asset class in peacetime and most mainstream U.S. venture firms in existence today do not have institutional cultures or histories that include defense innovation, apart from cybersecurity. · Major tech companies, like the FAANGs (Facebook, Apple, Amazon, Netflix, Google and Microsoft too), are generally unwilling to work on defense related projects, and sometimes must deal with employee protests when they do. · Many observers perceive this as an indicator that software engineers generally don’t want to work on defense-related innovation. · Finally, in a bizarre set of twists, some of the organizations that comprise the Limited Partners of venture capital firms (the blue chip endowments and foundations of the U.S. Eastern establishment, often founded on the fortunes of great American industrialists from decades ago, along with public pension funds throughout the country) are [sometimes accidentally funding Chinese defense technology](https://www.buzzfeednews.com/article/ryanmac/us-money-funding-facial-recognition-sensetime-megvii) while often restricting their U.S. venture managers from making defense investments. Foundations and endowments in particular often have negotiated Limited Partnership Agreements with the venture firms they finance precluding them from investing in anything that could have military usage. The irony is that these same tax-exempt pools of capital are frequently investors in Chinese venture funds which provide software to make smarter and more deadly Chinese weapons and to the advanced surveillance systems that have turned China’s Xinjiang province into a virtual Uighur prison camp and a human rights disaster. No single individual or entity has caused this state of events to transpire; it is simply the accumulation of various cultural aspects of the capital formation process of the venture industry and its portfolio companies. Fortunately, we believe that almost all these characteristics will rapidly change over the next few years. But first let’s discuss some additional background. Venture capital has come of age in a time of unprecedented peace The U.S. venture capital industry is about 100 years old. Bessemer Ventures was formed in 1911 and originally had just the family fortune of Henry Phipps Jr., a co-founder of Carnegie Steel, as its sole limited partner. Despite these deep roots, the U.S. venture industry has only institutionalized as an asset class since the mid-1990s. Until then it was extremely clubby and very small. Sequoia Capital, KPCB, Charles River Ventures, and NEA were all founded in the 1970s and Accel Partners in the 1980s. But it has really only been since the mid-1990s (Benchmark Capital was founded in 1995, as was my own former firm, Foundation Capital) that the industry has institutionalized and grown substantially, first in the desktop computing and internet boom, and second during the combination of platform shifts over the last ten years that have given us mobile computing, social media, e-commerce, cloud computing, software-as-a-service and all of their associated new business models. For a quarter of a century, the institutional, mainstream venture investing ecosystem, at the startup, venture firm and limited partner levels, developed business processes, mental models, networks, and expertise in certain technical areas and heuristics — in aggregate, an industry culture — that have created one of the most dynamic parts of the U.S. economy. The U.S. tech industry is also one of the most unique aspects of American life — and a powerful, difficult-to-replicate form of “soft power,” featuring an inclusivity for aspirational immigrant founders — a feature perhaps unequalled in human history. From a long-term U.S. historical viewpoint, it is striking that the venture industry’s maturation has occurred during a unique period in American history when the United States had no major great power competitor, either ideologically or technologically. The Cold War ended in 1991, the Soviet Union dissolved, and Russia was in disarray for the next 15 years. This period of peace was not without its own unique trials, but the security challenges associated with terrorism, counterinsurgency, and lower-intensity military activity have not required the sort of Herculean societal and political efforts that were drawn upon during the Cold War or World War II. We should all be grateful every day that this has been the reality of the last 25 years. A useful analogy might be made with gold. In 1933, President Roosevelt made it illegal for U.S. citizens to own gold. In 1934, Benjamin Graham published the first edition of Security Analysis. In January 1975 it became legal to own gold again. Graham died in 1976. It was therefore illegal to own gold during key years of the development of modern security analysis. From this gap came gold bugs — the weirdos who seemed to always talk about nothing else, and didn’t get invited to key social events. No analogies are perfect but this captures some of the similarities between venture and defense today. Cybersecurity investors understand the cybersecurity parts of U.S. defense. But most mainstream Silicon Valley venture firms do not spend time on other parts of defense due to the industry’s institutionalization during this recent period of relative peace and American dominance — which has also been a time when the lion’s share of defense spending has gone to the Primes, as discussed. Sadly, peace is ahistorical. Great power competitions are a feature of humanity, not a bug. Periods of time when a major power, or superpower, are not challenged in some profound fashion by one or more other powers, regardless of whether they are driven by fear, prestige, economic interest, or ideology — are, in short, rare when looking back on the sojourn of homo sapiens on planet earth. The period when the free world had a monopoly on power has now ended. The tech-defense status quo is inverting The only previously delineated area where we don’t expect much change is from the FAANGs. These massive companies are best viewed as small nation-states themselves with global stakeholders. For example, many of their employees are not U.S. citizens and may not want their employers engaged in U.S. defense work. We think everything else will invert. · We believe defense budgets will begin unlocking for young startups. Many key national security decision-makers in Washington are now seeking better, faster alternatives to the byzantine Pentagon acquisitions process. Thought leaders like Will Roper, in charge of the U.S. Air Force’s $40 billion annual research and acquisition budget, are [eagerly welcoming the contributions that smaller, nimble venture-capital funded entrepreneurs can make](https://federalnewsnetwork.com/dod-reporters-notebook-jared-serbu/2019/03/air-force-looks-to-build-big-idea-pipeline-to-expand-its-industrial-base/). Roper, and others in the Pentagon, are reforming their practices to make it easier for genuine innovators to compete against the legacy defense oligopoly. When recently asked at a conference what problem keeps him up at night, Roper replied, “The industrial base.” · Given the hardware roots of the Primes, they are ill-suited to provide solutions to many of the most pressing problems today. The Defense Department will increasingly allocate resources to startups solving software problems for which the Primes have no existing stock of machine learning engineers. · As this happens some venture firms will experience cultural shifts toward more defense investing. As venture capitalists see that startups are receiving large purchase orders from various Defense Department units, they will develop strategies to deploy capital toward defense innovation. A good example is [last week’s award by the Air Force of $121 million to Pivotal Software in San Francisco](https://dod.defense.gov/News/Contracts/Contract-View/Article/1861753/source/GovDelivery/). · Institutional limited partners as a group will likely slowly allocate away from any China-based manager who could be investing in Chinese military technologies. Some LPs with the freedom to do so may remove restrictions on defense investing from limited partnership agreements. · We believe it is a myth that software engineers do not want to work on defense. This is a classic case of preference falsification, the social phenomenon in which people do not speak their true minds about a given topic, though their actions often indicate otherwise. We believe that talented engineers are often very attracted to defense-related work because it often offers the hardest problems to solve. An enormous opportunity therefore exists for startups: to hire the engineers who don’t want to work for ancient and outdated Primes, and who aren’t very welcome at the FAANGS, but who wish to create the technologies that an increasingly eager democratic government needs to defend itself and its allies. Companies in our own portfolio, like [SpaceX](https://www.spacex.com/), [Rigetti Computing](https://www.rigetti.com/), [Anduril Industries](https://www.anduril.com/), and [Umbra Lab](https://umbralab.com/) are executing this strategy. The hardest technical problems today are defense-related How can data from satellites, drones, land-based radar, ships, and other sources be stitched together, in real time, to find long-range missiles on mobile transporters, hiding among the background in cities, forests, and mountains? How can friendly troops, who have separated into very small units in order to hide and survive, be connected to each other electronically, and be resupplied from historically long ranges? How and to what degree and in what conditions should an adversary’s sensor networks be spoofed? What type of false electronic picture can be painted? The aggregation of targeting data for an air wing takes 72 hours today and has a heavy human component. Can this complex optimization problem be solved autonomously, such that the targeting list for pilots is developed in 15 minutes? How does a deployed force of perhaps 50,000 personnel, with planes, ships, and land forces, continue to fight when satellite links have been knocked out, and “reachback” to the U.S., for data processing, is no longer possible? Can deep learning be used for crisis diplomacy? Put another way, since DeepMind’s AlphaZero can teach itself to move pieces forward on a board to win a game, can it learn to move them backwards, to de-escalate a crisis? These problems, and many others, are asking to be solved by entrepreneurs. Phase change There is a looming breakdown in deterrence. If the U.S. defense establishment is unable to adapt to the new great power competitive environment, then adversaries will be tempted to grab for a fait accompli, with war the result. This has been the pattern since Homer wrote The Iliad; there is no evidence to conclude human behavior is different in the 21st Century. We believe the prevention of this scenario involves rapid technical innovation. The defense environment is more favorable now for upstart firms than anytime in the past several decades. If you are a founder building technology to ensure the survival of government by consent, our firm would like to talk to you.

