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**REGULATING  
OUTER SPACE:**  
*OF GAPS,  
OVERLAPS, AND  
STOVEPIPES*

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The Center for  
Growth and Opportunity  
at Utah State University

# Regulating Outer Space: Of Gaps, Overlaps, and Stovepipes

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Policy Paper

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# Executive Summary

In the United States, there exists no one National Outer Space Act and no single U.S. Space Regulatory Agency. Instead, private companies seeking to do business in space face a patchwork quilt of regulations, promulgated by several separate agencies, relying on authorizing statutes that are nearly 100 years old.

On the heels of the Supreme Court's decision in *West Virginia v. EPA*, concluding that Congress must clearly delegate regulatory authority before an agency can act, this paper examines the enabling statutes of the leading agencies that deal with outer space and analyzes whether these agencies have clear authority from Congress to both promulgate and enforce regulations related to activities in outer space.

The current cumbersome and incomplete approach to regulation threatens to slow down U.S. companies, or worse, drive them overseas to seek licenses from foreign jurisdictions willing to more lightly regulate their activities in exchange for fees and potential tax revenues. Moreover, a regulatory system full of friction (both in terms of time, cost, and complexity of compliance) threatens to allow our adversaries to catch up and perhaps become dominant in the new cis-lunar economy.

While drafting comprehensive space legislation is beyond its scope, this paper does highlight the key issues that Congress should address.

# Introduction

Outer Space is hot. Not in terms of the thermal environment (where space can be either very hot or very cold, depending on your orientation to the Sun), but in terms of the regulatory environment. As the space launch cadence has increased dramatically in the last few years, especially for commercial space launches,<sup>1</sup> there is new interest by some in regulating all that activity above our heads.

This paper will look at the U.S. regulatory structure, admittedly promulgated several generations ago,<sup>2</sup> who regulates outer space, and under what authority. Are there gaps (vacuums) in the regulatory structure, and do they actually need to be filled? There are plenty of calls for regulating activities in space, especially new and innovative activities. But little comprehensive analysis exists exploring how proposed regulatory changes would interact with the existing order, and what, if any “domino effects” and interagency clashes could result from such new regulations.

The regulatory thicket is dense, and the open questions are extensive:

- What impact would regulations have on the nascent market for in-space servicing, assembly, and manufacturing (ISAM)?
- Are there “stovepipes” in the regulatory system that keep the U.S. from taking an “all-of-government” approach to space regulation?
- Given that outer space is inherently international, what impact does the U.S. regulatory regime have on where companies and individuals choose to locate (or at least become regulated entities)?
- Is the current international treaty regime sufficient to ensure a peaceful and prosperous future for space activities?
- Would attempts to change or add treaties lead to a better legal environment for commercial space, or would it create a stifling regulatory environment in which the costs of the regulatory overburden strips away any ability to profit from space resources and the space environment?
- Given the interest of some governments to elevate their presence (and perhaps dominance) in space, what concerns should commercial companies have with the future safety of their operations in space?
- Are we inevitably headed toward a war in space, or can humans contain their earthly disputes to the surface and airspace of the planet and leave outer space to flourish and as an environment for freedom and “permissionless innovation”?<sup>3</sup>

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1 See FED. AVIATION ADMIN., *Commercial Space Data* (Jan. 4, 2022), [https://www.faa.gov/data\\_research/commercial\\_space\\_data/](https://www.faa.gov/data_research/commercial_space_data/).

2 See Vice President Kamala Harris, Remarks at Chabot Space and Science Center: Supporting the Commercial Space Sector (Aug. 12, 2022), <https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/08/12/remarks-by-vice-president-harris-on-supporting-the-commercial-space-sector/> (“To that end, we understand that we have got to update the rules, because they’re just simply outdated. They were written for a space industry of the last century. And when I was going through here just today, speaking with some of our innovators and looking at where the technology has grown in just the last decade, we know that we really are quite behind in terms of maximizing our collective understanding about how we will engage on the technology of today and what we can quickly and easily predict will be the technology over the next decades.”).

3 “Permissionless Innovation” is the concept that individuals and markets should be allowed to experiment with new technologies rather than having to seek government permission to innovate. For a fuller discussion of this topic, see ADAM THIERER, PERMISSIONLESS INNOVATION: THE CONTINUING CASE FOR COMPREHENSIVE TECHNOLOGICAL FREEDOM (rev. ed. 2016), <https://www.mercatus.org/research/books/permissionless-innovation-continuing-case-comprehensive-technological-freedom>.

These are vital questions that merit serious consideration, not knee-jerk reactions to a fear that space is getting out of control.

These questions merit thorough analysis, especially following *West Virginia v. EPA*,<sup>4</sup> in which the U.S. Supreme Court made clear that agencies are not free to regulate wherever they see a vacuum, or where regulating might further a political agenda. Rather, the power of agency regulation comes only from Congress, and any regulation must have firm roots in properly delegated authority, not some amorphous ancillary jurisdiction or “public interest” standard. One excellent measure of whether Congress authorized agencies to regulation is whether they also provided enforcement authority to the agencies. After all, what good are regulations if they have no teeth, or if an agency must rely on someone else to enforce their rules?

This paper thus reviews the enabling statutes of the modern U.S. agencies that one would think might have regulatory authority over private sector enterprises seeking to do business in outer space. Two questions are asked:

- 1) Did Congress give the agency rulemaking authority over outer space activities, and was that authority constrained to rules related to internal operations of that agency only?
- 2) Did Congress give the agency enforcement authority over the substance of the rules regulating outer space activities?

The results are surprising. Agencies that have historically regulated the activities of commercial businesses most (the FCC and FAA) may have the least regulatory authority over outer space activities, and an agency that historically has not regulated commercial activities (NASA) may currently possess the widest congressional mandate to regulate space operations. Whether NASA possesses the expertise to regulate private businesses is another matter, given its historical mandate to explore outer space and develop the technologies necessary to do so.

Against the current regulatory backdrop, what is the path forward for creating a more rational regulatory system? While the specific details of a new regulatory act are beyond its scope, this paper is intended to provide the necessary background to begin that conversation. What is clear is that after *West Virginia v. EPA*, reform efforts must come from Congress with clear statutory authority provided to the relevant agencies including guardrails to keep agencies from promulgating inconsistent or redundant regulations. There may also be a vital role for private or quasi-private standards-setting organizations to develop best practices, crafted by experts who are in a better position to find solutions to problems.

As will become clear, the specific issues that need to be addressed in this legislation are:

- What should the Federal Aviation Administration’s (FAA) regulatory responsibilities be (launch, reentry, payloads, other operations)?
- What is the overall role of the Department of Commerce?
  - Should Commerce or the FAA be in charge of space traffic management (STM)?
  - If Commerce handles STM, how can outer space and national air space be integrated?

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<sup>4</sup> 142 S. Ct. 2587 (2022).

- What is the role of the Federal Communications Commission (FCC) in space? Is it limited to allocating and licensing frequencies, or does its “public interest” standard imply more regulatory authority?
- What agency should promulgate rules related to orbital debris, and should this power be exclusive (i.e., other federal agencies should defer to the lead agency)?
- In instances where interagency coordination is necessary, what measures should be instituted to force transparency (with due regard to national security interests), ensure timely resolution, and remove “black box” vetoes without accountability?
- What agency, if any, should “authorize” and “supervise” space activities that fall outside the traditional norms of telecommunications, launch, and/or remote sensing? Is there a role for “permissionless innovation” in outer space?

This paper will explain why these questions are important when considering any comprehensive regulatory reform for outer space.

## I. The State of Space Activity

We are in a new space race. Not one that pits government against government in a race with a specific goal, such as placing the first humans on the Moon,<sup>5</sup> but rather a race to establish a cis-lunar economy<sup>6</sup> and better reap the scientific and economic benefits of space resources.<sup>7</sup> The competitors, especially among democracies, predominantly come from the commercial sector. And the activities they wish to conduct in space are far different from what governments have traditionally regulated. Rather than a space economy fueled almost entirely by telecommunications and remote sensing of Earth (i.e., businesses that merely use space to transport information), the new space race features activities that use the resources of space (microgravity, abundant solar energy, mineral resources) to create value in space itself. These innovative activities, in turn, will fuel an entire space ecosystem where satellites will need to be serviced on-orbit, and components for large space systems will be manufactured and assembled.<sup>8</sup> This is the space economy of science fiction,<sup>9</sup> or of science visionaries such as Gerard K. O’Neill.<sup>10</sup>

That is not to say that governments don’t play a key role. They do. Indeed, outer space is inherently international, both physically and legally, and the treaty regime places the ultimate responsibility for space activities on nations, not individuals or corporations.<sup>11</sup> Under Article VI of the 1967 Outer Space Treaty, for instance, governments must both authorize and supervise the activities of

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<sup>5</sup> See WALTER A. MCDUGALL, *THE HEAVENS AND THE EARTH: A POLITICAL HISTORY OF THE SPACE AGE* (1985).

<sup>6</sup> As used in this paper, “cis-lunar economy” refers to all economic activity from launch out to and including in the orbit and on the surface of the Moon.

<sup>7</sup> See, e.g., U.S. BUREAU OF ECON. ANALYSIS, *New and Revised Statistics for the U.S. Space Economy, 2012–2021*, SURVEY OF CURRENT BUSINESS (June 27, 2023), <https://apps.bea.gov/scb/issues/2023/06-june/0623-space-economy.htm> (the space economy generated \$211 billion in revenue in 2021, up from \$180 billion in 2012).

<sup>8</sup> Grouped together, these activities are often referred to as ISAM (in-space assembly and manufacturing).

<sup>9</sup> See, e.g., many of the works of Robert A. Heinlein, including *THE MOON IS A HARSH MISTRESS* (1966) and *HAVE SPACE SUIT – WILL TRAVEL* (1958). See also ALAN STEELE, *CLARKE COUNTY, SPACE* (1990).

<sup>10</sup> See, e.g., GERARD K. O’NEILL, *THE HIGH FRONTIER: HUMAN COLONIES IN SPACE* (1976) and ARTHUR C. CLARKE, *THE PROMISE OF SPACE* (1968).

<sup>11</sup> See *infra* § III.



their nationals.<sup>12</sup> Although there is significant debate about what Article VI means,<sup>13</sup> and whether or not it is self-executing,<sup>14</sup> it is clear that nations cannot simply abdicate responsibility for their nationals' activities in space, as they risk international liability under both the Outer Space Treaty and the Liability Convention.<sup>15</sup> Some regulatory system is required under international law.

What makes the United States different from virtually every other spacefaring nation is that, notwithstanding the fact that we have the most commercial space enterprises and lead the world in so many facets of developing a space economy, there is no uniform U.S. space law (no "U.S. Space Act"), and no one agency (or even a group of agencies) clearly can wield regulatory authority over commercial space activities. As one space scholar notes:

At the same time, the United States turns out to present a rather unusual picture from the perspective of domestic implementation of international obligations under the space treaties and domestically specifying the agencies exercising jurisdiction for the purpose. It does not have a single national framework space act from which all further detailed regulations follow (which is essentially what all other countries with dedicated national space laws have availed themselves of), but a set of separate, to some extent even disparate national acts handling different aspects and elements. While historically understandable, and so far not having raised major legal problems, this is rapidly changing now under the pressure of such new developments as sketched above.<sup>16</sup>

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12 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, Art. VI, *adopted* Dec. 5, 1979, 18 U.S.T 2410, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty or OST] ("States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the Moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the Moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty.")

13 *See, e.g.*, Frans G. von der Dunk, *Scoping National Space Law: The True Meaning of "National Activities in Outer Space" of Article VI of the Outer Space Treaty*, in PROCEEDINGS OF THE INTERNATIONAL INSTITUTE OF SPACE LAW 2019 227-237 (Blount et al. eds., 2020), <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1116&context=spacelaw> (canvassing fifty years of experience with Article VI interpretations).

14 A treaty is self-executing if its provisions become judicially enforceable upon ratification, i.e., no further domestic legislation is required to enforce the treaty's provisions. While many countries have their own interpretation of what it means to be self-executing, under U.S. Supreme Court precedent, it is clear that many of the provisions of the outer space treaty regime remain non-self-executing, meaning that domestic U.S. law is necessary to implement these provisions. *See* *Medellin v. Texas*, 552 U.S. 491, 504-05 (2008) ("This Court has long recognized the distinction between treaties that automatically have effect as domestic law, and those that—while they constitute international law commitments—do not by themselves function as binding federal law. The distinction was well explained by Chief Justice Marshall's opinion in *Foster v. Neilson*, which held that a treaty is 'equivalent to an act of the legislature,' and hence self-executing, when it 'operates of itself without the aid of any legislative provision.' When, in contrast, '[treaty] stipulations are not self-executing they can only be enforced pursuant to legislation to carry them into effect.' In sum, while treaties 'may comprise international commitments . . . they are not domestic law unless Congress has either enacted implementing statutes or the treaty itself conveys an intention that it be 'self-executing' and is ratified on these terms.") (citations omitted). *See also* *Reopening the American Frontier: Exploring How the Outer Space Treaty Will Impact American Commerce and Settlement in Space: Before the Subcomm. on Space, Sci., and Competitiveness of the S. Comm. on Com., Sci., & Transp.*, 115th Cong. (2017) (written testimony of James E. Dunstan & Berin Szoka), <https://www.commerce.senate.gov/services/files/A9AD88B2-9636-4291-A5B0-38BC0FF6DA90> [hereinafter Dunstan & Szoka 2017 Testimony], video at <https://www.commerce.senate.gov/2017/5/reopening-the-american-frontier-exploringhow-the-outer-space-treaty-will-impact-american-commerce-and-settlement-in-space> (discussion of Article VI of the Outer Space Treaty and *Medellin*).

15 *See* Outer Space Treaty, *supra* note 12.

16 Frans G. von der Dunk, *Effective Exercise of "In-Space Jurisdiction": The US Approach and the Problems It Is Facing*, 90 SPACE, CYBER, AND TELECOMMS. L. PROGRAM FAC. PUBL'NS 149 (2015), <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1090&context=spacelaw>.

