Negative: Space Junk Counterplan

By “Coach Vance” Trefethen

***Resolved: The United States federal government substantially reform the use of Artificial Intelligence technology***

Case Summary: The AFF plan has the US government fund an AI program to help satellites avoid space junk and other obstacles in earth orbit (live satellites, dead satellites, and blown-up debris from past crashes in space). Space debris is a problem, but reinventing the wheel isn’t the solution . The European Space Agency (ESA) already has an AI program doing the AFF Plan (in fact, AFF will cite it in their evidence). But then, why go build another one? Counterplan is to have the ESA share theirs with us and use the money AFF was going to spend reinventing it to instead give that money to ESA for their space debris removal program. Avoidance is good (and ESA does it already). Removal is better (and ESA has already started doing it). Use and fund ESA instead of starting over from scratch.

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Negative: Space Junk Counterplan

TOPICALITY

1. Nothing reformed

Link: European Space Agency is already doing it

Julie Campbell 2021 (journalist) 6 May 2021 <https://www.qrcodepress.com/artificial-intelligence/8539302/> (accessed 1 Feb 2022)

The new AI-driven system is being developed to help reduce the risk of orbital collision. The European Space Agency (ESA) is working on a system using artificial intelligence that will help to be able to avoid collisions with the rapidly growing amount of space junk littering the near-Earth environment.

Violation: Doing more of Status Quo isn’t reform

Remember, the resolution doesn’t say the federal government should reform “its” use of AI. It says reform the use in general. If Status Quo is already doing it, doing some more isn’t reform.

Impact: Negative ballot

No one is affirming the resolution, so no matter who wins the round, you should vote Negative.

COUNTERPLAN – We deny the resolution and achieve all the benefits of the Affirmative plan plus more

Overview

Our Counterplan will use alternate means that do not involve the US federal government doing anything about AI, so we will continue to deny the resolution.

Our Counterplan is also structured to be mutually exclusive with the Affirmative’s plan. You could not do both plans at the same time, so there is a clear choice between Affirmative and Negative in this round.

Mandates

1. Avoidance. The European Space Agency (ESA) makes its existing AI space junk avoidance system available to anyone in the U.S. who wants to use it. Any minimal increase in funding needed to make the system available to US users will come from cuts in European Union farm subsidies.
2. Removal. All Affirmative plan US funding for AI space junk avoidance is removed from their plan and donated instead to the European Union to pay for expansion of their existing space junk removal plan. .
3. Enforcement and administration through existing EU governing bodies and the European Space Agency that already manage their existing space junk programs.
4. Timeline is the same as the time mentioned in the Affirmative plan.
5. All Negative speeches may clarify the Counterplan.

Now let’s look at the Justifications for why this Counterplan is superior to the Affirmative’s Plan.

JUSTIFICATION 1. Faster solvency. Not reinventing the wheel means we get space junk avoidance faster

**There’s no need to build from scratch a US space junk avoidance system when the European Space Agency has an existing one that is close to completion and is already showing promise. We see this in 3 sub-points**

A. ESA avoidance system will be ready in a few years

Tereza Pultarova 2021 (journalist) 29 Apr 2021 “Artificial intelligence is learning how to dodge space junk in orbit” <https://www.space.com/AI-autonomous-space-debris-avoidance-esa> (accessed 1 Feb 2022)

The agency will explore newer approaches to AI development, such as deep learning and neural networks, to improve the accuracy of the algorithms, Tim Flohrer, the Head of ESA's Space Debris Office told Space.com. "The standard AI algorithms are trained on huge data sets," Flohrer said. "But the cases when we had actually conducted manoeuvres are not so many in AI terms. In the next phase we will look more closely into specialised AI approaches that can work with smaller data sets." For now, the AI algorithms can aid the ground-based teams as they evaluate and monitor each conjunction alert, the warning that one of their satellites might be on a collision course with another orbiting body. According to Flohrer, such AI-assistance will help reduce the number of experts involved and help the agency deal with the increased space traffic expected in the near future. The decision whether to conduct an avoidance manoeuvre or not for now still has to be taken by a human operator.  "So far, we have automated everything that would require an expert brain to be awake 24/7 to respond to and follow up the collision alerts," said Krag. "Making the ultimate decision whether to conduct the avoidance manoeuvre or not is the most complex part to be automated and we hope to find a solution to this problem within the next few years."