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#### Spacefaring Nations should:

#### increase funding for space-situational awareness technology, and

#### warn all states about known impending collisions on their space assets

#### develop satellites with automated collision avoidance systems.

#### Planks 1 and 2 solves collisions, assures allies, and avoids key sharing key secrets

Hitchens and Johnson-Freese 16 (Theresa Hitchens and Joan Johnson-Freese. Johnson-Freese is a professor of national security affairs at the Naval War College in Newport, Rhode Island. Theresa Hitchens is a Senior Research Scholar at the University of Maryland’s Center for International and Security Studies at Maryland (CISSM), and former Director of the United Nations Institute for Disarmament Research (UNIDIR). “Toward a New National Security Space Strategy Time for a Strategic Rebalancing,” Atlantic Council Strategy Papers, No. 5, 2016, <https://www.atlanticcouncil.org/images/publications/AC_StrategyPapers_No5_Space_WEB1.pdf>)

Improved SSA is a foundational capability for any US space strategy in any and all circumstances, given the rapid changes in the space environment. The national space security community has recognized this repeatedly, although funding has arguably not been commensurate with the rhetoric. Attempts are now being made to rectify the funding situation because of the Russia/China threat scare. According to the Government Accountability Office (GAO), the Obama administration is planning to spend about $6 billion between 2015 and 2020 to beef up SSA capabilities—largely within the Pentagon, but also at contributing agencies NOAA and NASA.50 Calculating exact spending on SSA activities, however, is not possible due to the way the Defense Department tracks (or, rather, does not track) related spending. According to the GAO report:

• Compiling a budget for all SSA-related efforts is a challenge because many assets that support the SSA mission do not have it as their primary mission.

• DOD is not required to and does not track the budgets specific to its SSA efforts for multiple-mission systems, and it does not estimate what percentage would be allocated to SSA.

• For example, some portion of the ballistic missile defense sensors budget, which averages about $538 million per fiscal year over the next few years, supports SSA, but DOD does not track the efforts of multi-mission sensors in a manner that would provide such data.

• SSA-related efforts performed using intelligence community sensor systems are also not included in the core SSA budget because those efforts and their budgets are classified.51

SSA is also an area ripe for possible leveraging of commercial and foreign capabilities, both to provide resilience and to complicate an adversary’s calculations regarding an attack—one of the stated goals of the Obama administration’s NSP. However, that potential has yet to be fully exploited, and greater emphasis should be put on doing so.

On June 1, 2015, US Strategic Command (STRATCOM) initiated a six-month pilot program to research how to integrate commercial operators (and their SSA data) into the JSpOC, called the Commercial Integration Cell. The initial effort involves six operators: Intelsat, SES Government Solutions, Inmarsat, Eutelsat, DigitalGlobe, and Iridium Communications. The goal is to assess whether JSpOC operations can be enhanced via integration of industry capabilities and insights, and, if so, how.52 The pilot program comes after years of lobbying by industry, including through SDA, for closer cooperation and collaboration between commercial operators and the US military on space-object data tracking. One major hurdle has been that the computer systems and models used by JSpOC are antiquated, and incompatible with more up-to-date industry practices. While updates are planned, given the lack of adequate budget resources, this situation is not likely to be rectified anytime soon. This misalignment between ways and means should be addressed as soon as possible by the incoming administration.