## II. Why the Regulatory Environment Is Critical to Winning the New Space Race

Rather than being faced with a race that can be won through engineering excellence and blank check government spending,<sup>17</sup> this race is far more nuanced and requires far different tools to win. Interestingly, and contrary to many of the calls for heavy regulation (if not the total prohibition of commercial activity in space), the United States, and specifically its commercial bedrocks in the American free-market economic system, is far better equipped to win this race than any “top-down” authoritative economy.<sup>18</sup>

The United States was successful in putting humans on the Moon with the Apollo program, and “won” that race. What came shortly thereafter, however, was a total collapse of our space program, which lacked both leadership and broad political will to continue with a centralized, government-owned and run space economy.

[In February 1969] President Nixon asked Vice President Spiro Agnew to chair a Space Task Group (STG) created to provide a definitive recommendation regarding the course the space program should take during the post-Apollo period. . . . [Vice President Spiro] Agnew was supportive, stating that NASA needed an “Apollo for the seventies.” [But] “*Nixon was concerned about scientific-technological programs that might stress engineering over science, competition over cooperation, civilian over military, and adventure over applications* . . . [and his] emphasis on frugality in government spending prompted caution on his part in endorsing any effort in space.” Public sentiment toward the space program had also begun to shift, with increasing concerns that the government had misplaced priorities. A Gallup Poll conducted in July 1969, at the time of the Apollo 11 mission, indicated that only 39% of Americans were in favor of U.S. government spending to send Americans to Mars, while 53% were opposed. Thus, [NASA Administrator] Paine and Agnew were pushing for a large new Apollo-like commitment despite the fact that there appeared to be little or no support for such an undertaking within the White House or the mass public.<sup>19</sup>

This longing for a new Apollo program has permeated NASA and several administrations since, with each effort resulting in failure after failure to recapture the public’s infatuation with space or to spark Congress’s willingness to fund large government-controlled space exploration projects.<sup>20</sup>

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17 Adjusted for inflation, NASA’s budget peaked during the Apollo program, at more than \$60 billion in today’s dollars, or roughly 4.5 percent of the federal budget, and close to one percent of Gross Domestic Product (GDP). Over the past two decades, NASA’s budget has hovered around \$20 billion, or less than one percent of the federal budget, and approximately one-tenth of one percent of GDP. David A. King, *NASA Budget History*, CTR. FOR LUNAR SCI. & EXPL., <https://www.lpi.usra.edu/exploration/multimedia/NASABudgetHistory.pdf> (last visited July 4, 2023).

18 See TechFreedom Comments on Moon to Mars Objectives (June 3, 2022), <https://techfreedom.org/wp-content/uploads/2022/06/TechFreedom-Comment-Moon-to-Mars-6-3-22.pdf> (discussing NASA’s continued failures to embrace the commercial sector as part of its post-Apollo initiatives, and why each attempt by NASA to return to the Moon has failed).

19 THOR HOGAN, *MARS WARS: THE RISE AND FALL OF THE SPACE EXPLORATION INITIATIVE 21–22* (2007), <https://history.nasa.gov/sp4410.pdf> (footnotes omitted, emphasis added).

20 President George H.W. Bush’s Space Exploration Initiative (SEI) suffered the same fate as the post-Apollo NASA; it was ultimately cancelled when Congress failed to appropriate the \$500 billion NASA said it needed for a return to the moon. See Steve Dick, Summary of Space Exploration Initiative, NASA, <https://history.nasa.gov/seisummary.htm> (last visited June 29, 2023). But the SEI failure also highlighted more systemic problems with NASA and its relationship with the White House.

Without full public backing or full congressional appropriations for new large programs, NASA attempted to enter the waters of “commercial space” by proposing the space shuttle, which supposedly would serve the needs of anyone wishing to get into space with a reusable rocket that could fly often, and cheaply. That, of course, never materialized, as the shuttle turned out to be only partially reusable and cost more than a billion dollars a mission to fly.<sup>21</sup> That should have come as no surprise, given that NASA was not created to further commercial space development, and its attempts to dabble in commercial space ventures has been spotty, at best.<sup>22</sup>

The government’s approach to commercial space, as poor as it has been, hasn’t stopped entrepreneurs from finding ways to build an Earth-facing space economy, first through providing communications services from orbit, then commercial remote sensing, and more recently, beginning to undertake more innovative activities, including in-space servicing, assembly, and manufacturing (ISAM).<sup>23</sup> The reduction of cost engendered by SpaceX and other “NewSpace” entrants has ushered in this new space race, with commercial entities—not governments—emerging as the key players.<sup>24</sup>

This is why analyzing the current state of the U.S. space regulatory system is so important. Governments that provide a stable and frictionless regulatory system will write the rules for this new space race. In “Why Nations Fail: The Origins of Power, Prosperity, and Poverty,” D. Acemoglu and J. Robinson analyze many historical societies, their governments, and why

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The rise of SEI and its eventual demise represents one of the landmark episodes in the history of the American space program—ranking with the creation of NASA, the decision to go to the Moon, the post-Apollo planning process, and the space station decision. The story of this failed initiative is one shaped by key protagonists and critical battles. It is a tale of organizational, cultural, and personal confrontation. Organizational skirmishes involved the Space Council versus NASA, the White House versus congressional appropriators, and the Johnson Space Center versus the rest of the space agency—all seeking control of the national space policy process. Cultural struggles pitted the increasingly conservative engineering ethos of NASA against the “faster, better, cheaper” philosophy of a Space Council looking for innovative solutions to technical problems.

HOGAN, *supra* note 19, at 2. President Obama’s Constellation Program (which deferred the question of whether NASA should return to the Moon or go directly on to Mars by trying to build technologies that could do both *and* visit asteroids) suffered a similar failure when he canceled the program halfway through his first term. William Harwood, *Obama Ends Moon Program, Endorses Private Spaceflight*, CNET (Feb. 1, 2010), <https://www.cnet.com/science/obama-ends-moon-program-endorses-private-spaceflight/> (“The Obama administration concluded the Constellation program, which has cost taxpayers more than \$9 billion so far, ‘was over budget, behind schedule, and lacking in innovation due to a failure to invest in critical new technologies,’ according to a budget summary. ‘Using a broad range of criteria, an independent review panel determined that even if fully funded, NASA’s program to repeat many of the achievements of the Apollo era ... was the least attractive approach to space exploration as compared to potential alternatives.’”).

21 See Elizabeth Heywood, *NASA’s Greatest Failure: The Space Shuttle Program*, THE IRIS (June 18, 2021), [www.theirisnyc.com/post/nasa-s-greatest-failure-the-space-shuttle-program](http://www.theirisnyc.com/post/nasa-s-greatest-failure-the-space-shuttle-program); Roger Pielke Jr. & Radford Byerly, *Shuttle Programme Lifetime Cost*, 472 NATURE 38 (2011), <https://doi.org/10.1038/472038d> (estimating the total cost of the shuttle program, divided by number of missions equals \$1.5 billion per launch).

22 See, e.g., LORI GARVER, *ESCAPING GRAVITY: MY QUEST TO TRANSFORM NASA AND LAUNCH A NEW SPACE AGE* (2022).

23 For an excellent discussion of the history of ISAM, see DALE ARNEY ET AL., *IN-SPACE SERVICING, ASSEMBLY, AND MANUFACTURING (ISAM) STATE OF PLAY* (2022), [https://nexis.gsfc.nasa.gov/isam/docs/isam\\_state\\_of\\_play\\_final\\_2022\\_v2\\_S\\_2022\\_10\\_17.pdf](https://nexis.gsfc.nasa.gov/isam/docs/isam_state_of_play_final_2022_v2_S_2022_10_17.pdf).

24 The government, too, can have a substantial impact on technology development of space systems by how it interfaces with the commercial sector, and especially how it constructs its acquisition programs. The success of NASA’s commercial cargo and commercial crew programs is well documented. See, e.g., Air University, Maxwell AFB, *Fast Space: Leveraging Ultra Low-Cost Space Access for 21st Century Challengers* at 3 (2017) [hereinafter *Fast Space Study*], [https://www.airuniversity.af.edu/Portals/10/Research/Space-Horizons/documents/Fast%20Space\\_Public\\_2017.pdf](https://www.airuniversity.af.edu/Portals/10/Research/Space-Horizons/documents/Fast%20Space_Public_2017.pdf) (this author wrote the regulatory reform section on that document). About a decade ago, the agency estimated that its traditional cost-plus contracting regime would have cost taxpayers \$4 billion to acquire the Falcon 9 rocket. See NASA ASSOCIATE DEPUTY ADM’R FOR POL’Y, *FALCON 9 LAUNCH VEHICLE NAFCOM COST ESTIMATES* (Aug. 2011), [https://www.nasa.gov/pdf/586023main\\_8-3-11\\_NAFCOM.pdf](https://www.nasa.gov/pdf/586023main_8-3-11_NAFCOM.pdf). But it cost SpaceX \$443 million, a mere tenth of a comparable rocket. This is largely a product of the fixed-cost contract model. In total, the Commercial Crew program alone saved the agency between \$20 billion and \$30 billion. See Rebecca Harrington, *This Is the Biggest Misconception People Have about NASA Partnering with SpaceX*, INSIDER (Apr. 14, 2016), <https://www.businessinsider.com/nasa-has-always-contracted-companies-like-spacex-2016-4>.

even bordering cities can have radically different qualities of life based on how their respective governments operate.

The reason that Nogales, Arizona, is much richer than Nogales, Sonora, is simple; it is because of the very different institutions on the two sides of the border, which create very different incentives for the inhabitants of Nogales, Arizona, versus Nogales, Sonora. The United States is also far richer today than either Mexico or Peru because of the way its institutions, both economic and political, shape the incentives of businesses, individuals, and politicians. Each society functions with a set of economic and political rules created and enforced by the state and the citizens collectively. Economic institutions shape economic incentives: the incentives to become educated, to save and invest, to innovate and adopt new technologies, and so on. It is the political process that determines what economic institutions people live under, and it is the political institutions that determine how the process works.<sup>25</sup>

This analogy scales well in analyzing the outer space economy, given that all countries of the world border space (it is, after all, a mere 100 km or so above their heads), and the domestic regulatory policies of one country can have an outsized impact on the business activities of every other country seeking access to the space economy.

At the same time that we're seeing a rush to space by commercial companies in the United States under this patchwork of regulations, we're also seeing some of our adversaries, especially China, devote serious resources to staking a claim on being the dominant power in outer space.

China views space as critical to its future security and economic interests due to its vast strategic and economic potential. Moreover, Beijing has specific plans not merely to explore space, but to industrially dominate the space within the moon's orbit of Earth. China has invested significant resources in exploring the national security and economic value of this area, including its potential for space-based manufacturing, resource extraction, and power generation, although experts differ on the feasibility of some of these activities.<sup>26</sup>

With so much at stake economically and from a national security standpoint, if we as a country don't have a viable and inviting regulatory system, America will see companies flee "across the border" for jurisdictions that are more conducive to the commercial space sector.<sup>27</sup> Or worse, America might see a foreign power, one that does not share our ideals, emerge as the dominant

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25 DARON ACEMOGLU & JAMES A. ROBINSON, *WHY NATIONS FAIL: THE ORIGINS OF POWER, PROSPERITY, AND POVERTY* 42 (2012).

26 U.S.-CHINA ECON. & SEC. REV. COMM'N, ANN. REP. 16 (2019), <https://www.uscc.gov/sites/default/files/2019-11/2019%20Annual%20Report%20to%20Congress.pdf>.

27 See James E. Dunstan, *Who Wants to Step Up to A \$10 Billion Risk?*, SPACENEWS (June 25, 2021), <https://spacenews.com/op-ed-who-wants-to-step-up-to-a-10-billion-risk/>. See also Dunstan & Szoka 2017 Testimony, *supra* note 14, at 8 ("If a regulatory regime is adopted for mission authorizations that mirrors, or even remotely resembles, the ITAR regime, Congress will have failed to execute our Treaty obligations in a way that promotes the 'exploration and use' of space—the overarching goal of the Treaty (Article II)—and commercial entities will flee the United States to jurisdictions that treat their citizens in a fairer manner, just as satellite manufacturers fled the U.S."). See also TechFreedom Comments on Space Innovation & Facilitating Capability for In-Space Servicing, Assembly, and Manufacturing (Oct. 31, 2022), <https://techfreedom.org/wp-content/uploads/2022/10/TechFreedom-Comments-FCC-ISAM-NOI.pdf>; TechFreedom Comments on Expediting Initial Processing of Satellite and Earth Station Applications & Space Innovations (Mar. 3, 2023), <https://techfreedom.org/wp-content/uploads/2023/03/TechFreedom-Comments-Satellite-Streamlining-3-3-23.pdf>.

force in space—able to exercise substantial control over others wishing to explore and develop the cis-lunar region of space.

To be sure, a regulatory system conducive to private space commerce is only part of the recipe necessary for winning the next space race. The U.S. government will continue to be a major player in space, from NASA's role to explore space and develop technologies, and the Department of Defense's role in defending U.S. national security interests. How government agencies spend money is also critical. Generations of “cost-plus” contracting methods have resulted in huge cost overruns and program cancellations, hampering both NASA and DoD. Only recently, both NASA and DoD have taken advantage of their “other transaction authority” (OTA) to enter into contracts that both incentivize private businesses to invest their own funds and require the government to accept a heightened level of risk in exchange for less costly contracts. As discussed below, these contracting methods, coupled with using commercial off-the-shelf (COTS) systems, have revolutionized space government contracting. But even innovative contracting methods can't fully replace the free-market, where entrepreneurs risk everything to make their space dreams come true.