B. No US system

In order for the Affirmative to claim their plan is topical, they have to argue the US has no system at all. If we already have a system, then they’re just endorsing the Status Quo and they lose on topicality.

C. Starting from scratch will be expensive. The better AI is, the more expensive it is to create and deploy

[Will Knight](https://www.wired.com/author/will-knight) 2020 (senior writer for WIRED, covering artificial intelligence. He was previously a senior editor at *MIT Technology Review) “*Prepare for Artificial Intelligence to Produce Less Wizardry” 11 July 2020 <https://www.wired.com/story/prepare-artificial-intelligence-produce-less-wizardry/> (accessed 1 Feb 2022)

“Deep neural networks are very computationally expensive,” says [Song Han](https://songhan.mit.edu/), an assistant professor at MIT who specializes in developing more efficient forms of deep learning and is not an author on Thompson’s paper. “This is a critical issue.” Han’s group has created more efficient versions of popular AI algorithms using novel [neural network](https://www.wired.com/tag/neural-networks/) architectures and specialized chip architectures, among other things. But he says there is a “still a long way to go” to make deep learning less compute-hungry. [Other researchers](https://openai.com/blog/ai-and-compute/) have noted the soaring computational demands. The head of Facebook’s AI research lab, Jerome Pesenti, told WIRED last year that AI researchers were [starting to feel the effects](https://www.wired.com/story/facebooks-ai-says-field-hit-wall/) of this computation crunch.

D. ESA cooperation with the U.S. works, and we need to expand it. Example: SpaceX in Sept. 2019

Charlie Wood 2019 (journalist) 4 Sept 2019 “European and SpaceX operators avoided a satellite collision… over email” <https://www.popsci.com/space-x-esa-satellite-collision/> (accessed 2 Feb 2022)

A European satellite dodged one belonging to [SpaceX](https://www.popsci.com/spacex-methane-engine-flight-test/) over the Pacific Ocean on Monday morning, hopping around the other spacecraft after a communication glitch left SpaceX unresponsive to follow-up messages. While the odds of a collision remained low—never exceeding 1 in 1,000—the extraterrestrial game of chicken highlights the growing challenge of flying satellites through Earth’s ever-more-crowded orbital environment. Streets have stoplights. Airports have air traffic controllers. But space remains wide open, with European Space Agency (ESA) operators addressing Monday’s near miss the same way one might request a sick day—writing a polite email and hoping for a speedy response. As SpaceX and other companies build global internet networks using “mega constellations” of thousands of satellites, experts say only a better traffic control system can keep our space-based infrastructure from coming crashing down.

JUSTIFICATION 2. Better solvency. You need the European Union to really solve space junk avoidance.

The Affirmative plan would need Europe’s cooperation anyway to work. But you only get it with a Negative ballot

Jonathan O’Callaghan (Q) interviewing Dimitra Stefoudi (A) 2020 (Stefoudi is part of the Academic Staff of the International Institute of Air & Space Law of Leiden University and a PhD Candidate in Space Law) 2 March 2020 “Q&A: ‘We need to improve how we keep track of objects in space’ “ <https://ec.europa.eu/research-and-innovation/en/horizon-magazine/qa-we-need-improve-how-we-keep-track-objects-space> (accessed 1 Feb 2022) (brackets added; parentheses in original)

**[Q.] What role does the European Union play in space traffic management?
[A.]** ‘Quite prominent, especially because it represents a group of states. The European Commission has a (recent) [policy about space situational awareness](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014D0541), specifically recognising all these problems and trying to do something about it. I consider this to be a very good step. The main problem with space traffic management and space situational awareness at the moment is that it needs broad cooperation not only by European states but by many other states in order to gather as much information as possible.’