Another question is the extent to which US allies will be allowed access to the improved SSA data, including the interference warnings and collision analysis it will provide.53 The issue with allies is not just technical, but also, and primarily, political. The uncertainty in the private sector about JSpOC-industry collaboration and data sharing is underscored by AGI’s COMSpOC. AGI is seeking to tap into the expanded (and unfilled by JSpOC) need for such data in the commercial marketplace, both in the United States and abroad.54

Lieutenant General John W. Raymond, Commander of the Joint Functional Component Command for Space, told the House Armed Services Strategic Forces Subcommittee on March 25, 2015, that STRATCOM is working on a new “tiered SSA Sharing Strategy.” Raymond stated: “The tenets of this strategy are to share more information in a timelier manner with the broadest range of partners. We aim to promote an interactive, exchange-based relationship with satellite 35 owners and operators where all parties gain. This open exchange of information also supports U.S. and allied efforts to detect, identify, and attribute actions in space that are contrary to responsible use and the long-term sustainability of the space environment.” He further noted that, as of March 2015, there were forty-six SSA-sharing agreements in place with forty-six commercial firms, eight nations, and two intergovernmental organizations, with ten more in the works.55 (The number of such SSA agreements, as of March 2016, is now at sixty-three.)56

The word “tiered” in Raymond’s statement is central, as part of the issue for the Defense Department is figuring out what data to share with whom, at what level of specificity and accuracy. There has traditionally been reluctance about “giving away the store,” particularly because many allies more closely integrate their civilian and military space operations, with less of a focus on protecting national security secrets. It is hard to underestimate the challenges— for example, simply regarding security clearances for access to US data. Further, some nations are leery of relying too closely on information provided by the US military. For this very reason, the European Union (EU) in 2009 launched an effort to pursue independent SSA capabilities— an effort that has proceeded in fits and starts, due to internal EU concerns about the sharing of both information and funding. As of early 2015, the nascent program is being funded by fourteen participating EU states, focusing largely on figuring out how to better coordinate European activities, but also looking at how to improve capabilities.57According to the European Space Agency (ESA): “To date, Europe’s access to information on what is happening in space has been largely dependent on non-European sources. In recent years, for example, data to trigger alerts on potential collisions between European satellites and debris objects have only come through the good will of other spacefaring nations. For this and other reasons, Europe needs an autonomous SSA capability.”58 It remains unclear how the EU SSA system, once established, will interact with that of the United States. This should be a major focus of future US space diplomacy and cooperation, to ensure that the systems are compatible and accessible—in part, to provide mission assurance.

The United States signaled its desire to forge the closest partnership on SSA sharing with Australia, Canada, and the United Kingdom, via a Memorandum of Understanding on Combined Space Operations, signed in September 2014.59 The details of the MoU, however, are vague.60 It should be noted that all three countries have assets that could contribute to US efforts, and would not simply benefit from a one-way absorption of US data.

Also, it is not only US allies who require better SSA in order to operate satellites safely and securely. More than seventy countries operate satellites, with 1,381 operating satellites in orbit at the end of 2015.61 Many of these operators lack sufficient SSA. In the July 2013 report adopted by the UN General Assembly in October 2013, the Group of Governmental Experts on Transparency and Confidence-Building Measures in Outer Space Activities cited the need for improved global access to space data, both for safety purposes and for building trust. The report stated that, beyond a lack of space capacity, “the inability of many States to acquire significant space-based information” is a factor “contributing to the lack of confidence.”62 Russia has proposed to the COPUOS Scientific and Technical Subcommittee that the UN Office of Outer Space Affairs consider the development of an international, open database of on-orbit objects (both operational satellites and debris) to fill this gap.63 The United States and its allies have rejected the Russian proposal, largely for budgetary reasons, but the United States has been internally mulling over a possible proposition to create an informal international group to discuss the challenges to sharing SSA data and how to overcome them. This would be a promising first step, and a testimony to continued leadership in SSA by the United States, consistent with a national space strategy aimed at reducing risks. Inevitably, some form of open-access space-object database is going to be required, simply to ensure on-orbit safety—particularly in LEO, as the number of so-called Cubesats (very small satellites) rises 37 dramatically. The United States should take the lead on developing a workable space-traffic management regime underpinned by SSA.

#### Plank 3 solves miscalc

Green 14 (Brian D. Green, “Space Situational Awareness Data Sharing: Safety Tool or Security Threat?” A thesis submitted to McGill University in partial fulfillment of the requirements of the degree of MASTER OF LAWS, December 2014, <http://digitool.library.mcgill.ca/webclient/StreamGate?folder_id=0&dvs=1569190779049~368>)

Countries with SSA capabilities would not need to reveal those types of critical information to provide warnings when a collision appears imminent, and thus could provide such warnings even for the benefit of a hostile country. If, for example, the United States detected that Iran’s Sina-1 satellite was in danger of colliding with another space object, it could issue Iran the warning without compromising the security of its own assets. If the US or an ally was in control of the satellite that was in danger of colliding, it could also perform or recommend a collision avoidance maneuver on its own. In either case, collision avoidance procedures would not require a country to provide potentially sensitive details such as a satellite’s current mission tasking, sensor resolution, or design blueprints. However, they could both avert a space-debris producing accident and show good faith in a way that could keep international tensions from escalating.