### III. The International Regulatory Framework

Although the bulk of this paper centers on U.S. regulatory policy, it is nonetheless important to understand key components of international space law. As mentioned above, the activities of humans in space are governed by four key international treaties:

- Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, (“Outer Space Treaty” or “OST”);<sup>28</sup>
- Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (“Rescue and Return Agreement”);<sup>29</sup>
- Convention on International Liability for Damage Caused by Space Objects (“Liability Convention”);<sup>30</sup>
- Convention on Registration of Objects Launched into Outer Space (“Registration Convention”).<sup>31</sup>

A fifth treaty, the Moon Treaty,<sup>32</sup> was adopted by the United Nations in 1979, but ratified by only a handful of nations, none of which had an independent space program with launch capabilities when the country ratified the treaty.<sup>33</sup> Whereas the first four treaties were largely aspirational in

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28 Outer Space Treaty, *supra* note 12.

29 Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968, 19 U.S.T. 7570, 672 U.N.T.S. 119.

30 Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, 961 U.N.T.S. 187 (“Liability Convention”).

31 Convention on Registration of Objects Launched into Outer Space, Jan. 14, 1975, 28 U.S.T. 695, T.I.A.S. 8480.

32 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 18, 1979, 1363 U.N.T.S. 21 [hereinafter the Moon Treaty].

33 Countries ratifying the Moon Treaty are: Armenia, Australia, Austria, Belgium, Chile, Kazakhstan, Kuwait, Lebanon, Mexico, Morocco, Netherlands, Pakistan, Peru, Philippines, Saudi Arabia, Turkey, Uruguay, and Venezuela. *Id.* Saudi Arabia withdrew from the Moon Treaty on January 5, 2023. Depository Notification, *Saudi Arabia: Withdrawal* (Jan. 5, 2023), <https://treaties.un.org/doc/Publication/CN/2023/CN.4.2023-Eng.pdf>.

nature,<sup>34</sup> the Moon Treaty specifically called for the creation of an “international regime” for the “orderly and safe development of the natural resources of the moon,” and “an equitable sharing by all States Parties in the benefits derived from those resources.”<sup>35</sup>

The Moon Treaty also departed from the concepts of the first four treaties that “[t]he exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.”<sup>36</sup> Instead, the Moon Treaty declared that “[t]he moon and its natural resources are the common heritage of mankind.”<sup>37</sup> The switch from “province of all mankind”<sup>38</sup> to “common heritage of mankind,” was more than a change of language. It signified a significant change in perspective, and one which ultimately kept all the major spacefaring nations from ratifying the Moon Treaty.<sup>39</sup>

While most would argue that the Moon Treaty and its “international regime” is a dead letter,<sup>40</sup> there are some that still cling to its concepts and argue that it is still good international law.<sup>41</sup> This

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34 See, e.g., Sophie Goguichvili et al., *The Global Legal Landscape of Space: Who Writes the Rules on the Final Frontier?*, WILSON CENTER (Oct. 1, 2021), <https://www.wilsoncenter.org/article/global-legal-landscape-space-who-writes-rules-final-frontier> (“Generally, international space law falls into two categories: 1) binding or normative instruments such as treaties, standards, and national regulations, and 2) non-binding agreements which are used to convey voluntary, non-normative and/or aspirational ideals that may be too difficult to achieve international consensus on. These two types of agreements largely work in tandem to make up the global space governance framework that exists today.”); see also CENTER FOR ETHICS AND THE RULE OF LAW, SUMMARY OF DISCUSSIONS OF THE EXPERT ROUNDTABLE ON THE WEAPONIZATION OF OUTER SPACE: ETHICAL AND LEGAL BOUNDARIES 5 (2018), <https://www.law.upenn.edu/live/files/10006-cerl-conference-summary-report-weaponization> (“A debate arose as to whether the Outer Space Treaty is a treaty of principles, setting only aspirational goals, or whether it is a law-making treaty. There was a majority agreement that the treaty is more than merely aspirational but that there are some obligations that are weaker than others in their formulation.”).

35 1979 Moon Agreement, *supra* note 32, Art. 11 (7).

36 Outer Space Treaty, *supra* note 12, Art. I.

37 1979 Moon Agreement, *supra* note 32, Art. 1.

38 For example, in ratifying the Outer Space Treaty, the United States Senate hotly debated the terms “for the benefit and in the interests of all countries” and “province of all mankind.” See *Hearings Before the S. Comm. on Foreign Rel.*, 90th Cong. 7 (Mar. 7, 13, and Apr. 12, 1967). Ultimately, Senators concluded that those terms, in practice, meant that the United States had an obligation to share with other countries such things as satellite weather data, and scientific knowledge gained in spaceflight, but that other countries were not entitled to ownership of U.S.-based satellite systems.

39 See L5 News, *UN Moon Treaty Falling to U.S. Opposition Groups*, NAT’L SPACE SOC’Y (Mar. 1982), <https://space.nss.org/15-news-un-moon-treaty-falling-to-us-opposition-groups> (“This controversial ‘Moon Treaty’ elicited heavy opposition from U.S. business and scientific communities because, critics charged, it would have prohibited commercial development in outer space and would have ‘socialized’ future lunar and planetary bases and space stations.”).

40 It is the official position of the United States that the 1979 Moon Agreement does not reflect international law. Exec. Order No. 13,914, 85 Fed. Reg. 20,381 (Apr. 6, 2020), <https://www.federalregister.gov/documents/2020/04/10/2020-07800/encouraging-international-support-for-the-recovery-and-use-of-space-resources> (“The United States is not a party to the Moon Agreement. Further, the United States does not consider the Moon Agreement to be an effective or necessary instrument to guide nation states regarding the promotion of commercial participation in the long-term exploration, scientific discovery, and use of the Moon, Mars, or other celestial bodies. Accordingly, the Secretary of State shall object to any attempt by any other state or international organization to treat the Moon Agreement as reflecting or otherwise expressing customary international law.”). See also Sujata Porwal, *Moon Agreement, 1979*, LEGALDESIRE.COM (June 13, 2020), <https://legaldesire.com/moon-agreement-1979/> (“The question however, is whether this Agreement successfully justifies its ratification as a new space law, considering that it has not been ratified or signed by any of the ‘Big Three Nations’ (USA, Russia and China). The Moon Agreement is one of the least supported treaty/agreements relating to the outer space law. India is the only country with independent spaceflight capabilities that has signed (but not ratified) this Agreement.”).

41 See, e.g., Stefan-Michael Wedenig & Jack Wright Nelson, *The Moon Agreement: Hanging by a Thread*, MCGILL INST. OF AIR & SPACE L. (Jan. 26, 2023), <https://www.mcgill.ca/iasl/article/moon-agreement-hanging-thread> (“[A] treaty with just 18 parties cannot afford to lose one. Nor can it afford to lose a party with an ambitious space program such as Saudi Arabia. What does this all mean for the future of the Moon Agreement?”). See also Michael Listner, *The Moon Treaty: Failed International Law or Waiting in the Shadows?*, SPACE REV. (Oct. 24, 2011), <https://thespacereview.com/article/1954/1> (“However, even though the Moon Treaty is technically not binding on the Big Three, it is technically valid international law. Even with only six nations ratifying the Moon Treaty, the fact that eleven other nations, including Australia, France, and India, have acceded to or become signatories to the Moon Treaty creates a shadow of customary law that could grow such that non-parties could find themselves overshadowed by the penumbra of the Moon Treaty, especially if those non-parties take no action to refute its legitimacy.”).

is critical, as many of the calls for regulating outer space, especially from those outside the United States, call for such regulations to emulate the concepts put forward in the Moon Treaty, whereby a single international organization would approve, govern, and extract monetary concessions from those making a profit from outer space activities. This also means that calls for new international space treaties will most likely fail to produce sufficient consensus to reach adoption, as so many non-spacefaring countries still desire such a restrictive regulatory regime.<sup>42</sup>

## IV. Calls for Regulation

With the increase in space activity has come an increased cadence of calls for more regulation from academics, scientists, and bureaucrats. Some propose reasonable approaches to regulation, some advocate for proscriptive rules (perhaps even a precautionary principle approach to outer space regulation),<sup>43</sup> while others call for an outright ban on market-driven commercial activity in space. These calls can be grouped into two major areas of alleged concerns: 1) The need to protect space from the evils of capitalism; 2) The need to fill vacuums in the regulatory system.

### A. Calls to Protect Space from the Evils of Capitalism

These calls strive to stop commercial space development in its tracks. Some of these calls source from people and groups that one might expect, such as foreign governments who do not share a belief in (or are jealous of) individual freedoms and our free market system, or otherwise want to slow down everyone else while their domestic aerospace industry catches up.<sup>44</sup> For example, the Egyptian delegation to the United Nations presented a proposal, on June 2, 2021, to the UN's Committee on the Peaceful Uses of Outer Space (COPUOS) calling for “a new era for human civilization.”<sup>45</sup> The document argues that the entire underpinning of what most would call Western democracy (and the “pursuit of happiness”) cannot be allowed to migrate to outer space.

The result of [the development of civilization on Earth] has shaped our collective governing culture to become a culture of conflict, resulting in many wars, struggles, and catastrophes that have plagued humanity. It becomes evident [] that our current human civilization with all its negative attributes cannot be the basis for

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42 It is indeed noteworthy that at the same time many countries call for Moon Treaty-type regulation of space activities, they themselves engage in space activities in the form of operating satellites. See James Dunstan, “Space Trash”: *Lessons Learned (and Ignored) from Space Law and Government*, 39 J. OF SPACE L. 23, 27 (2013) (as of 2013, 47 countries have registered satellites, or roughly 25 percent of all nations on Earth).

43 The “precautionary principle” has its root in German environmental law of the 1970s. It is best articulated as: “Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.” Rio Declaration on Environment and Development, Principle 15, June 13, 1992, 31 I.L.M. 874, 879. For further discussion of the precautionary principle, see Sonia Boutillon, *The Precautionary Principle: Development of an International Standard*, 23 MICH. J. INT’L L. 429 (2002), <https://repository.law.umich.edu/mjil/vol23/iss2/7>.

44 Some of these arguments are also rooted in the shift from the concept that space is “province of mankind” to the “common heritage of mankind.” In the former approach, those seeking to venture first into space were required to make sure that their activities did not preclude the ability of lesser developed nations to both reap the benefits of outer space development, as well as not foreclose such countries from eventually developing their own space programs. See *supra* note 38. The latter concept of “common heritage of mankind” comes with it the notion that any development of space should come only after being authorized by a centralized government approval, such as is seen in the Moon Treaty.

45 Egyptian Delegation, *The proposal of the Egyptian delegation for Space culture, a new era for human civilization: Before the Comm. on the Peaceful Uses of Outer Space of the UN Office for Outer Space Affairs*, LSC 60th Sess. (June 2, 2021), [https://www.unoosa.org/oosa/oosadoc/data/documents/2021/aac.105c.22021crp/aac.105c.22021crp.20\\_0.html](https://www.unoosa.org/oosa/oosadoc/data/documents/2021/aac.105c.22021crp/aac.105c.22021crp.20_0.html). Freedom House rated Egypt as “not free” and gave Egypt a “Political Rights” score of 6 out of 40 and a “Civil Liberties” score of 12 out of 60, with a total score of 18 out of 100. *Egypt*, FREEDOM HOUSE, <https://freedomhouse.org/country/egypt> (last visited May 15, 2023).

a new human civilization in outer space. Therefore, we as humans are required to lay down the building blocks of a new human civilization in outer space, that takes in consideration all the above-mentioned resources and potentials, as well as the possible dangers and threats. We will call this the second human civilization or the human space civilization. Having also witnessed all the negative and destructive attributes of our current human civilization, it becomes our duty to not transfer these negative attributes to any new human civilization in space.<sup>46</sup>

Similarly, others have called for either an outright ban on future commercial uses of outer space, or that such activity should be allowed only under a heavy regulatory environment that considers the needs of all nations and even the views of “indigenous peoples,”<sup>47</sup> as if exploring and exploiting the resources of outer space will somehow displace the rights of others.<sup>48</sup> This includes a claim that light pollution from satellites somehow infringes on some ancestral (or, apparently, God-given) rights that international law should recognize.<sup>49</sup> Invoking religion as the basis for slowing or stopping space development is remarkable, in that at least one author claims that the evils of outer space colonization itself are rooted in religion, and therefore must be abandoned.

[T]he ideology of space colonization and exploitation is largely Western, and Christian, as noted above. It appears to be some interpretation of Christian dominion, or dominionist, theology that drives colonization advocates to declare that humans are destined to fill the universe, that humans “must” colonize Mars, that outer space resources are there for the taking. The ideology of space exploration is in need of rejuvenation. The author advocates a vision of a human future in space in which humanity finds its way to a collective peaceful existence on Spaceship Earth, a way to work together to preserve life here and to look for life out there. Perhaps at some point in the distant future, humans might be ready—technologically and socially—to live together peacefully on other planets. But we are not there yet.<sup>50</sup>

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46 Egyptian Delegation, *supra* note 45, at 2.

47 See Nicola Davis, *End “Colonial” Approach to Space Exploration, Scientists Urge*, GUARDIAN (Mar. 4, 2023), <https://www.theguardian.com/science/2023/mar/04/end-colonial-approach-to-space-exploration-scientists-urge> (“[I]n Canada Indigenous peoples had rights and responsibilities to unceded and treaty land, with the absence of a height limit, meaning those concerns extend to the skies above.” “Right now when we look at the moon in terms of the space missions and colonisation it is very much as a dead object to be conquered. And that’s not how many Indigenous peoples see it.”). No mention is made in this article to the fact that Canada is a signatory to the Outer Space Treaty, that declares quite clearly, that “Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.” Outer Space Treaty, *supra* note 12, Art. II. This means that whatever cultural claims Canada’s Indigenous peoples may have had over outer space, those rights were ceded by Canada in becoming a signatory to the OST.