JUSTIFICATION 3. Root cause solvency. We advance the solution of removing space junk, not just avoiding it

A. The European Space Agency has started a program to remove space junk

Daniel Clery 2020. (journalist) Europe plans space claw to capture orbiting junk 1 Dec 2020 <https://www.science.org/content/article/europe-plans-space-claw-capture-orbiting-junk> (accessed 1 Feb 2022)

The European Space Agency (ESA) today finalized a contract to launch a mission in 2025 that will be the first to capture and dispose of a piece of orbiting space junk. The ClearSpace-1 mission, built by Swiss startup ClearSpace, will home in on a piece of debris the size of a washing machine, grapple it with a four-armed claw, and escort it down to a lower orbit where the duo will enter the atmosphere and burn up.

B. Removal is the most urgent priority, and progress right now is too slow

Daniel Clery 2020. (journalist) Europe plans space claw to capture orbiting junk 1 Dec 2020 <https://www.science.org/content/article/europe-plans-space-claw-capture-orbiting-junk> (accessed 1 Feb 2022)

Darren McKnight, a space debris expert at the technology company Centauri, applauds ESA for being one of the few agencies to take action. But he is concerned by the slow progress in removing orbital debris, which he believes will increasingly threaten working satellites and astronauts. "If we don't get started soon, we're going to be in big trouble," he says. "We need to take baby steps fast."

C. Counterplan funding helps: Cleaning up space debris needs more funding

Daniel Clery 2020. (journalist) Europe plans space claw to capture orbiting junk 1 Dec 2020 <https://www.science.org/content/article/europe-plans-space-claw-capture-orbiting-junk> (accessed 1 Feb 2022)

ClearSpace has grander plans. "We will steadily move to larger and more ambitious targets," says ClearSpace CEO Luc Piguet, as well as missions that can dispose of multiple targets to reduce costs. That's going to be necessary, says Hugh Lewis, who models space debris at the University of Southampton. He points out that ClearSpace-1 will spend €100 million (€86 million from ESA) to clean up a little over 100 kilograms of space junk. At that cost Envisat—a defunct, bus-size, 8000-kilogram, Earth-observing, ESA satellite—would be prohibitively expensive to bring down, even though Lewis says it is "the riskiest object in orbit."

D. Removing the biggest threats is the best policy. That’s why you should prefer our Counterplan over their Plan

Daniel Clery 2020. (journalist) Europe plans space claw to capture orbiting junk 1 Dec 2020 (brackets added) <https://www.science.org/content/article/europe-plans-space-claw-capture-orbiting-junk> (accessed 1 Feb 2022)

At the International Astronautical Congress in October, [Darren] McKnight [space debris expert at the technology company Centauri] presented an analysis of the 50 most concerning pieces of debris in low-Earth orbit. He asked 11 teams around the globe to draw up their top 50 list based on criteria including mass, expected orbital lifetime, and proximity to working satellites. He then compiled a composite list. The first 20 items on the list are Soviet and Russian rocket stages launched between 1985 and 2007 and left in crowded operational orbits. Each one is heavier than an elephant and as big as a school bus. These giant objects, he says, are more of a threat than the swelling fleets of relatively small internet communications satellites that have been launched by the likes of SpaceX with plans and capabilities for deorbiting. "Clusters of dead things are more hazardous than constellations of live things," he says.

2N / Backup Evidence: Space Junk

COUNTERPLAN SOLVENCY BACKUP

Funding: EU spends $65 billion/year on farm subsidies. Most of it goes to the connected and powerful few

NEW YORK TIMES 2019. (journalists Selam Gebrekidan, Matt Apuzzo and Benjamin Novak) “The Money Farmers: How Oligarchs and Populists Milk the E.U. for Millions” 3 Nov 2019 <https://www.nytimes.com/2019/11/03/world/europe/eu-farm-subsidy-hungary.html> (accessed 1 Feb 2022)

Every year, the 28-country bloc pays out $65 billion in farm subsidies intended to support farmers around the Continent and keep rural communities alive. But across Hungary and much of Central and Eastern Europe, the bulk goes to a connected and powerful few. The prime minister of the Czech Republic collected tens of millions of dollars in subsidies just last year. Subsidies have underwritten Mafia-style land grabs in Slovakia and Bulgaria. Europe’s farm program, a system that was instrumental in forming the European Union, is now being exploited by the same antidemocratic forces that threaten the bloc from within. This is because governments in Central and Eastern Europe, several led by populists, have wide latitude in how the subsidies, funded by taxpayers across Europe, are distributed — even as the entire system is shrouded in secrecy.