## Case

We agree with their standard and think that whoever can prevent xtinc should be voted for

### Adv1

#### The plan spills over to halt any weaponization, even that which isn’t directly covered:

#### The fine print creates a slippery slope that ends in an ASAT ban and there’s no explicit exemption for self-defense

Rand **Simberg 11**, Adjunct Scholar at the Competitive Enterprise Institute, Former Project Manager with Rockwell International, Former Employee of The Aerospace Corporation, “Europeanizing American Space Activities by Stealth”, PJ Media, 5/7/2011, https://pjmedia.com/blog/europeanizing-american-space-activities-by-stealth/?singlepage=true

Originally drafted in 2008, with a revision last September, the code seems innocuous enough at first reading, basically forbidding the destruction of satellites and generating debris in low earth orbit. Among other things, it is an attempt by space arms controllers to accomplish what they have never been able to get by formal treaty -- a **limit on space weaponry**. An actual anti-satellite ban has been criticized as unworkable and unverifiable, so instead, they drafted up **“rules of the road,”** a series of **best practices** for operating in space.

However, the **language concerns** some analysts. There was a panel on the topic hosted by the Marshall Institute in February, which questioned the need for this, on which industry analyst/journalist Jeff Foust reported in March:

Paula DeSutter, former Assistant Secretary of State for Verification, Compliance, and Implementation, took issue at the Marshall Institute forum with Section 4.5, which calls for “further security guarantees within the appropriate fora for the purposes of enhancing the security of outer space activities by all States and the prevention of an arms race in outer space.” That passage, she said, is a **“slippery slope”** towards **broader** arms control in space that should be stricken from the document. “**It** sort of **ties you to something you** may or **may not want to do**, and probably in my view shouldn’t do,” she said.

DeSutter is also concerned with Section 5, which calls on signatories to “refrain from the intentional destruction of any on-orbit space object or other activities which may generate long-lived space debris”. “**On its own**, it’s **not good**,” she said, since it doesn’t include any **exceptions** for cases like **self defense**. However, she noted those caveats are found elsewhere in the document, so it would be simple to incorporate similar provisions in that section.

#### No space war--- interdependence and deterrence check.

Bragg et al, July 2018 - \*Dr. Allison Astorino-Courtois, NSI’s Chief Analytics Officer (CAO) and Executive Vice President, PhD in IR @ NYU \*\*Dr. Robert Elder, PhD @ Emory, BA @ Clemson, Assistant prof of History @ Baylor \*\*\*Dr. Belinda Bragg, principle research scientist at NSI, Inc. Lecturer in polisci @ Texas A&M.;“Contested Space Operations, Space Defense, Deterrence, and Warfighting: Summary Findings and Integration Report,” NSI, https://nsiteam.com/social/wp-content/uploads/2018/11/Space-SMA-Integration-Report-Space-FINAL.pdf

Everyone needs space

While the US may be relatively more dependent on space for national security than are other states, it is far from alone in relying on space. Nuclear armed states are dependent on space for important command and control functions, and major powers are increasingly using space for battlefield situational awareness and communications. China and Russia were identified as having significant (and fairly equal) levels of strategic risk in space (ViTTa Q16), although their regional security priorities and (to date) less spacedependent economies place them at an advantage to the US. They may, therefore, see the strategic risk of conflict is space as lower than does the US. Still, space capabilities remain a source of economic expansion and national pride for both, and their calculations of the cost of conflict involving space may include consideration of these factors. Even now, there is a general consensus that the US and other actors have more to gain from space than they have from the loss of space-based capabilities (ViTTa Q3). This suggests that, although the US is more vulnerable in the space domain than are other states, the likelihood that aggressive action against an adversary’s space assets would be reciprocated may provide a degree of security. It also creates another incentive for actors to use diplomacy and international law to reduce risk and increase transparency in the space domain.

#### No space war and terrestrial conflict turns it

Luke Penn-Hall 15, Analyst at The Cipher Brief, M.A. from the Johns Hopkins School for Advanced International Studies, B.A. in International Relations and Religious Studies from Claremont McKenna College, “5 Reasons “Space War” Isn’t As Scary As It Sounds”, The Cipher Brief, 8/18/2015, https://www.thecipherbrief.com/article/5-reasons-%E2%80%9Cspace-war%E2%80%9D-isn%E2%80%99t-scary-it-sounds

The U.S. depends heavily on military and commercial satellites. If a less satellite-dependent opponent launched an anti-satellite (ASAT) attack, it would have far greater impact on the U.S. than the attacker. However, it’s not as simple as that – for the following reasons:

1. An ASAT attack would likely be part of a larger, terrestrial attack. An attack on space assets would be no different than an attack on territory or other assets on earth. This means that no space war would stay limited to space. An ASAT campaign would be part of a larger conventional military conflict that would play out on earth.

2. Every country with ASAT capabilities also needs satellites. While the United States is the most dependent on military satellites, most other countries need satellites to participate in the global economy. All countries that have the technical ability to play in this space – the U.S., Russia, China and India - also have a vested interest in preventing the militarization of space and protecting their own satellites. If any of those countries were to attack U.S. satellites, it would likely hurt them far more than it would hurt the United States.

3. Destruction of satellites could create a damaging chain reaction. Scientists warn that the violent destruction of satellites could result in an effect called an ablation cascade. High-velocity debris from a destroyed satellite could crash into other satellites and create more high-velocity debris. If an ablation cascade were to occur, it could render certain orbital levels completely unusable for centuries.

4. Any country that threatened access to space would threaten the global economy. Even if a full-blown ablation cascade didn’t occur, an ASAT campaign would cause debris, making operating in space more hazardous. The global economy relies on satellites and any disruption of operations would be met with worldwide disapproval and severe economic ramifications.

5. International Prohibits the Use of ASAT Weapons. Several international treaties expressly prohibit signatory nations from attacking other countries’ space assets. It is generally accepted that space should be treated as a global common area, rather than a military domain.