48 See Duane W. Hamacher et al., *Whitening the Sky: Light Pollution as a Form of Cultural Genocide*, 1 J. DARK SKY STUD. (2020), <https://arxiv.org/ftp/arxiv/papers/2001/2001.11527.pdf> (“Many Indigenous traditions and knowledge systems around the world are based on the stars, and the peoples’ ability to observe and interpret stellar positions and properties is of critical importance for daily life and cultural continuity. The erasure of the night sky acts to erase Indigenous connection to the stars, acting as a form of ongoing cultural and ecological genocide.”). This particular article is focused on terrestrial light pollution, but the same arguments are made repeatedly by those who wish to curtail or heavily regulate satellites, which may interfere with Earth-based astronomy. See, e.g., Davide Castelvocchi, *Are Telescopes on the Moon Doomed Before They’ve Even Been Built?: Booming Exploration and Commercial Activity Could Ruin the Quiet Environment of the Lunar Far Side*, NATURE (Mar. 3, 2023), <https://www.nature.com/articles/d41586-023-00635-8> (paywall).

49 See Brittney Manning, *Blinded by the Light: How Skyglow Pollution Is Separating Us from the Stars*, GUARDIAN (Dec. 10, 2022), <https://www.theguardian.com/australia-news/2022/dec/11/blinded-by-the-light-how-skyglow-pollution-is-separating-us-from-the-stars> (“Light pollution is taking away one’s God-given right to see a dark, starry sky.”).

50 Linda Billings, *Colonizing Other Planets Is a Bad Idea*, 110 FUTURES 44, 44–46 (2019), <https://doi.org/10.1016/j.futures.2019.02.020>.



Others echo this belief, which itself was brandished as a protest to the Apollo program,<sup>51</sup> that humans should not move out into the cosmos until we've somehow proven ourselves worthy by meeting the authors' demands that we first clean up Earth.

On one side of the continuum, some people argue that humans have no business in space until and unless they prove they can manage the Earth responsibly. They believe that public opinion concerning colonies is driven by a largely uncritical acceptance of ideologies of conquest and domination, which should have no place in the debate. They also point to humanity's abysmal environmental record on Earth and ask if we have the right to subject another world to our destructive presence.<sup>52</sup>

To be clear, these calls for stopping "colonialism" in outer space are not really a call to protect indigenous peoples or their environments,<sup>53</sup> but rather an indictment of capitalism and Western civilization in general.<sup>54</sup> Some have gone so far as to argue that the colonization of outer space literally "means the destruction of Earth,"<sup>55</sup> while others have even argued that outer space, or at least the private exploration of space, is somehow racist.<sup>56</sup> That is not to say that there hasn't been pushback on these arguments.<sup>57</sup> However, the danger of buying into the notion that colonizing space is the same as colonizing Earth (with its concomitant deprivation of indigenous peoples'

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51 See Meghan Bartels, *Hundreds Demonstrated Against Poverty at Apollo 11 Moon Launch*, SPACE.COM (July 16, 2019), <https://www.space.com/apollo-11-launch-protest-poverty.html>; Eric Niiler, *Why Civil Rights Activists Protested the Moon Landing*, HISTORY (July 11, 2019), <https://www.history.com/news/apollo-11-moon-landing-launch-protests>.

52 *Should Earthlings Colonize the Final Frontier? Ethicists Weigh In*, CLEMSON NEWS (May 28, 2019), <https://news.clemson.edu/should-earthlings-colonize-the-final-frontier-ethicists-weigh-in/>. The source above cites the June 2019 issue of *Futures* magazine that contains articles on both sides of the ethical debate as to whether humans should venture forth from Earth to settle in space. *Human Colonization of Other Worlds*, 110 *FUTURES* 1, 1–66 (2019), <https://www.sciencedirect.com/journal/futures/vol/110/suppl/C>. Authors arguing against human expansion include Kelly Smith ("Human Colonization: A World Too Far"), Lori Marino ("Humanity Is Not Prepared to Colonize Mars"), and Linda Billings ("Colonizing Other Planets Is a Bad Idea"), and those arguing in favor of expanding permanent human presence beyond the surface of the Earth include Brian Patrick Green ("Self-Preservation Should Be Humankind's First Ethical Priority and Therefore Rapid Space Settlement is Necessary") and Gonzalo Munevar ("An Obligation to Colonize Outer Space").

53 Planetary protection and the need to protect other planets from Earth contamination are significant issues, to which NASA has paid significant attention. See, e.g., NASA, *In-situ Exploration and Sample Return: Planetary Protection Technologies*, <https://mars.nasa.gov/mer/mission/technology/planetary-protection/> (last visited May 15, 2023). That being said, advocates like John S. Lewis, University of Arizona professor and author of *Mining the Sky*, often refer to the Moon as the solar system's slag heap, meaning that it lacks any signs of life, and so humans need not be worried about forward contamination, at least of that body in the solar system. See Dennis Wingo, *Economic Development of the Solar System: The Heart of a 21st-century Spacepower Theory*, in *TOWARD A THEORY OF SPACEPOWER* 1, 162 (Charles D. Lutes et al. eds., 2011), <https://apps.dtic.mil/sti/pdfs/ADA546585.pdf>.

54 See, e.g., Jack David Eller, *Space Colonization and Exonationalism: On the Future of Humanity and Anthropology*, 2 *HUMANS* 148, 153 (2022), <https://doi.org/10.3390/humans2030010> ("Again, while classic settler colonialism in space is (presumably) far off at best, there are other lessons that historical and anthropological experience of colonialism can teach us today. Most immediately, the privatization of space exploration and the capitalist inclinations of NewSpace should come as no surprise since both were entirely heralded by Western colonialism. States were often not the first or main colonial actors; rather, private enterprises, often in the form of chartered companies, took the lead in founding and managing colonies, for the glory of the homeland, no doubt, but also for the pecuniary benefit of company officers and shareholders.").

55 Srećko Horvat, *Under Capitalism, the Colonization of Space Means the Destruction of Earth*, JACOBIN (July 28, 2022), <https://jacobin.com/2022/07/colonization-space-exploration-moon-gunther-anders-privatization-earth-destruction/> ("For figures like Musk and Bezos—the new occupiers of space—it is precisely this notion of the Earth's obsolescence that has become the *criterium existendi*. In need of new resources for extraction, accumulation, and profit, they seek to colonize space, even if the price is the destruction of Earth.").

56 Kimberley D. McKinson, *Do Black Lives Matter in Outer Space?*, SAPIENS (Sept. 30, 2020), <https://www.sapiens.org/culture/space-colonization-racism/> ("At Cape Canaveral, Americans were being ushered to look to the stars to imagine the utopic future of humankind in space, while in the streets, they were confronting the country's dystopic underbelly of anti-Black racism.").

57 See, e.g., Mark R. Whittington, *In Defense of Space Colonies and Mining the High Frontier*, THE HILL (Mar. 12, 2023), <https://thehill.com/opinion/technology/3895855-in-defense-of-space-colonies-and-mining-the-high-frontier/>.

rights) is that it also implicitly argues Western civilization as a whole is somehow to blame for all the ills of human society, and its belief systems should not be allowed to migrate into space.<sup>58</sup>

One would think that these anti-capitalist feelings would be limited to foreign governments or a certain segment of academics. Unfortunately, some of this thinking has filtered into our domestic agencies as well. NASA's Planetary Science and Astrobiology Decadal Survey committee received what can only be called a manifesto from its Equity, Diversity and Inclusion Working Group (EDIWG) entitled "Ethical Exploration and the Role of Planetary Protection in Disrupting Colonial Practices."<sup>59</sup> Its core thesis is that the exploration of the new world, the development of western civilization, and the establishment of democratic norms, is evil.

Violent colonial practices and structures—genocide, land appropriation, resource extraction, environmental devastation, and more—have governed exploration of Earth, and if not actively dismantled, will define the methodologies and mindset we carry forward into space exploration. It is critical that ethics and anticolonial practices are a central consideration of planetary protection. We must actively work to prevent capitalist extraction on other worlds, respect and preserve their environmental systems, and acknowledge the sovereignty and interconnectivity of all life.<sup>60</sup>

Thus, the inherent danger in calls for more regulation of outer space activities is that those making the rules may come to the table with a clear mindset that space is no place for the entrepreneur, no place for those seeking to leverage their skills into profits, no place for the expansion of capitalism. Even facially reasonable efforts to regulate, therefore, must be viewed through a skeptical lens that there lurks an anti-capitalist movement that uses a heavy regulatory blanket to snuff out the future space economy.

Capitalism certainly has its problems, and we can debate the extent to which we should regulate various aspects of our economy, but the proof of the benefits of a free market approach to outer space are evident all around us. Confined to governmental programs and traditional government procurement models, space development stagnated for 50 years. As recently as just a decade ago, many aerospace engineers claimed that landing a first stage rocket back at its launch site was either impossible or impractical, yet SpaceX has demonstrated that its Falcon 9 first stages can be reused over a dozen times. It has only been in the past decade, in which American entrepreneurship has been allowed to flourish, that launch costs have come down, launch rates have gone up, and we're now seeing the beginnings of this new space race.<sup>61</sup>

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58 For example, Bill Nye, the former TV "Science Guy," and now head of the Planetary Society, argues that we should describe our future in outer space as a move to "settle," not "colonize" space. See Mike Wall, *Bill Nye: It's Space Settlement, Not Colonization*, SPACE.COM (Oct. 25, 2019), <https://www.space.com/bill-nye-space-settlement-not-colonization.html>. Others have embraced the reframing of terms, such as the Beyond Earth Institute. See THE BEYOND EARTH INST., EMERGING SPACE INDUSTRIAL ECOSYSTEM LEADING TO EVENTUAL BEYOND EARTH MIGRATION 10 (2022), [https://beyondearth.org/wp-content/uploads/2022/10/Ecosystem-Doc\\_colorFinal.pdf](https://beyondearth.org/wp-content/uploads/2022/10/Ecosystem-Doc_colorFinal.pdf) ("Without these norms in place, off-planet business expansion, encouraged by individual national interests on the Earth, will be doomed to repeat our planet's history of colonialism, exploitation, environmental damage, human suffering, and armed conflict."). The danger of jettisoning the "baggage" of the term "colonize" is that others will interpret this reframing as also acknowledging some inherent evil in capitalism without articulating what is actually wrong with capitalism.

59 Frank Tavares et al., *Ethical Exploration and the Role of Planetary Protection in Disrupting Colonial Practices* (Planetary Sci. and Astrobiology Decadal Survey White Paper 461, Mar. 18, 2021), <https://baas.aas.org/pub/2021n4i461/release/1>.

60 *Id.* at 1.

61 For an excellent discussion of these changes and how private enterprise has fueled this next phase of space development, see generally Fast Space Study, *supra* note 24.

## B. Calls to Fill the Perceived Gaps in U.S. Regulations

Calls for more regulation of space activities are not limited to those who seek to slow down or stop the economic development of outer space (at least by commercial entities). Nor does it source just from abroad. There are strong calls from within the U.S. government for increased regulation of space activities, especially those of the private sector. In many cases, there is a clear acknowledgment that the U.S. space regulatory system is broken, or at least so outdated that it can't keep up with the pace of space progress. These calls come from the highest level of government, from Vice President Kamala Harris who is also chair of the National Space Council. She has called for an all-of-government assessment of the current outdated regulatory regime.<sup>62</sup>

These sentiments have been echoed by the chair of the Federal Communications Commission (FCC), responsible for space spectrum allocation and licensing.<sup>63</sup> The FCC has opened a number of new proceedings to deal with the new space race, including a Notice of Inquiry on ISAM.<sup>64</sup> The Department of Commerce, which has been tasked by the White House to spearhead the future of space traffic management (STM),<sup>65</sup> although late to the game, is finally beginning to find a voice in the space regulatory debate.<sup>66</sup> Longtime Florida senator, Bill Nelson, now NASA Administrator, has even chimed in on the issue of regulating outer space, although Congress most likely has given NASA no regulatory authority beyond setting rules for NASA-owned systems and internal operations. When asked about whether space tourism should be regulated, Nelson had this exchange:

Q: But just to finish with this question of space tourism, what rules should there be? Is this a scenario that NASA should try to have some regulation? Is there a way that this can be made more accessible so that more people can experience this extraordinary adventure? How are you thinking about space tourism going forward?

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62 See, e.g., Vice President Kamala Harris, Remarks at Chabot Space and Science Center: Supporting the Commercial Space Sector (Aug. 12, 2022), <https://www.whitehouse.gov/briefing-room/speeches-remarks/2022/08/12/remarks-by-vice-president-harris-on-supporting-the-commercial-space-sector/> (“[W]e understand that we have got to update the rules, because they’re just simply outdated. They were written for a space industry of the last century. And when I was going through here just today, speaking with some of our innovators and looking at where the technology has grown in just the last decade, we know that we really are quite behind in terms of maximizing our collective understanding about how we will engage on the technology of today and what we can quickly and easily predict will be the technology over the next decades. . . . So I am proud today to announce that our partnership with regulatory agencies will engage the private sector as we develop a new rules framework. And we will discuss this work and much more at our next meeting, at the next convening of the National Space Council. That meeting will take place on September 9th, and I look forward to seeing many of you there.”).

63 Chairwoman Jessica Rosenworcel, Remarks at the Satellite Industry Association’s 24th Annual Leadership Dinner (Mar. 13, 2023), <https://www.fcc.gov/document/chairwoman-rosenworcel-satellite-industry-association-dinner> (“Beyond just reorganizing the agency for this new world, we have made real policy changes as part of our Space Innovation Agenda. We have kicked off efforts to streamline our rules to expedite the processing of new satellite and earth station applications and to promote new spectrum sharing opportunities.”).

64 See FCC Docket No. 22-272, Facilitating Capability for In-Space Servicing, Assembly, and Manufacturing, Notice of Inquiry, FCC 22-66 (Aug. 8, 2022), <https://www.fcc.gov/document/fcc-opens-proceeding-servicing-assembly-manufacturing-space-0>.

65 Presidential Memorandum on National Space Traffic Management Policy, Space Policy Directive-3 (June 18, 2018), <https://trumpwhitehouse.archives.gov/presidential-actions/space-policy-directive-3-national-space-traffic-management-policy/>.