Cooperation is better because the US alone doesn’t have all the info it needs

Robert J. Rovetto 2015. (MA Philosophy with ontology focus; international expert on space debris policy) “AN ONTOLOGICAL ARCHITECTURE FOR ORBITAL DEBRIS DATA” Aug 2015 EARTH SCIENCE INFORMATICS <https://arxiv.org/ftp/arxiv/papers/1704/1704.01014.pdf> (accessed 2 Feb 2022) (brackets in original)

Any given organization tracking space debris acquires large amounts of data, yet “[n]one of the existing networks and SSA initiatives provides complete coverage or a comprehensive catalogue of all objects in orbit. The sharing of data is also limited.” (Kretzenbacher et al 2012, emphasis added). The United States, for instance, maintains an extensive system and makes some data available, but “there are gaps in its coverage and catalog” (Weeden 2014). What more, given that it is primarily military-centric, data-sharing is not entirely at a premium (Becker and Chow 2012). The above sources of space object observational data, as well those under development and those yet to be constructed, are therefore potential partners in data-sharing initiatives toward more complete SSA.

Space debris solutions will be much more effective if done internationally

Robert J. Rovetto 2015. (MA Philosophy with ontology focus; international expert on space debris policy) “AN ONTOLOGICAL ARCHITECTURE FOR ORBITAL DEBRIS DATA” Aug 2015 EARTH SCIENCE INFORMATICS <https://arxiv.org/ftp/arxiv/papers/1704/1704.01014.pdf> (accessed 2 Feb 2022) (brackets in original)

The improvement of SSA for all orbital, near-earth and deep-space objects is critical for national security and planetary defense. In pooling data and resources toward better SSA, the individual parties expand their knowledge. Collectively they are in a better position for improving space safety and planetary defense. “Improving SSA for all space actors is critical to space activities and the long‐term sustainability of space. It provides knowledge about what is happening in space, and in particular Earth orbit. This knowledge provides understanding of potential threats (natural or human‐generated)” (Weeden 2014) Solving the orbital debris problem and increasing SSA are more efficiently addressed via cooperative efforts at the international scale.

US Government and ESA have technical capability to share space junk data

European Space Agency 2017. (ethical disclosure: Article is undated but references material elsewhere that was published in 2017) “Reentry and collision avoidance” <https://www.esa.int/Safety_Security/Space_Debris/Reentry_and_collision_avoidance> (accessed 2 Feb 2022)

Benefiting from a data-sharing agreement with US Strategic Command, ESA uses Conjunction Data Messages provided by the US Joint Space Operations Center ([JSpOC](http://www.stratcom.mil/Media/Factsheets/Factsheet-View/Article/976414/usstratcom-space-control-and-space-surveillance/%22%20%5Ct%20%22_blank%22%20%5Co%20%22JSpOC)) together with ESA’s own orbit data, to analyse all close approaches (‘potential conjunctions’) of a given satellite (‘target’) with any of the catalogued objects.  The collision risk is determined as a function of the object sizes, the predicted miss distance, the flyby geometry and the orbit uncertainties of the two objects involved.

Cleaning up debris should be the top priority. ESA “removal” program is a great start, and better than what US is doing

Sandra Erwin 2022. (journalist) 6 Jan 2022 “Space debris expert warns U.S. ‘woefully behind’ in efforts to clean up junk in orbit” https://spacenews.com/space-debris-expert-warns-u-s-woefully-behind-in-efforts-to-clean-up-junk-in-orbit/

Unlike other countries, the United States is tackling the debris issue as a long-term problem that is decades away, he said. In reality, the risk of satellites colliding with debris objects — and debris-on-debris collisions that create even more space junk — is increasing rapidly and could soon begin to impact the industry’s ability to operate satellites reliably. “It’s embarrassing to me hearing people talk about the need for active debris removal and the need for debris mediation as if it’s something that’s going to be decades out,” said [Darren] McKnight [senior technical fellow at LeoLabs and member of the International Academy of Astronautics’ Space Debris Committee]. “The European Space Agency and Japan’s space agency are way ahead on those sorts of things.”