While it remains necessary for military planners to create contingency plans for a, space war it is a highly unlikely scenario. All involved parties are incentivized against attacking. However, if a space war did occur, it would be part of a larger conflict on Earth. Those concerned about the potential for war in space should be more concerned about the potential for war, period.

#### Jasamie doesn’t prove space war – never mentions escalation even once only that china approached russia to build together proves no internal to !

### Adv2

#### Precision farming via satellites *locks in* unsustainable agriculture practices by securing agri-business’ hold over small farmers globally

**Ruiz-Marrero 02** (Carmelo Ruiz-Marrero, Fellow at the Society of Environmental Journalists and a Research Associate at the Institute for Social Ecology, “Precision Farming: Agribusiness Meets Spy Technology”, 10/2/02, http://www.councilforresponsiblegenetics.org/ViewPage.aspx?pageId=131)

Which corporations are involved? Joining forces to promote precision farming are farm equipment manufacturers like John Deere, agrochemical companies like Monsanto and DowElanco, pharmaceutical/biotech companies like Rhone-Poulenc, Novartis and AstraZeneca, as well as information brokering and data management firms. Not surprisingly, **corporations with a long history of service to the military-industrial complex** **and intelligence agencies**, like Rockwell and Lockheed Martin, **are** also **jumping onto the precision farming bandwagon**. For example, in a 1,000-acre potato farm, aerospace behemoth Lockheed Martin can place meteorological stations that measure 13 different weather parameters every 15 minutes and telemeter the data to a computer base station. "More than 430 gauges measure irrigation. Yield measurements are taken every three seconds during harvest. Crop quality samples are analyzed," boasts Lockheed's promotional material. What's more, "Soil is tested for 18 nutrient parameters. Microbialcommunities in the topsoil are studied." The Downside **An interesting historical parallel comes to mind**. Just as World War Two military contractors developed the chemicals and machinery that fueled the Green Revolution of the 1970's, **precision farming is**, to a large extent, an **outgrowth of** the **space-age surveillance technologies** used in the Cold War. The tight relationship between the military industries and industrial agriculture continues well into the twenty-first century. Some observers fear that **these new technologies bode ill for sustainable agriculture and democratic governance**, **and could impose new forms of dependence on farmers**. "**Precision farming has less to do with mitigating agricultural pollution than with advancing industrial modes of production**", according to social scientists Steven Wolf of the University of California, Berkeley and Fred Buttel of the University of Wisconsin. Action Group on Erosion, Technology and Concentration (ETC Group) Research Director Hope Shand agrees. "**Precision farming is about commodification and control of information and it is among the high-tech tools that are driving the industrialization of agriculture**, **the loss of local farm knowledge** and **the erosion of farmers rights**", she told CorpWatch. "With precision farming, **farmers increasingly depend on off-farm decision making** **to determine precise levels of inputs**. For example, **dictating what seed, fertilizer, chemicals, row spacing, irrigation and harvesting techniques are used, and other management requirements**," Shand explained. **Precision farming seeks to legitimate and reinforce the uniformity and chemical-intensive requirements of industrial agriculture under the guise of protecting the environment and improving efficiency**, according to Shand. How it Works: Remote Sensing Remote sensing is an important component of precision agriculture. For example, NASA is a partner in Ag 20/20, a long-range research project that involves remote sensing. A satellite-mounted sensor looks down on farm fields, distinguishing as many as 256 light wavelengths. Similar systems that work with land-based and plane-mounted sensors are also in the works. With the right hardware, software and know-how, the precision farmer can use this spectral information to find out a crop's health status. Does it need irrigation? Is it under attack by pests? Are weeds gaining ground? Are soil nitrogen levels OK? A great number of quantifiable variables can be measured. The use of satellites in agriculture is already a reality. The government of the southern Pacific island of Tasmania is using GPS technology on some 600 farms as part of an identity protection pilot program, which it plans to extend to all of Tasmania's farms by 2005. In Argentina, satellite surveillance is being used to catch farmers who cheat on their taxes by underreporting the size of their fields, and to prevent them from saving seed, which is illegal there. Who Will Benefit? Will farmers want, or be able, to understand the advanced gadgetry of precision farming? In Puerto Rico, for example, only 14% of farmers have college degrees, and a higher percentage might be illiterate altogether. The average Puerto Rican farmer is 55 years old, according to the US Farm Census. Many are probably too traditional to embrace advanced software, satellite imaging and other new technologies. To get around this obstacle, precision farming contractors plan to offer farmers a plethora of consulting services. Critics fear that these services will exacerbate farmers' dependence on the purveyors of agribusiness even further. Of course, the more fundamental question is what farmer will be able to afford precision farming technology, whose basic packages start at $15,000 to $20,000? **How can family farms in the United States, facing extinction by economic strangulation**, **afford these dazzling technological advances**? What will happen to rural U.S. and worldwide farming communities if food processors, retailers and other major purchasers of agricultural produce start requiring suppliers to use precision farming and identity protection technology? **Large U.S. industrial farms, heavily capitalized and subsidized by the government with tens of billions of dollars every year, will easily afford the technology**. But **struggling family farms could be put out of business**. Suing the Victim These remote sensing technologies can also be used to distinguish GM from non-GM crops and trace genetic pollution. **Runaway pollen and seeds from GM crops** like soy, corn and canola have been a great concern since the commercial cultivation of GM plants began in 1996. Last year, GM corn was found to be aggressively proliferating in Mexico, causing farmers, scientists and environmentalists to worry about potential consequences for the environment, biodiversity and world agriculture. **Agribusiness corporations can use satellite imaging to find out what farmers have had their crops contaminated with GM pollen and sue them**. This actually happened to Canadian farmer Percy Schmeiser of Bruno, Saskatchewan. When he complained that his organic canola crop had been genetically contaminated by a GM canola field somewhere upwind, Monsanto's lawyers sued him for illegally planting the corporation's patented seed. Kafka could have hardly thought of a more bizarre scenario. Monsanto didn't accept Schmeiser's argument that the corporation's GM canola had blown downwind to his farm, and neither did the judge, who ruled that how the GM seed got there is irrelevant. In September 2002 Schmeiser lost his appeal and now intends to take his case to Canada's Supreme Court. [For more information about Schmeiser’s plight, visit www.percyschmeiser.com]. Unfortunately, Schmeiser's ordeal is not an isolated case. **Monsanto is suing farmers all over Canada and the United States for allegedly planting its patented GM seeds** without authorization. Many of them claim they never knowingly planted Monsanto's seeds, and that their fields were contaminated by upwind GM plantations. Once again, the tortilla gets flipped. The same corporations that vehemently denied that GM pollution by pollination would ever take place, may soon be eager — too eager — to believe every report of such contamination, especially if the information can be used to sue the victims. Precision Agriculture and Global Trade **This type of persecution could reach global proportions** **through the** Trade-Related Intellectual Property Rights agreement (**TRIPS**) **enforced by** **the** World Trade Organization (**WTO**). Under TRIPS, **the WTO can impose economic sanctions against countries deemed guilty of illegally using patented products**, like seeds. **The intellectual property rights provisions of NAFTA are even more draconian**, since the agreement allows private entities to sue governments. Given this possibility, **one can visualize a scenario in which Monsanto sues Mexico under NAFTA for illegally planting its GM corn**. **The corporation could conceivably demand a compensation ranging in the hundreds of millions of dollars**. What are advocates of socially responsible and environmentally sustainable agriculture doing about precision farming? Many in the movement against corporate globalization hold that **this and other new agro-technologies must be addressed within the context of a broader critique of industrial agriculture**. "**The reality is that farmers do not control precision farming**," notes Hope Shand of ETC Group. "Rather, **precision agriculture is more likely to dictate decision making**, control and management of the farmer." **Shand compares precision agriculture to a kind of high tech feudalism**: "**Precision farming reinforces bioserfdom** and the role of the farmer as a ‘renter of germplasm.’"