66 See Marcia Smith, *NOAA’s Office of Space Commerce Gets New Director, Elevated Position*, SPACEPOLICYONLINE.COM (Apr. 27, 2022), <https://spacepolicyonline.com/news/noaas-office-of-space-commerce-gets-new-director-elevated-position/> (Commerce Secretary Gina Raimondo, in defending DoC’s RY2023 budget request, and naming Richard DalBello as Director of NOAA’s Office of Space Commerce (a position that had sat unfilled for over 15 months), said, “I think that at long last we are now organizing and prioritizing space commerce and putting leadership in that we need and I’m very much asking Congress for support on the funding that the President requests.”).

MR. NELSON: All of the above. If the so-called space tourists are going to the International Space Station, then what I am insisting on, that they go through all the training, the medical exams, the psychological/psychiatric exams that any one of our astronauts would do because they are going to a space station with astronauts and cosmonauts that is doing genuine productive work in research. And I don't want somebody getting up there and going crazy. So NASA is all over this and will require that. If they're going on a venture on their own, then that's a different matter.<sup>67</sup>

NASA is also moving forward with gaining additional signatories on the Artemis Accords, a set of principles for the next generation of space exploration and development.<sup>68</sup> As of this writing, 26 nations have signed onto these principles.<sup>69</sup> I have previously criticized NASA for taking on the role of international regulation negotiator,<sup>70</sup> given that NASA has no current external regulatory role. Fortunately, the U.S. State Department, which oversees international negotiations of regulation, is stepping in to provide the necessary structure for the Artemis Accords.<sup>71</sup>

Other agencies with some jurisdiction over space activities have been relatively silent on the new push toward regulating innovative space activities. Transportation Secretary Pete Buttigieg has had little to say about outer space, notwithstanding the fact that all launch and reentry licenses for commercial vehicles are issued from the Federal Aviation Administration's Office of Commercial Space Transportation (AST). Since his appointment, Buttigieg has said virtually nothing about the role of the FAA in outer space regulation,<sup>72</sup> and the FAA remains without a Senate-confirmed administrator.<sup>73</sup>

Capitol Hill has also shown a renewed interest in outer space, especially with the new Republican leadership in the House of Representatives, beginning in January 2023. Within a few weeks of taking power, the House held two oversight hearings: one on the threat of China to our technology

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67 Interview by David Ignatius with Bill Nelson, *Transcript: The Path Forward: New Frontiers in Space with NASA Administrator Bill Nelson*, WASH. POST (July 22, 2021), <https://www.washingtonpost.com/washington-post-live/2021/07/22/transcript-path-forward-new-frontiers-space-with-nasa-administrator-bill-nelson/>.

68 NASA, THE ARTEMIS ACCORDS: PRINCIPLES FOR COOPERATION IN THE CIVIL EXPLORATION AND USE OF THE MOON, MARS, COMETS, AND ASTEROIDS FOR PEACEFUL PURPOSES (OCT. 2020), <https://www.nasa.gov/specials/artemis-accords/img/Artemis-Accords-signed-13Oct2020.pdf>.

69 See Robert Lea, *What are the Artemis Accords?*, SPACE.COM (Jan. 22, 2023), <https://www.space.com/artemis-accords-explained>. See also *Artemis Accords*, U.S. DEPARTMENT OF STATE, <https://www.state.gov/artemis-accords/> (last visited June 29, 2023).

70 See Press Release, TechFreedom, Artemis Accords: One Small Step for NASA, Not So Giant a Leap for Space Law (May 15, 2020), <https://techfreedom.org/artemis-accords-one-small-step-for-nasa-not-so-giant-a-leap-for-space-law/> ("Our international partners will want a neutral mechanism for resolving disputes—and our rivals will demand it, or simply ignore a multilateral approach to space governance. American companies will need that, too, to govern their interactions with NASA and with each other. *NASA was never designed to be a regulatory agency, and shouldn't be.*" (Emphasis in original)).

71 See Media Note, U.S. Dep't of State, First Meeting of Artemis Accords Signatories (Sept. 19, 2022), <https://www.state.gov/first-meeting-of-artemis-accords-signatories/> ("Together, we are working to increase the predictability, transparency, safety, and sustainability of human space exploration, and to ensure space exploration is carried out for the benefit of all countries and of all humankind.").

72 Secretary Buttigieg's outer space activities appear limited to naming new members to the Commercial Space Transportation Advisory Committee (COMSTAC) in October 2022. Press Release, Fed. Aviation Admin., U.S. DOT Names New Members to the Commercial Space Transportation Advisory Committee (Oct. 21, 2022), <https://www.faa.gov/newsroom/us-dot-names-new-members-commercial-space-transportation-advisory-committee>.

73 Polly Trottenberg was named acting FAA Administrator in June 2023. Her predecessor was never confirmed by the Senate. FAA KEY OFFICIALS, POLLY TROTTENBERG, [https://www.faa.gov/about/key\\_officials/trottenberg](https://www.faa.gov/about/key_officials/trottenberg) (last visited July 3, 2023).

base,<sup>74</sup> and another about the satellite industry and regulation by the FCC.<sup>75</sup> Both the Energy and Commerce Committee (with jurisdiction over the FCC), and the Science, Space, and Technology Committee (with more general jurisdiction over space),<sup>76</sup> are showing an interest in conducting far more oversight hearings related to outer space than did their predecessors in the 117th Congress (which actually never held an oversight hearing for the FCC, for instance). Both committees also are working on significant legislation relating to outer space regulation.<sup>77</sup> Whether any of these bills will survive in a divided Congress is in doubt, even though space has traditionally not been a particularly partisan issue.<sup>78</sup>

With that background, the remainder of this article will discuss the overall U.S. regulatory system, the gaps and overlaps, and where we might see improvements to the U.S. regulatory system that don't increase the regulatory overburden on commercial enterprises. While commercial operators cite the regulatory process as one of the key factors in closing their business plans,<sup>79</sup> they are also gravely concerned with the time it takes U.S. regulatory agencies to issue the requisite licenses for their activities and the overall cost of regulatory compliance.<sup>80</sup>

## V. The U.S. Regulatory Environment and Limits to Agency Rulemaking Authority

As noted above, there is no single U.S. Space Act—no comprehensive congressional mandate for how to regulate space activities. Instead, commercial space enterprises are faced with a gauntlet of agency rules with which they must comply. This perceived vacuum of regulatory turf has prompted a number of agencies to promulgate rules for space activities that may or may not be legal. Before we turn to each agency's regulatory approach to space, we must first be cognizant of recent Supreme Court precedent that makes clear that executive branch agencies may not regulate in areas

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74 *The United States, China, and the Fight for Global Leadership: Building a U.S. National Science and Technology Strategy: Hearing Before the H. Comm. on Sci., Space, and Tech.*, 118th Cong. (2023), <https://science.house.gov/hearings?ID=37EDAA28-C2E9-4962-A5E7-533B126772E9>.

75 See *Launching Into the State of the Satellite Marketplace: Hearing Before the Subcomm. on Comm'n and Tech. of the H. Comm. on Energy & Com.*, 118th Cong. (2023), <https://energycommerce.house.gov/events/subcommittee-on-communications-and-technology-hearing-launching-into-the-state-of-the-satellite-marketplace>.

76 One of the themes running through this paper is the problem of “stovepipes,” vertical silos of agency authority or jurisdiction that exist independent of, and sometimes totally at odds with, similar “stovepipes” in other agencies. See, e.g., Bob Greeves, *Death to Stovepipes and Silos*, FCW (Nov. 18, 1996), <https://fcw.com/1996/11/death-to-stovepipes-and-silos/248018/>. The fact that multiple Congressional committees, for example, have jurisdiction over differing aspects of outer space itself is a cause for concern that a true “all of government” approach to outer space regulation may not be possible.

77 E.g., DOE and NASA Interagency Research Coordination Act, H.R. 2988, 118th Cong. (2023); Commercial Remote Sensing Amendment Act, H.R. 290, 118th Cong. (2023); Satellite and Telecommunications Streamlining Act, H.R. 1338, 118th Cong. (2023); Secure Space Act, H.R. 675, 118th Cong. (2023); see also *Full Committee Markup of 19 Bills: Hearing Before the H. Comm. on Energy & Com.*, 118th Cong. (2023), <https://energycommerce.house.gov/events/full-committee-markup-of-19-bills-1>.

78 See, e.g., Mary Lynne Dittmar, *Space Exploration Is a Bipartisan Imperative that Benefits All*, THE HILL (Nov. 1, 2020), <https://thehill.com/opinion/energy-environment/523795-space-exploration-is-a-bipartisan-imperative-that-benefits-all/>; Jeff Foust, *Can Space Bridge a Widening Partisan Divide?*, SPACE REV. (Jan. 4, 2021), <https://www.thespacereview.com/article/4100/1>.

79 See, e.g., Alyssa Goessler, *The Private Sector's Assessment of U.S. Space Policy and Law*, CSIS AEROSPACE SECURITY PROJECT (July 25, 2022), <https://aerospace.csis.org/the-private-sectors-assessment-of-u-s-space-policy-and-law/> (“[A]n overarching theme is the struggle to align a legacy regulatory system with an increasingly diverse space environment. Emerging space activities frequently lack a clear regulatory home, and U.S. national security goals sometimes conflict with U.S. commercial goals in space. Many company representatives commented that current regulatory mechanisms were designed for the space environment of the past, and they identify several areas for improvement.”).

80 See Jeff Foust, *Seeking Regulatory Certainty for New Space Applications*, SPACE REV. (Dec. 4, 2017), <https://www.thespacereview.com/article/3385/1>.

where Congress has not provided them explicit authority. In short, the days of an agency finding regulatory authority hidden in “mouseholes” are over.<sup>81</sup> A short diversion into somewhat obscure concepts of administrative law is therefore warranted prior to addressing the specific regulatory authority of various agencies.

## A. The Impact of *West Virginia v. EPA*—Modest Words Alone Do Not Create Regulatory Authority

Now, more than ever, courts are looking to find actual statutory authority for an agency’s action (especially rules adopted), when such actions are challenged. The Supreme Court made clear in *West Virginia v. EPA* that agencies are no longer free to find a vague provision in their governing statute and use it as a launching pad to regulate.<sup>82</sup> After discussing previous decisions in which the Supreme Court had limited agency actions, Chief Justice Roberts continued:

All of these regulatory assertions had a colorable textual basis. And yet, in each case, given the various circumstances, “common sense as to the manner in which Congress [would have been] likely to delegate” such power to the agency at issue made it very unlikely that Congress had actually done so. Extraordinary grants of regulatory authority are rarely accomplished through “modest words,” “vague terms,” or “subtle device[s].” Nor does Congress typically use oblique or elliptical language to empower an agency to make a “radical or fundamental change” to a statutory scheme. Agencies have only those powers given to them by Congress, and “enabling legislation” is generally not an “open book to which the agency [may] add pages and change the plot line.” We presume that “Congress intends to make major policy decisions itself, not leave those decisions to agencies.”

Thus, in certain extraordinary cases, both separation of powers principles and a practical understanding of legislative intent make us “reluctant to read into ambiguous statutory text” the delegation claimed to be lurking there. To convince us otherwise, something more than a merely plausible textual basis for the agency action is necessary. The agency instead must point to “clear congressional authorization” for the power it claims.<sup>83</sup>

Although the most recent articulation on the limitation of the power of agencies, *West Virginia v. EPA* rests upon a long line of cases in which agencies have attempted to expand their statutory authority to promulgate new regulations that push the boundaries of their enabling statute. In striking down many of these actions, courts have invoked uncharacteristically (at least for most judges) catchy terms of phrase to make clear that these limitations on agency authority are not esoteric legal constructs, but strike to the heart of the separation of powers between the branches of government—fundamental administrative law. Examples of such colorful language include:

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<sup>81</sup> *Whitman v. American Trucking Ass’ns, Inc.*, 531 U.S. 457, 468 (2001).

<sup>82</sup> *See* 142 S. Ct. 2587 (2022).

<sup>83</sup> *Id.* at 2609 (internal citations omitted).

- Congress “does not alter the fundamental details of a regulatory scheme in vague terms or ancillary provisions—it does not . . . hide elephants in mouseholes.”<sup>84</sup>
- “The implausibility of Congress’s leaving a highly significant issue unaddressed (and thus ‘delegating’ its resolution to the administering agency) is assuredly one of the factors to be considered in determining whether there is ambiguity.”<sup>85</sup>
- “Great caution is warranted here, because the disputed [] regulations rest on no apparent statutory foundation and thus appear to be ancillary to nothing. Just as the Supreme Court refused to countenance an interpretation of the second prong of the ancillary jurisdiction test that would confer ‘unbounded’ jurisdiction on the Commission, *Midwest Video II*, 440 U.S. at 706, 99 S.Ct. 1435, we will not construe the first prong in a manner that imposes no meaningful limits on the scope of the FCC’s general jurisdictional grant.”<sup>86</sup>
- “The insurmountable hurdle facing the FCC in this case is that the agency’s general jurisdictional grant does not encompass the regulation of consumer electronics products that can be used for receipt of wire or radio communication when those devices are not engaged in the process of radio or wire transmission.”<sup>87</sup>
- “[T]he Commission maintains that congressional policy by itself creates ‘statutorily mandated responsibilities’ sufficient to support the exercise of section 4(i) ancillary authority. Not only is this argument flatly inconsistent with *Southwestern Cable*, *Midwest Video I*, *Midwest Video II*, and *NARUC II*, but if accepted *it would virtually free the Commission from its congressional tether*.<sup>88</sup>

## B. The Difference between “Substantive” and “Procedural” Regulatory Authority

Even in instances where an agency has some statutory power to promulgate rules, one must consider what types of rules an agency may adopt. Did Congress give the agency authority to create *substantive* rules that impact the public generally, or did Congress limit such authority to *procedural* rules to govern the internal activities of the agency, or at most, rules that regulate the relationship between the agency itself and the outside world?<sup>89</sup> Sometimes it is far from clear the extent of rulemaking authority that has been granted by Congress.