AFF SOLVENCY RESPONSES

1. More study needed

Europe is still in the early stages of developing Space Situational Awareness and Space Traffic Management [but at least they’re working on it – According to AFF, the US isn’t doing it at all]

Dimitra Stefoudi 2020 (Stefoudi is part of the Academic Staff of the International Institute of Air & Space Law of Leiden University and a PhD Candidate in Space Law) 2 March 2020 “Q&A: ‘We need to improve how we keep track of objects in space’ “ <https://ec.europa.eu/research-and-innovation/en/horizon-magazine/qa-we-need-improve-how-we-keep-track-objects-space> (accessed 1 Feb 2022) (brackets added)

‘In the context of developing space situational awareness [SSA] and space traffic management [STM], at first stage research should be focused on related scientific and engineering issues, such as what kind of data technology can be used to effectively monitor traffic in space and what data analysis methods can be used to assess potential threats. Even though there are educational and research programs at the moment on planetary science and exploration, on data science and on space monitoring, they don't take into account SSA/STM. ‘Alongside this, it would be useful to examine the specific legal and policy challenges around STM and SSA. One of the main burdens at the moment is how to overcome the security aspects that prevent countries and other entities from sharing information about their space objects and space missions, as well as how to cooperate in sharing information.’

2. US government can’t ramp up AI – inadequate staffing

**[One more reason our counterplan is better. Europe already has the people working on it, whereas the AFF Plan would have to wait, maybe forever, for the federal government to find and hire the skilled workers to do it.]**

US Government has trouble ramping up expertise needed to manage the deep technology of AI

Prof. Ryan Calo 2017. (Associate Professor, University of Washington School of Law; hosted the first White House workshop on artificial intelligence policy, organized AI workshops for the National Science Foundation) Artificial Intelligence Policy: A Primer and Roadmap <https://lawreview.law.ucdavis.edu/issues/51/2/Symposium/51-2_Calo.pdf> (accessed 8 Aug 2021)

The better-grounded observation is that government lacks the requisite expertise to manage society in such a deeply technically-mediated world. Government bodies are slow to hire up and face steep competition from industry. When the state does not have its own experts, it must either rely on the self-interested word of private firms (or their proxies) or experience a paralysis of decision and action that ill-serves innovation. Thus, one overarching policy challenge is how best to introduce expertise about AI and robotics into all branches and levels of government so they can make better decisions with greater confidence. [**END QUOTE**] The solution could involve new advisory bodies, such as an official Federal Advisory Committee on Artificial Intelligence with an existing department or even a standalone Federal Robotics Commission. Or it could involve resuscitating the Office of Technology Assessment, building out the Congressional Research Service, or growing the Office of Science and Technology Policy. Yet another approach involves each branch hiring its own technical staff at every level. [**HE GOES ON TO CONCLUDE IN THE SAME CONTEXT QUOTE:]** The technical knowledge and affordances of the government — from the ability to test claims in a laboratory to a working understanding of AI in lawmakers and the judiciary — will ultimately affect the government’s capacity to generate wise AI policy.

US Government has massive human talent deficit in AI

National Security Commission on Artificial Intelligence 2021 (bipartisan commission of 15 technologists, national security professionals, business executives, and academic leaders) March 2021 “Final Report” <https://www.nscai.gov/wp-content/uploads/2021/03/Full-Report-Digital-1.pdf> (accessed 17 June 2021)

The human talent deficit is the government’s most conspicuous AI deficit and the single greatest inhibitor to buying, building, and fielding AI-enabled technologies for national security purposes. This is not a time to add a few new positions in national security departments and agencies for Silicon Valley technologists and call it a day. We need to build entirely new talent pipelines from scratch.