#### Unsustainable ag production is *independently* responsible for the biodiversity crisis

**Lanz 18** (Bruno Lanz, University of Neuchâtel, Department of Economics and Business, ETH Zurich, Chair for Integrative Risk Management and Economics, Massachusetts Institute of Technology, Joint Program on the Science and Policy of Global Change; Simon Dietz, London School of Economics and Political Science, Grantham Research Institute on Climate Change and the Environment, and Department of Geography and Environment; Tim Swanson, Graduate Institute of International and Development Studies, Department of Economics and Centre for International Environmental Studies; “The Expansion of Modern Agriculture and Global Biodiversity Decline: An Integrated Assessment”, Ecological Economics, 144, 260–277, 2018, doi:10.1016/j.ecolecon.2017.07.018)

An increase in agricultural output can be achieved in various ways and the great increases seen in the second half of the twentieth century came mainly from intensification and corresponding increases in yields (FAOSTAT; Klein Goldewijk et al., 2011). Nonetheless the clear consensus from global land-use models is that some of the additional future production will come from expanding the agricultural land area. According to the Agricultural Model Intercomparison and Improvement Project or AgMIP, **the area of world cropland in 2050 will be between 10 and 25% larger than today**, under a reference scenario in which world food production rises by 43 to 99% (von Lampe et al., 2014; Schmitz et al., 2014).

The expansion of modern agriculture through a combination of intensification and extensification has managed to sustain the world population explosion that began with the industrial revolution and accelerated in the early to mid twentieth century (United Nations, 2015). For example, the prevalence of undernourishment has declined globally (Fogel, 1997; World Bank, 2016), while the real prices of agricultural commodities fell quite significantly between 1950 and 2000 (Alston and Pardey, 2014).2 However, the expansion of modern agriculture has had other, less desirable consequences.

Both **agricultural intensification** – **of the prevailing**, nonecological or unsustainable **variety** (cf. Bommarco et al., 2013; Godfray and Garnett, 2014) – **and extensification have been primary causes of a historically unprecedented loss of global biodiversity**. According to the Millennium Ecosystem Assessment (2005), **the current global rate of species extinction is up to 1000 times higher than the background rate** that has been estimated from the fossil record. A broader index of global biodiversity has been in decline since 1970 (the first year for which data are available) and **there is no statistical indication that the rate of decline is slowing** (Butchart et al., 2010). **Local species richness is estimated to have declined by over 10% in the last 200 years, globally on average** (Newbold et al., 2015).

#### BioD loss causes extinction and turns everything

**Torres 16** (Phil, founder of the X-Risks Institute, an affiliate scholar at the Institute for Ethics and Emerging Technologies, and the author of The End: What Science and Religion Tell Us About the Apocalypse, "Biodiversity loss: An existential risk comparable to climate change," Bulletin of Atomic Scientists, 4/11, http://thebulletin.org/biodiversity-loss-existential-risk-comparable-climate-change9329)