One method of analysis for differentiating between the granting of substantive versus procedural rules is whether Congress granted the agency the authority to enforce such rules through civil penalties in the same statute in which it granted rulemaking authority.<sup>90</sup> This convention holds that, absent any provision for enforcement that includes sanctions, an agency can issue only

84 *Whitman v. American Trucking Ass’ns, Inc.*, 531 U.S. 457, 468 (2001).

85 *Id.* at 468–69 (quoting *Christensen v. Harris County*, 529 U.S. 576, 590, n.1 (2000) (Scalia, J., concurring in part and concurring in judgment)).

86 *American Library Ass’n v. Fed. Comm’n Comm’n*, 406 F.3d 689, 692 (D.C. Cir. 2005).

87 *Id.* at 700.

88 *Comcast Corp. v. Fed. Comm’n Comm’n*, 600 F.3d 642, 655 (D.C. Cir. 2010) (emphasis added).

89 See generally, Berin Szóka & Corbin Barthold, *The Constitutional Revolution That Wasn’t: Why the FTC Isn’t a Second National Legislature* (TechFreedom, working paper, June 2022), <https://techfreedom.org/wp-content/uploads/2022/06/FTC-UMC-Rulemaking-Authority-TF-Version.pdf>.

90 See Thomas W. Merrill & Kathryn Tongue Watts, *Agency Rules with the Force of Law: The Original Convention*, 116 HARV. L. REV. 467 (2002), [https://scholarship.law.columbia.edu/faculty\\_scholarship/375/](https://scholarship.law.columbia.edu/faculty_scholarship/375/).

procedural “housekeeping” or “interpretive” rules, which do no more than “advise the public of the agency’s construction of the statutes and rules which it administers.”<sup>91</sup> An agency that attempts to promulgate substantive rules without any statutory authority to enforce such rules through civil penalties runs the risk of violating the nondelegation doctrine.<sup>92</sup>

Therefore, before we can determine who *should* regulate outer space activities, we must determine who *can* regulate space within their existing statutory mandate. In almost all cases, statutory authority to regulate outer space is lacking, even for certain agencies whose rules heretofore have gone unchallenged.

## VI. An Agency-by-Agency Review of Space Regulatory Authority

For each agency that plays a role in regulating outer space activities, I review their statutory authority under three rubrics:

- 1) What does their organic statute say about their authority to promulgate rules?
- 2) Does the statute delegate to the agency rulemaking authority to make merely procedural rules? Or may they adopt substantive rules that impact a wider community?
- 3) Does the statute provide the agency with enforcement powers, and do those powers include monetary sanctions?

### A. The White House National Space Council—What Is Its Regulatory Role?

The White House’s National Space Council has an “on-again, off-again history.”<sup>93</sup> It has its roots in the 1958 NASA Act, which called for the establishment of a “National Aeronautics and Space Council,” which would include specific cabinet officials.<sup>94</sup> So there is a statutory basis for the Council, though as we’ll see, that organic statute has been ignored for much of the past 60 years. The original role of the Space Council was to “advise the President with respect to the performance of the duties” under the Act, which included:

- (1) survey all significant aeronautical and space activities, including the policies, plans, programs, and accomplishments of all agencies of the United States

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91 U.S. DEP’T OF JUST., ATT’Y GEN.’S MANUAL ON THE ADMIN. PROCEDURE ACT 30 n.3 (1947), <http://library.law.fsu.edu/Digital-Collections/ABA-AdminProcedureArchive/1947iii.html>.

92 The essence of the non-delegation doctrine is that Congress (legislative branch) cannot delegate legislative (lawmaking) power to an executive agency (executive branch). Doing so violates the separation of powers between the three distinct branches of government established by the U.S. Constitution. *See Gundy v. United States*, 139 S. Ct. 2116 (2019).

93 *See James A. Vedda, National Space Council: History and Potential*, CTR. FOR SPACE POL’Y AND STRATEGY at 3 (2017), <https://aerospace.org/sites/default/files/2018-05/NationalSpaceCouncil.pdf>.

94 National Aeronautics and Space Act of 1958, Pub. L. No. 85-568, 72 Stat. 426, § 201(a). Signed by President Dwight D. Eisenhower on July 29, 1958. The administration officials that are statutorily named to the Council are: The President (who shall preside over meetings of the Council); the Secretary of State; the Secretary of Defense; the Administrator of the National Aeronautics and Space Administration; the Chairman of the Atomic Energy Commission; not more than one additional member appointed by the President from the departments and agencies of the Federal Government; and not more than three other members appointed by the President, solely on the basis of established records of distinguished achievement from among individuals in private life who are eminent in science, engineering, technology, education, administration, or public affairs.



engaged in such activities; (2) develop a comprehensive program of aeronautical and space activities to be conducted by agencies of the United States; (3) designate and fix responsibility for the direction of major aeronautical and space activities; (4) provide for effective cooperation between the National Aeronautics and Space Administration and the Department of Defense in all such activities, and specify which of such activities may be carried on concurrently by both such agencies notwithstanding the assignment of primary responsibility therefor to one or the other of such agencies; and (5) resolve differences arising among departments and agencies of the United States with respect to aeronautical and space activities under this Act, including differences as to whether a particular project is an aeronautical and space activity.<sup>95</sup>

Note that the original role of the National Space Council was limited to government activities and coordination among various government agencies. There is no mention of any regulatory role vis-à-vis the private sector in the enabling statute. The original mandate of the National Space Council was amended in 1961 by trimming the Council to just five members and naming the vice president as Chair.<sup>96</sup> President Nixon eliminated the Council in 1973, along with the Office of the Science Advisor. The latter President Ford reinstated in 1976.<sup>97</sup> During the Reagan administration, space advisory functions were housed in the National Security Council, which received input from its senior advisory groups, with Reagan refusing congressional demands to reinstate the Council, including vetoing the NASA Authorization Act, which contained a provision requiring reinstatement.<sup>98</sup>

The National Space Council was revived under the George H.W. Bush administration following the passage of the NASA Authorization Act of 1989.<sup>99</sup> Its expanded membership that looks closer to the current agency lineup. However, the newly reconstituted National Space Council was not universally accepted. “NASA Administrator Richard Truly wanted his agency to stay focused on the shuttle and space station, and openly expressed his disdain for [Bush’s Space Exploration Initiative and a call to return to the Moon], which helped to sour the agency’s relationship with the space council.”<sup>100</sup>

The Council was disbanded again during the Clinton administration, and each administration’s space policies were developed without a Council through both the George W. Bush and Obama administrations. Thus, for over two thirds of the time since the 1958 NASA Act (44 of 65 years), although required by Congress, the National Space Council has not actually existed.

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95 *Id.* § 201(e).

96 Act of Apr. 25, 1961, Pub. L. No. 87–26, 75 Stat. 46, §1. By this Act, the National Space Council’s membership consisted of the Vice President, the Secretary of State, the Secretary of Defense, the NASA Administrator, and the Chairman of the Atomic Energy Commission.

97 See Vedda, *supra* note 93, at 2.

98 See Vedda, *supra* note 93, at 2–3.

99 National Aeronautics and Space Administration Authorization Act, Fiscal Year 1989, Pub. L. No. 100–685, 102 Stat. 4083. The Act allowed the President to name the members of the Council, but also limited its full-time staff to seven. *Id.* § 501(c). See also Proclamation No. 12,675, 54 Fed. Reg. 17,691 (Apr. 20, 1989). Under George H.W. Bush’s Executive Order No. 12,675, the membership of the Space Council included: Vice President (chair), Secretary of Defense, Secretary of State, Secretary of Commerce, Secretary of Transportation, Secretary of the Treasury, Secretary of Energy, Director of Central Intelligence, NASA Administrator, National Security Advisor, President’s Chief of Staff, President’s Science Advisor, Director of Office of Management and Budget, Chairman of the Joint Chiefs of Staff, and other agency and White House officials (if deemed appropriate by the chair).

100 See Vedda, *supra* note 93, at 3.

President Trump revived the National Space Council in 2017. Chaired by Vice President Mike Pence, it saw a further increase in its membership.<sup>101</sup> Also, for the first time, the National Space Council's functions were specifically expanded to "foster close coordination, cooperation, and technology and information exchange among the civil, national security, and commercial space sectors."<sup>102</sup> The Trump National Space Council was quite active, doing the background work for what became a substantial set of deliverables by the White House on space policy.<sup>103</sup> It had a much greater focus on commercial space, including Space Policy Directive 1 (SPD-1), which amended Presidential Policy Directive-4 of June 28, 2010 by stating that it is the policy of the United States to "Lead an innovative and sustainable program of exploration with commercial and international partners to enable human expansion across the solar system and to bring back to Earth new knowledge and opportunities."<sup>104</sup>

Similarly, Space Policy Directive 2 (SPD-2) called for "streamlining regulations on commercial use of space," and directed the Secretary of Transportation to review, and where appropriate, amend its rules to meet the policy goal to "promote economic growth; minimize uncertainty for taxpayers, investors, and private industry; protect national security, public-safety, and foreign policy interests; and encourage American leadership in space commerce."<sup>105</sup> SPD-2 also called on the Secretary of Commerce to review regulations under the Land Remote Sensing Policy Act of 1992 to likewise streamline remote sensing licensing.<sup>106</sup>

Space Policy Directive 3 (SPD-3) set forth a policy for establishing a more formal plan for space traffic management (STM) and directed that such an initiative be housed in the Department of Commerce.<sup>107</sup> SPD-3 made clear that the commercial space sector plays a vital role in future space development:

The future space operating environment will also be shaped by a significant increase in the volume and diversity of commercial activity in space. Emerging commercial ventures such as satellite servicing, debris removal, in-space manufacturing, and tourism, as well as new technologies enabling small satellites and very large constellations of satellites, are increasingly outpacing efforts to develop and implement government policies and processes to address these new activities.

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101 Proclamation No. 13,803, 82 Fed. Reg. 31,429 (June 30, 2017). Under the Trump administration, the National Space Council's members included: The Vice President, Secretary of State, Secretary of Defense, Secretary of Commerce, Secretary of Transportation, Secretary of Homeland Security, Director of National Intelligence, Director of the Office of Management and Budget, Assistant to the President for National Security Affairs, Administrator of the National Aeronautics and Space Administration, Director of the Office of Science and Technology Policy, Assistant to the President for Homeland Security and Counterterrorism, Chairman of the Joint Chiefs of Staff, and the heads of other executive departments and agencies and other senior officials within the Executive Office of the President, as determined by the Chair.

102 *Id.* § 3(b)(iv).

103 See CTR. FOR SPACE POL'Y AND STRATEGY, *Space Policy Archive*, <https://csps.aerospace.org/resources/space-policy-archive> (last visited June 28, 2023) (listing thirty-six Trump administration directives, speeches, reports, and fact sheets. During the first two-plus years of the Biden administration, the Archive lists only seven items, and the Archive has only thirteen items from the Obama administration).

104 Donald Trump, Remarks on Signing a Memorandum on Reinvigorating America's Human Space Exploration Program, 2017 DAILY COMP. PRES. DOC. 901 (Dec. 11, 2017).

105 Memorandum on Reinvigorating America's Human Space Exploration Program, 2017 DAILY COMP. PRES. DOC. 902 (Dec. 11, 2017).

106 *Id.*

107 Memorandum on National Space Traffic Management Policy, 2018 DAILY COMP. PRES. DOC. 431 (June 18, 2018).

To maintain U.S. leadership in space, we must develop a new approach to space traffic management (STM) that addresses current and future operational risks. This new approach must set priorities for space situational awareness (SSA) and STM innovation in science and technology (S&T), incorporate national security considerations, encourage growth of the U.S. commercial space sector, establish an updated STM architecture, and promote space safety standards and best practices across the international community.<sup>108</sup>

The three key space policy directives of the Trump administration remain in place today. The Biden administration further expanded the membership of the National Space Council through Executive Order 14056.<sup>109</sup> The Biden administration also issued the United States Space Priorities Framework, which underscores the vital role of the commercial space sector, including the need to establish a “regulatory environment that enables a competitive and burgeoning U.S. commercial space sector.”<sup>110</sup>

Notwithstanding the uptick of activity by the National Space Council, it is clear from its authorizing statute that the authority of the Council is limited. Its role is to “advise and assist the President on space policy and strategy.”<sup>111</sup> Further, “[t]he operation of the Council shall not interfere with the existing lines of authority in or responsibilities of any agency.”<sup>112</sup> There is no hint in the statute that Congress intended for the Council to promulgate rules, and the NASA Act (as amended) contains no provisions allowing the Council to enforce any of its policies.

Thus, it is clear that the National Space Council has no authority from Congress to regulate outer space activities. It functions solely to coordinate between executive branch agencies. Any regulations must come from other agencies, and their ability to regulate must stem from their authorizing statutes.

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108 *Id.*

109 Proclamation No. 14,056, 86 Fed. Reg. 68,871 (Dec. 15, 2021). The new National Space Council membership now includes: the Vice President, Secretary of State, Secretary of Defense, Secretary of the Interior, Secretary of Agriculture, Secretary of Commerce, Secretary of Labor, Secretary of Transportation, Secretary of Energy, Secretary of Education, Secretary of Homeland Security, Director of the Office of Management and Budget, Director of National Intelligence, Director of the Office of Science and Technology Policy, Assistant to the President for National Security Affairs, Assistant to the President for Economic Policy, Assistant to the President for Domestic Policy, Assistant to the President and National Climate Advisor, Chairman of the Joint Chiefs of Staff, Administrator of the National Aeronautics and Space Administration, and the heads of other executive departments and agencies and other senior officials within the Executive Office of the President, as determined by the Chair.

110 UNITED STATES SPACE PRIORITIES FRAMEWORK (Dec. 2021), [https://csp.s.aerospace.org/sites/default/files/2021-12/United-States-Space-Priorities-Framework\\_-\\_December-1-2021.pdf](https://csp.s.aerospace.org/sites/default/files/2021-12/United-States-Space-Priorities-Framework_-_December-1-2021.pdf). The Framework goes on to state:

U.S. commercial space activities are on the cutting edge of space technology, space applications, and space-enabled services. To facilitate the growth of U.S. industry and support the creation of American jobs, the United States will clarify government and private sector roles and responsibilities and support a timely and responsive regulatory environment. U.S. regulations must provide clarity and certainty for the authorization and continuing supervision of non-governmental space activities, including for novel activities such as on-orbit servicing, orbital debris removal, space-based manufacturing, commercial human spaceflight, and recovery and use of space resources. To create free and fair market competition internationally, the United States will work with allies and partners to update and harmonize space policies, regulations, export controls, and other measures that govern commercial activities worldwide. Additionally, the United States will work with allies and partners to combat foreign government non-market practices, protect critical U.S. technologies and intellectual property, and reduce reliance on strategic competitors for key space capabilities. Such efforts will be informed by economic data and research to better understand the space economy and will reflect the importance of the responsible and sustainable use of space.

111 Proclamation No. 14,056, 86 Fed. Reg. 68,871 § 3 (Dec. 3, 2021).

112 *Id.* § 3(b).

## B. The FCC—Keeper of the Frequencies

### 1. Regulatory Authority

The authority of the FCC to regulate space comes from the Communications Act of 1934,<sup>113</sup> and the Communications Satellite Act of 1962.<sup>114</sup> The original Communications Act of 1934 gave the FCC broad, but not unlimited, power to ensure that “[a]ll charges, practices, classifications, and regulations for and in connection with such communication service, shall be just and reasonable, and any such charge, practice, classification, or regulation that is unjust or unreasonable is hereby declared to be unlawful.”<sup>115</sup> Congress directed the Commission in the 1934 Act to regulate carriers “consistent with the public interest,”<sup>116</sup> a term that judges have struggled to define over the years.<sup>117</sup>

Most important for this discussion, Congress also authorized the FCC to allocate and license frequencies.

Except as otherwise provided in this Act, the Commission from time to time, as public convenience, interest, or necessity requires, shall . . . assign bands of frequencies to the various classes of stations, and assign frequencies for each individual station and determine the power which each station shall use and the time during which it may operate.<sup>118</sup>

This authority has been upheld in the broadest terms by the courts over the years.<sup>119</sup> Not surprising, the words “space,” and “satellite” do not appear in the 1934 Act. Indeed, the FCC first took up the issue of frequencies for space uses in 1957 following a series of articles and filings by Andrew

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113 Communications Act of 1934, Pub. L. No. 73-416, 48 Stat. 1064 (codified as amended at 47 U.S.C. § 151 et seq. (2018)).

114 Communications Satellite Act of 1962, Pub. L. No. 87-624, 76 Stat. 419 (codified at 47 U.S.C. § 701 et seq.). The Telecommunications Act of 1996, although modifying the FCC’s authority significantly as regards to wireless and other aspects of communications, does not mention space communications. Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (codified at 47 U.S.C. § 609 et seq.).

115 Communications Act of 1934, Pub. L. No. 73-416, § 201(b), 48 Stat. 1064, 1070 (codified as amended at 47 U.S.C. § 151 et seq. (2018)).

116 *See, e.g., id.* at § 303(g), where Congress directed the FCC to “Study new uses for radio, provide for experimental uses of frequencies, and generally encourage the larger and more effective use of radio in the public interest.” The term “public interest” appears sixteen times in the Act.

117 The term “public interest, convenience and necessity” in the Communications Act was borrowed from the Interstate Commerce Act. Interstate Commerce Act of 1887, Pub. L. No. 49-104, 24 Stat. 379. One story has it that Congress added that language because it knew it needed some standard but were unsure of the language to adopt. *See* Stuart Shorestein & Lorna Veraldi, *Defining the Public Interest in Term of Regulatory Necessity*, 17 J. CIV. RTS. & ECON. DEV., 45, 46 (2003). Described as both “delivering the mail” and a “Holy Grail,” the FCC’s public interest standard has been much debated. *Id.*, citing Erwin G. Krasnow & Jack N. Goodman, *The “Public Interest” Standard: The Search for the Holy Grail*, 50 FED. COMM. L. J. 605, 606 (1998); Randolph J. May, *The Public Interest Standard: Is It Too Indeterminate to Be Constitutional?*, 53 FED. COMM. L. J. 427 (2001). The public interest standard is not without limit, and the “necessity” portion of the standard has gained in prominence over the past few decades. *See* Fox Television Stations v. Fed. Commc’n Comm’n, 280 F.3d 1027 (D.C. Cir. 2002) (finding the FCC’s 35 percent national ownership cap arbitrary and capricious); Sinclair Broad. Group, Inc. v. Fed. Commc’n Comm’n, 284 F.3d 12 (D.C. Cir. 2002) (FCC TV duopoly rule arbitrary and capricious).

118 Communications Act of 1934, Pub. L. No. 73-416, § 303(c), 48 Stat. 1064, 1082 (codified as amended at 47 U.S.C. § 151 et seq. (2018)).

119 *See, e.g.,* Fed. Commc’n Comm’n v. Sanders Bros. Radio Station, 309 U.S. 470, 474 (1940) (“The genesis of the Communications Act and the necessity for the adoption of some such regulatory measure is a matter of history. The number of available radio frequencies is limited. The attempt by a broadcaster to use a given frequency in disregard of its prior use by others, thus creating confusion and interference, deprives the public of the full benefit of radio audition. Unless Congress had exercised its power over interstate commerce to bring about allocation of available frequencies and to regulate the employment of transmission equipment, the result would have been an impairment of the effective use of these facilities by anyone. The fundamental purpose of Congress in respect of broadcasting was the allocation and regulation of the use of radio frequencies by prohibiting such use except under license.”);

G. Haley, former general counsel of the FCC, general counsel of the American Rocket Society (ARS), and president of the International Astronautics Federation (IAF).<sup>120</sup> Haley argued both before the FCC and the International Telecommunications Union (ITU) that spectrum needed to be set aside for space uses.

In April 1957, the FCC issued a Notice of Inquiry in Docket 11997 to look into non-government allocations in the 23-890 MHz band,<sup>121</sup> and a Fifth Notice of Inquiry in Docket 12263 on December 9, 1957, requesting comments on allocations above 890 MHz.<sup>122</sup> At the 1959 Conference in Geneva, the ITU for the first time established two new services, the “space service,” and the “earth-space service.”<sup>123</sup>

While the FCC was studying how to implement the ITU’s new space allocation, Congress passed the Communications Satellite Act of 1962. It created a quasi-private corporation, COMSAT, to establish “as expeditiously as practicable a commercial communications satellite system, as part of an improved global communications network, which will be responsive to public needs and national objectives, which will serve the communication needs of the United States and other countries, and which will contribute to world peace and understanding.”<sup>124</sup> The COMSAT Act further authorized the FCC to regulate certain aspects of COMSAT, including “insure that all present and future authorized carriers shall have nondiscriminatory use of, and equitable access to, the communications satellite system and satellite terminal stations under just and reasonable charges, classifications, practices, regulations, and other terms and conditions and regulate the manner in which available facilities of the system and stations are allocated among such users thereof.”<sup>125</sup>

It is important to note that the COMSAT Act limited the FCC’s authority to “communications satellite[s],” defined as “an earth satellite which is intentionally used to relay telecommunication information.”<sup>126</sup> Congress also stated that: “It is not the intent of Congress by this Act to preclude the use of the communications satellite system for domestic communication services where consistent with the provisions of this Act nor to preclude the creation of additional communications satellite systems, if required to meet unique governmental needs or if otherwise required in the national interest.”<sup>127</sup>

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Fed. Comm’n Comm’n v. National Broad. Co., Inc., 319 U.S. 239 (1943); Red Lion Broad. Co., Inc. v. Fed. Comm’n Comm’n, 395 U.S. 367, 375-76 (1969) (“Before 1927, the allocation of frequencies was left entirely to the private sector, and the result was chaos. It quickly became apparent that broadcast frequencies constituted a scarce resource whose use could be regulated and rationalized only by the Government. Without government control, the medium would be of little use because of the cacophony of competing voices, none of which could be clearly and predictably heard. Consequently, the Federal Radio Commission was established to allocate frequencies among competing applicants in a manner responsive to the public ‘convenience, interest, or necessity.’” (Footnotes omitted)).

120 See generally ANDREW HALEY, SPACE LAW AND GOVERNMENT 172-76 (1963).

121 EDWARD WENK, JR., 86TH CONG., RADIO FREQUENCY CONTROL IN SPACE TELECOMMUNICATIONS 35 (Comm. Print 1960), [https://books.google.com/books?id=CEcRA1ed\\_dIC&pg=PA35&lp=PA35&dq=%22docket+12263%22+FCC&source=b&ots=K7-1ZTaUJw&sig=ACfU3U11\\_3hWVfixrayd\\_fiiAqNTXMC28g&chl=en&csa=X&ved=2ahUKEwi3-ciHs4H-AhU\\_j4kEHXfSBkgQ6AF6BAgDEAM#v=onepage&q=%22docket%2012263%22%20FCC&f=false](https://books.google.com/books?id=CEcRA1ed_dIC&pg=PA35&lp=PA35&dq=%22docket+12263%22+FCC&source=b&ots=K7-1ZTaUJw&sig=ACfU3U11_3hWVfixrayd_fiiAqNTXMC28g&chl=en&csa=X&ved=2ahUKEwi3-ciHs4H-AhU_j4kEHXfSBkgQ6AF6BAgDEAM#v=onepage&q=%22docket%2012263%22%20FCC&f=false) (last accessed June 28, 2023).

122 23 Fed. Reg. 2701 (1958), <https://www.govinfo.gov/content/pkg/FR-1958-04-23/pdf/FR-1958-04-23.pdf>.

123 Radio Regulations, Geneva, Aug. 17-Dec. 21, 1959, Res. 36. For a fuller discussion of the ITU process in this era, see Nandasiri Jasentuliyana, *Regulatory Functions of the I.T.U. in the Field of Space Telecommunications*, 34 J. OF AIR L. AND COMM. 62 (1968).

124 Communications Satellite Act of 1962, Pub. L. No. 87-624, § 102(a), 76 Stat. 419 (codified at 47 U.S.C. § 701 et seq.).

125 *Id.* § 201(c).

126 *Id.* § 103(3).

127 *Id.* § 102(d).

While limited to “communications satellites” that “relay telecommunications information,” the ability of the FCC to promulgate regulations under the COMSAT Act is broad.

Under section (4)(j) of the Communications Act, the Commission has broad discretion to adopt such procedures, policies, and application requirements as will best conduce to the proper dispatch of its business and to the ends of justice. Moreover, under section 303 of the Communications Act, the Commission, among other things, may classify radio [earth] stations, prescribe the nature of the services to be rendered by each class, determine their location, and impose such other requirements relating to their operation. This broad grant of policy and rulemaking authority is supplemented by section 201(c)(11) of the Satellite Act which directs the Commission to make rules and regulations to carry out the provisions thereof (see also sec. 303(r) of the Communications Act). In addition, the Commission may delineate elements of the public interest which applicants for station licenses must meet and may dismiss or reject, without hearing, such applications which fail to meet such requirements (*NBC v. U.S.*, 319 U.S. 190; *U.S. v. Stover Broadcasting Co.*, 351 U.S. 192). There is also no indication that Congress in any way specified a particular procedure to be followed in making the requisite public interest judgments under section 201(c)(7), or that it withdrew from the Commission any particular procedure; e.g., the adoption of a general policy or the issuance of rules and regulations.<sup>128</sup>

The Commission licensed the first commercial U.S. domestic fixed satellites not operated by COMSAT in 1970 when five companies were authorized to construct systems that would provide fixed-satellite services solely within the United States.<sup>129</sup> The FCC did so by concluding that space communications operations fit within its regulatory purview:

[T]he F.C.C. announced that the national interest would be best served by licensing non-governmentally owned and operated telecommunication satellites. In reaching this conclusion, the F.C.C. looked at two fundamental questions: first, did the F.C.C. have the legal authority to regulate the construction and use of domsat systems, and second, if the F.C.C. had such authority, how would the public interest be best served. In analyzing the first question, the F.C.C. noted three provisions of the Federal Communications Act of 1934. First, all nongovernment owned radio stations must be licensed by the F.C.C. Second, a radio station is defined as a station equipped to engage in radio communications. And, third, radio communication is defined as the “transmission by radio of writing, signs, signals, pictures, and sounds of all kinds, including . . . [among other things, the receipt, forwarding, and delivery of communications] incidental to such transmissions.” Together, these three provisions led the F.C.C. to the conclusion

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128 In the Matter of Amendment of Part 25 of the Commission's Rules and Regulations with Respect to Ownership and Operation of Initial Earth Stations, 38 F.C.C. 1104, 1106-07 (1965).

129 Establishment of Domestic Communications Satellite Facilities by Non-Governmental Entities, Report and Order, 22 F.C.C. 2d 86 (1970); Second Report and Order, 35 F.C.C. 2d 844 (1972); recon. in part, Memorandum Opinion and Order, 38 F.C.C. 2d 665 (1972).

that because a telecommunication satellite is a radio station engaged in receiving and forwarding radio communications, domsats (the space segment and earth-stations) may be regulated by the F.C.C.<sup>130</sup>

The FCC further adopted regulations to implement the WARC-71 allocation of additional frequencies for space use.<sup>131</sup> Since then, the FCC has a long history of licensing satellite systems.

In recent years the FCC has issued many frequency allocations and licenses with conditions that go beyond issues of interference. For example, in 2004 the FCC adopted comprehensive rules requiring licensees to submit an orbital debris mitigation plan as part of its license application (discussed more fully below in Section VII).<sup>132</sup> In doing so, the FCC concluded that “orbital debris mitigation issues are a valid public interest consideration in the Commission’s licensing process.”<sup>133</sup> Only one commenter in that proceeding even raised the issue of whether the FCC had statutory authority to address orbital debris, but that “commenter does not provide any legal analysis to support its position and does not address any of the analysis provided in the Notice.”<sup>134</sup>

Apparently unconvinced by its own arguments from 2004, the FCC questioned whether it had statutory authority to regulate orbital debris in its Notice of Proposed Rulemaking to amend its rules in 2019.