But **there is another existential threat** that the Bulletin **overlooked** in its Doomsday Clock announcement: **biodiversity loss**. This phenomenon is often identified as one of the many consequences of climate change, and this is of course correct. But biodiversity loss is also a contributing factor behind climate change. For example, deforestation in the Amazon rainforest and elsewhere reduces the amount of carbon dioxide removed from the atmosphere by plants, a natural process that mitigates the effects of climate change. So the causal relation between climate change and biodiversity loss is bidirectional. Furthermore, there are myriad phenomena that are driving biodiversity loss in addition to climate change. Other causes include ecosystem fragmentation, invasive species, pollution, oxygen depletion caused by fertilizers running off into ponds and streams, overfishing, human overpopulation, and overconsumption. All of these phenomena have a direct impact on the health of the biosphere, and all would conceivably persist even if the problem of climate change were somehow immediately solved. Such considerations warrant decoupling biodiversity loss from climate change, because the former has been consistently subsumed by the latter as a mere effect. Biodiversity loss is a distinct environmental crisis with its own unique syndrome of causes, consequences, and solutions—such as restoring habitats, creating protected areas (“biodiversity parks”), and practicing sustainable agriculture. The sixth extinction. **The repercussions of biodiversity loss are potentially as severe as those anticipated from climate change, or even a nuclear conflict**. For example, according to a 2015 study published in Science Advances, **the best available evidence reveals “an exceptionally rapid loss of biodiversity over the last few centuries, indicating that a sixth mass extinction is already under way**.” This conclusion holds, even on the most optimistic assumptions about the background rate of species losses and the current rate of vertebrate extinctions. The group classified as “vertebrates” includes mammals, birds, reptiles, fish, and all other creatures with a backbone. The article argues that, using its conservative figures, the average loss of vertebrate species was 100 times higher in the past century relative to the background rate of extinction. (Other scientists have suggested that the current extinction rate could be as much as 10,000 times higher than normal.) As the authors write, “The evidence is incontrovertible that recent extinction rates are unprecedented in human history and highly unusual in Earth’s history.” Perhaps the term “Big Six” should enter the popular lexicon—to add the current extinction to the previous “Big Five,” the last of which wiped out the dinosaurs 66 million years ago. But the concept of biodiversity encompasses more than just the total number of species on the planet. It also refers to the size of different populations of species. With respect to this phenomenon, **multiple studies have confirmed that wild populations around the world are dwindling and disappearing** at an alarming rate. For example, the 2010 Global Biodiversity Outlook report found that the population of wild vertebrates living in the tropics dropped by 59 percent between 1970 and 2006. The report also found that the population of farmland birds in Europe has dropped by 50 percent since 1980; bird populations in the grasslands of North America declined by almost 40 percent between 1968 and 2003; and the population of birds in North American arid lands has fallen by almost 30 percent since the 1960s. Similarly, 42 percent of all amphibian species (a type of vertebrate that is sometimes called an “ecological indicator”) are undergoing population declines, and 23 percent of all plant species “are estimated to be threatened with extinction.” Other studies have found that some 20 percent of all reptile species, 48 percent of the world’s primates, and 50 percent of freshwater turtles are threatened. Underwater, about 10 percent of all coral reefs are now dead, and another 60 percent are in danger of dying. Consistent with these data, the 2014 Living Planet Report shows that the global population of wild vertebrates dropped by 52 percent in only four decades—from 1970 to 2010. While biologists often avoid projecting historical trends into the future because of the complexity of ecological systems, it’s tempting to extrapolate this figure to, say, the year 2050, which is four decades from 2010. As it happens, a 2006 study published in Science does precisely this: It projects past trends of marine biodiversity loss into the 21st century, concluding that, unless significant changes are made to patterns of human activity, there will be virtually no more wild-caught seafood by 2048. Catastrophic consequences for civilization. The consequences of this rapid pruning of the evolutionary tree of life extend beyond the obvious. **There could be surprising effects of biodiversity loss that scientists are unable to fully anticipate in advance**. For example, **prior research has shown that localized ecosystems can undergo abrupt and irreversible shifts when they reach a tipping point.** According to a 2012 paper published in Nature, there are reasons for thinking that **we may be approaching a tipping point** of this sort **in the global ecosystem**, **beyond which the consequences could be catastrophic for civilization**. As the authors write, a planetary-scale transition could precipitate “substantial losses of ecosystem services required to sustain the human population.” An ecosystem service is any ecological process that benefits humanity, such as food production and crop pollination. **If the global ecosystem were to cross a tipping point and substantial ecosystem services were lost, the results could be “widespread social unrest, economic instability, and loss of human life.**” According to Missouri Botanical Garden ecologist Adam Smith, one of the paper’s co-authors, **this could occur in a matter of decades**—far more quickly than most of the expected consequences of climate change, yet equally destructive. **Biodiversity loss is a “threat multiplier” that, by pushing societies to the brink of collapse, will exacerbate existing conflicts and** introduce entirely new struggles between state and non-state actors. Indeed, it **could even fuel the rise of terrorism**. (After all, climate change has been linked to the emergence of ISIS in Syria, and multiple high-ranking US officials, such as former US Defense Secretary Chuck Hagel and CIA director John Brennan, have affirmed that climate change and terrorism are connected.) The reality is that we are entering the sixth mass extinction in the 3.8-billion-year history of life on Earth, and the impact of this event could be felt by civilization “in as little as three human lifetimes,” as the aforementioned 2012 Nature paper notes. Furthermore, the widespread decline of biological populations could plausibly initiate a dramatic transformation of the global ecosystem on an even faster timescale: perhaps a single human lifetime. **The unavoidable conclusion is that biodiversity loss constitutes an existential threat** in its own right. As such, it ought to be considered alongside climate change and nuclear weapons as **one of the most significant contemporary risks to** human prosperity and **survival**.

#### Destruction of satellites forces transition to sustainable methods – farmers are capable and would figure it out

**O’Connor et al. 19** – Researchers for RTI International (Alan C., “Economic Benefits of the Global Positioning System (GPS)”, RTI International, <https://www.rti.org/sites/default/files/gps_finalreport.pdf>, June 2019)//CProst

The impact of a 30-day outage in the agricultural sector is highly dependent on the time in which it occurs. PA experts mentioned different potential impacts happening at different points in the year. All agreed that the most damaging impacts would occur during planting season because farmers could be so delayed that they could potentially miss the planting window or plant at a suboptimal time, causing significant yield losses. Loss of VRT would affect the ability to apply fertilizer, and planting speeds would have to decrease, causing further delays. Impacts at other times of the year might affect agrochemical application or data collected by yield monitors during the harvest, but these impacts would be much less than those that occur during planting. Experts also agreed that a 30-day GPS outage during the planting season would be highly damaging or “devastating”; however, most agreed that farmers are **quite independent** and capable and would eventually figure out how to plant, **even if** it meant a yield loss and additional input costs. Experts estimated revenue losses if GPS were to shut off during the planting season. On average, experts estimated 17% with a +/− 6% margin of error for revenue losses across corn, soybeans, wheat, rice, peanuts, and cotton (Table 5-8). Many large growers that have adopted GPS-assisted PA technologies have adopted larger equipment that is less easy to manage without GPS. Experts discussed how many of the planters are not equipped with markers and are too big for drivers to easily track their rows. In the event of a 30-day outage, it would be very challenging for farmers to retrofit their equipment, and many operators do not have recent experience farming this way, causing numerous overlaps, skips, and over- or underapplying of inputs. Without VRT, farmers would **have to return** to a single rate application of seeds, fertilizer, and other inputs, increasing operational costs and leading to lower yields. For many places and crops, there is only a 15-day planting window, and if a farmer plants outside that window, then he will not get optimal yields. In terms of quantity, one expert estimated that farmers lose a bushel per acre when they plant 1 day outside the planting window.

**Ending industrial ag causes transition to small farms**

Miguel A. **ALTIERI 08**, Professor of Agroecology at the Department of Environmental Science, Policy and Management at U.C. Berkeley, President of the Latin American Scientific Society of Agroecology (SOCLA), “Small Farms as a Planetary Ecological Asset: Five Key Reasons Why We Should Support the Revitalisation of Small Farms in the Global South,” *Third World Network*, 2008, http://www.agroeco.org/doc/smallfarmes-ecolasset.pdf

**The immediate challenge** for our generation **is to transform industrial agriculture by transitioning the world’s food systems away from reliance on fossil fuels. We need an alternative agricultural** development **paradigm: one that encourages more ecological, biodiverse, sustainable, and socially just forms of agriculture**. Fortunately **there are** today **thousands of** new and **alternative initiatives** flowering **across the world to promote ecological agriculture, preservation** of the livelihoods **of small farmers, production of** healthy, safe and culturally **diverse foods, and localisation of distribution**, trade and marketing. Many of these sustainable models are rooted in the ecological rationale of traditional agriculture, which represent millenary examples of successful forms of community-based local agriculture. **These microcosms of traditional agriculture offer promising models for other areas as they promote biodiversity, thrive without agrochemicals, and sustain year-round yields** (Denevan 1995). Such systems have fed much of the world for centuries, while conserving ecological integrity through application of indigenous knowledge systems and continue to do so in many parts of the planet.

#### Squo solves debris – private tracking, surveillance, in-orbit servicing and green satellite tech all happening now – private sector and P3s are key and outpacing government monitoring

CSTP 20 – OECD Committee, The strategic objectives of the Committee as defined in its Mandate and by the work priorities agreed by Member countries' Ministers responsible for science and technology provide the framework for the Secretariat's proposals for activities to be developed or initiated under the aegis of the Committee itself or its subsidiary bodies (NESTI, TIP, GSF, BNCT and IPSO) [This paper was approved and declassified by written procedure by the Committee for Scientific and Technological Policy (CSTP) on 11 March 2020 and prepared for publication by the OECD Secretariat, “SPACE SUSTAINABILITYTHE ECONOMICS OF SPACE DEBRIS IN PERSPECTIVE,” OECD Science, Technology and Industry Policy Papers, April 2020, No. 87, https://www.oecd-ilibrary.org/science-and-technology/space-sustainability\_a339de43-en]

An emerging “space debris economy”?

* Will we see a more intensive use of cubesats and miniaturised technologies in lower orbits? Cubesats have been the fastest-growing category of launched satellites in the last years and, when launched at lower altitudes, are naturally compliant with debris mitigation guidelines. They are also ever more performant and affordable, and dedicated launch opportunities become more widespread. Furthermore, they increasingly receive preferential treatment in risk-based national legislations (e.g. introduction of sliding scale in the UK Outer Space Act for insurance requirements).
* Space surveillance and tracking capabilities, in both GEO and LEO: New (private) sources of situational awareness data are becoming increasingly important, with data analytics and modelling fuelled by advances in digital technologies. Private sector debris catalogues and tracking capabilities for the geostationary orbit may now be almost as good as government capabilities (IDA, 2016[76]), while solutions for the low-earth orbit are emerging. Start-ups such as LeoLabs provide data and services based on low-cost ground equipment and sophisticated data analysis. The company, which in October 2019 had three radars in the United States and New Zealand, has developed a cloud-based “Space Regulatory and Sustainability Platform” for the New Zealand Space Agency, a first of its kind, destined to track objects launched from New Zealand to ensure compliance with permit conditions (MBIE, 2019[77]). A novel project called TruSat intends to use blockchain technology to crowdsource and validate satellite orbital positions worldwide via open source software (TruSat, 2019[78]). The US Air Force Research Laboratory has signed agreements with several commercial space situational awareness data providers (e.g. Numerica, LeoLabs, ExoAnalytics) to get access to sensor networks and algorithms (Numerica, 2019[79]). The Space Situational Awareness (SSA) open-architecture data-sharing platform under development by the US Department of Commerce, including data from different government agencies, is also expected to spur innovative value-added products and services.
* In-orbit servicing solutions: Several governmental agencies and commercial companies have developed, or are in the process of acquiring, some capabilities for in-orbit servicing (e.g. NASA, DARPA, ESA, JAXA). In-orbit servicing involves a number of complex operations in space: the servicing of space platforms (e.g. satellite, space station) to replenish consumables and degradables (e.g. propellants, batteries, solar array); replacing failed functionality; and/or enhancing the mission through software and hardware upgrades.