With respect to the rules proposed here, the Commission revisits the Commission’s discussion in 2004, which addressed the Commission’s responsibilities and obligations under the Communications Act of 1934 (the Act). The 2004 Orbital Debris Order specifically referenced the Commission’s authority with respect to authorizing radio communications, including the statements in the Act that charge the FCC with encouraging “the larger and more effective use of radio in the public interest,” and provide for licensing of radio communications, upon a finding that the “public convenience, interest, or necessity will be served thereby.” Did the 2004 order cite all relevant and potential sources of Commission authority in this area? Do the provisions discussed, or other statutory provisions, provide the Commission with requisite legal authority to adopt the rules we propose today?<sup>135</sup>

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130 Michael S. Straubel, *Telecommunication Satellites and Market Forces: How Should the Geostationary Orbit Be Regulated by the F.C.C.*, 17 N.C. J. INT’L L. 205, 215–16 (1992).

131 Amendment of Part 2 of the Commission’s rules to conform, to the extent practicable, with the Geneva Radio Regulations, as revised by the Space WARC, Geneva, 1971, Docket No. 19547, Report and Order, F.C.C. 73-169, 38 Fed. Reg. 5561 (Mar. 1, 1973).

132 Amended Parts 5, 25, and 97 of the Commission’s rules by adopting new rules concerning mitigation of orbital debris, 19 FCC Rcd. 11567 (2004). Prior to the 2004 order, the FCC had adopted service rules for certain classes of satellite systems that including requirements for orbital debris mitigation. *See* The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band, Report and Order, IB Docket No. 99-81, FCC 00-302, 15 FCC Rcd. 16127, 16188 (2000) (2 GHz MSS Order); The Establishment of Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed Satellite Service in the Ku-band, Report and Order and Further Notice of Proposed Rulemaking, IB Docket No. 01-96, FCC 02-123, 17 FCC Rcd. 7841, 7865–66 (para. 81) (2002) (NGSO FSS Ku-Band Order); The Establishment of Policies and Service Rules for the Non-Geostationary Satellite Orbit, Fixed Satellite Service in the Ka-Band, IB Docket No. 02-19, FCC 03-137, 18 FCC Rcd. 14708, 14725–26 (para. 55) (2003) (NGSO FSS Ka-Band Order).

133 *Id.* ¶ 13.

134 *Id.*

135 Mitigation of Orbital Debris in the New Space Age, Notice of Proposed Rulemaking, 84 Fed. Reg. 4742, 4744 (2019).

In adopting a rule shortening the time that operators can allow their satellites to remain in orbit after ceasing operations from 25 years to five years, the FCC merely cited back to its general authority to license frequency uses in the “public interest.”<sup>136</sup>

Just last year, the FCC issued a Notice of Inquiry (NOI) seeking input as to how it should regulate in-orbit servicing, assembly, and manufacturing (ISAM).<sup>137</sup> Curiously, the only reference in the ISAM NOI to the FCC’s statutory authority relates to whether ISAM will “promote or inhibit advances in diversity, equity, inclusion, and accessibility, as well as the scope of the Commission’s relevant legal authority.”<sup>138</sup> As TechFreedom pointed out in its comments:

While the current FCC orbital debris mitigation requirements might be sustainable under current delegated authority to determine whether a satellite communications system was in the public interest, what is involved in ISAM manifestly is not a “satellite communications system.” Rather, ISAM is a wide-ranging set of activities that can be conducted outside the atmosphere of the Earth, some, but certainly not all of which, may involve communications satellites.<sup>139</sup>

Several members of Congress similarly have questioned whether the FCC can regulate ISAM.

At the recent meeting of the National Space Council on September 9, 2022, which you attended, Vice President Harris underscored the importance of coordination and collaboration on federal space activities. The Commission’s interest in acting alone to regulate orbital debris mitigation, however, poses the potential for creating confusion in an area that has historically been closely coordinated. Within the Federal government, agencies follow U.S. Orbital Debris Mitigation Standards and Practices, which are developed through coordination within the Federal government and based on scientific and technical research led by the National Aeronautics and Space Administration (NASA). In addition, NASA has been charged with reevaluating those standards and action by the FCC at this time could lead to conflicting U.S. guidelines.<sup>140</sup>

This is not the first time Congress has questioned the ability of the FCC to adopt rules governing space activities.<sup>141</sup> Other agencies have questioned the FCC’s jurisdiction over space operations as well, as the Department of Commerce did in 2019.

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136 Mitigation of Orbital Debris in the New Space Age, Report and Order, F.C.C. 22-74 ¶ 6 (Sept. 30, 2022).

137 In the Matter of Space Innovation, Facilitating Capabilities for In-space Servicing, Assembly, and Manufacturing, Notice of Inquiry, F.C.C. 22-66 (Aug. 8, 2022).

138 *Id.* ¶ 42.

139 TechFreedom Comments on Space Innovation & Facilitating Capability for In-Space Servicing, Assembly, and Manufacturing (Oct. 31, 2022), <https://techfreedom.org/wp-content/uploads/2022/10/TechFreedom-Comments-FCC-ISAM-NOI.pdf>. The author of those comments is also the author of this paper.

140 *See* Letter from Rep. Eddie Bernice Johnson (D-TX), Chairwoman, Committee on Science, Space, and Technology, Rep. Frank Lucas (R-OK), Ranking Member, Committee on Science, Space, and Technology, at 2 (Sept. 27, 2022), <https://democrats-science.house.gov/bipartisan-letter-to-fcc-on-orbital-debris-mitigation>.

141 *See, e.g.*, Press Release, Committee on Science, Space, & Technology, House Science Committee Leaders Criticize FCC Action on Space Orbital Debris (Apr. 24, 2020), <https://republicans-science.house.gov/2020/4/house-science-committee-leaders-criticize-fcc-action-orbital-space-debris>, citing Letter to FCC Chair Ajit Pai from Rep. Eddie Bernice Johnson (D-TX), Chairwoman, Committee on Science, Space, and Technology, Rep. Frank Lucas (R-OK), Ranking Member, Committee on Science, Space, and Technology (Apr. 15, 2020), [https://republicans-science.house.gov/\\_cache/files/9/d/9d1f5fb3-a6af-4f76-9ba1-2adfe9a78d1e/1EF44C07847DB88C92DA894FDE33EF2E.4.15.2020---fcc-orbital-debris-letter---final-bipartisan-.pdf](https://republicans-science.house.gov/_cache/files/9/d/9d1f5fb3-a6af-4f76-9ba1-2adfe9a78d1e/1EF44C07847DB88C92DA894FDE33EF2E.4.15.2020---fcc-orbital-debris-letter---final-bipartisan-.pdf).



It is clear that, given the multiple regulatory schemes across executive branch agencies impacting space commerce generally and orbital debris specifically, commercial space policies must be based on the technical expertise of the whole government. To that end, the [Commerce] Department has contributed to inter-agency efforts to achieve these shared space policy goals by leading administration efforts to advance space commerce, and The President’s Space Policy Directives are producing results and increasingly support a thriving space commerce industry in the U.S. As it leads the federal effort to dramatically grow U.S. space commerce, the Department shares the Commission’s objective “to ensure continued, safe operations in space and maximize space commerce investments and innovation.” Without a collaborative approach across federal agencies and independent authorities this objective cannot be attained.<sup>142</sup>

Given the questions raised by other agencies which themselves possess some statutory authority to regulate space activities, as well as the current legal landscape regarding agency discretion in issues rules, it is highly questionable as to whether the FCC has authority to regulate space activities that do not directly relate to providing satellite communications services to and from space.<sup>143</sup>

## 2. FCC Enforcement Authority

Congress provided the FCC, unlike virtually all other agencies discussed herein, statutory enforcement powers under Part 500 of Title 47. This includes a “general penalty” provision in Section 501 (including potential criminal penalties),<sup>144</sup> as well as civil penalties for violation of FCC rules under Section 502.<sup>145</sup> Recently, the FCC proposed its largest fine ever—\$300 million—against an

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142 See U.S. Dep’t of Com. Comments on Mitigation of Orbital Debris in the New Space Age at 15 (Apr. 5, 2019), <https://www.fcc.gov/ecfs/document/1040509194602/1> (footnote omitted).

143 See Nat’l Ass’n of Broads. v. Fed. Comm’n Comm’n, 39 F.4th 817 (D.C. Cir. 2022). In striking down FCC rules requiring broadcast stations to “independently confirm the sponsor’s status” as not being a foreign agent, the court rejected the Commission’s argument that such a rule was supported by the Commission’s general rulemaking authority.

A generic grant of rulemaking authority to fill gaps, however, does not allow the FCC to alter the specific choices Congress made. Instead, the FCC must abide “not only by the ultimate purposes Congress has selected, but by the means it has deemed appropriate, and prescribed, for the pursuit of those purposes.” Here, Congress chose the means for broadcasters to obtain the information necessary to announce who paid for programming: Ask employees and sponsors. The FCC cannot alter Congress’s choice.

*Id.* at 820 (internal citations omitted).

144 47 U.S.C. § 501.

Any person who willfully and knowingly does or causes or suffers to be done any act, matter, or thing, in this chapter prohibited or declared to be unlawful, or who willfully and knowingly omits or fails to do any act, matter, or thing in this chapter required to be done, or willfully and knowingly causes or suffers such omission or failure, shall, upon conviction thereof, be punished for such offense, for which no penalty (other than a forfeiture) is provided in this chapter, by a fine of not more than \$10,000 or by imprisonment for a term not exceeding one year, or both; except that any person, having been once convicted of an offense punishable under this section, who is subsequently convicted of violating any provision of this chapter punishable under this section, shall be punished by a fine of not more than \$10,000 or by imprisonment for a term not exceeding two years, or both.

145 47 U.S.C. § 502.

Any person who willfully and knowingly violates any rule, regulation, restriction, or condition made or imposed by the Commission under authority of this chapter, or any rule, regulation, restriction, or condition made or imposed by any international radio or wire communications treaty or convention, or regulations annexed thereto, to which the United States is or may hereafter become a party, shall, in addition to any other penalties provided by law, be punished, upon conviction thereof, by a fine of not more than \$500 for each and every day during which such offense occurs.

47 U.S.C. § 500 also contains specific enforcement provisions for plugola/payola (broadcast stations taking kickbacks to air material), 47 U.S.C. § 508, broadcaster violation of contest rules, 47 U.S.C. § 509, unlicensed (“pirate”) broadcast operations, 47 U.S.C. § 511, and

auto warranty scam robocaller.<sup>146</sup> The FCC has an entire “Enforcement Bureau,” which acts as the FCC’s cop and boasts a laundry list of areas in which it enforces FCC rules.<sup>147</sup> Criminal matters are referred to the Department of Justice for prosecution.<sup>148</sup> Generally speaking, the statute of limitations for enforcement is one year,<sup>149</sup> but the FCC on many occasions has concluded that its enforcement and recoupment powers are without any time limitations when it seeks to recover government benefits it determines were improperly paid.<sup>150</sup>

Of all the agencies analyzed in this paper, the FCC’s rulemaking and enforcement authorities are the clearest. What is far from clear, however, is whether, after *West Virginia v. EPA* and *NAB v. FCC*, that authority extends to activities in space that do not relate specifically to providing telecommunications services via space.

## C. The FAA—Thou Shalt Not Launch (or Reenter) without a License

### 1. FAA Regulatory Authority over Launch and Reentry

Congress granted authority to license commercial space launches to the Department of Transportation through the Federal Aviation Administration’s Office of Commercial Space Transportation (AST) in the 1984 Commercial Space Launch Act (CSLA).<sup>151</sup> The CSLA required the Secretary of Transportation to “establish procedures and timetables to expedite review of applications under this section and to reduce regulatory burdens for applicants.”<sup>152</sup> Much like the Department of Commerce,<sup>153</sup> Congress also tasked the FAA to “encourage, facilitate, and promote commercial space launches by the private sector.”<sup>154</sup>

Congress amended the CSLA several times, beginning in 1988 to establish insurance requirements for launches,<sup>155</sup> in 1994 to give the FAA enforcement powers,<sup>156</sup> in 1998 to give the FAA authority to issue licenses for the reentry of vehicles from space, and the operation of domestic launch sites,<sup>157</sup> and again in 2004 to provide the FAA with limited authority to regulate human

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for seizure of devices which cause interference in violation of FCC rules. 47 U.S.C. § 510.

146 Press Release, Fed. Comm’n Comm’n, FCC Proposes Largest Fine Ever Against Auto Warranty Scam Robocaller (Dec. 21, 2022), <https://www.fcc.gov/document/fcc-proposes-largest-fine-ever-against-auto-warranty-scam-robocaller>.

147 See FED. COMM’N COMM’N, ENFORCEMENT, <https://www.fcc.gov/enforcement> (last visited June 14, 2023). “In addition to general enforcement and deterrence goals, [the Enforcement Bureau] dedicates its resources to investigations and enforcement actions involving FCC-regulated services and equipment that significantly impact: Consumer Protection and Privacy; Data Security, Cybersecurity, and Supply Chain Integrity; National Security, Public Safety, Emergency Services, and Harmful Interference; Fraud Targeting Critical FCC-Funded and -Administered Programs; and Fair Competition and Equal Opportunities.”

148 See FED. COMM’N COMM’N, FCC ENFORCEMENT OVERVIEW at 22 (Apr. 2020), [https://www.fcc.gov/sites/default/files/public\\_enforcement\\_overview.pdf](https://www.fcc.gov/sites/default/files/public_enforcement_overview.pdf).

149 47 U.S.C. § 503(b)(6).

150 See generally James Dunstan, *The FCC, USF, and USAC: An Alphabet Soup of Due Process Violations* (Ctr. for Growth and Opportunity, Working Paper, Apr. 2023), <https://www.thecgo.org/research/an-alphabet-soup-of-due-process-violations/>.

151 Commercial Space Launch Act, Pub. L. No. 98-575, 98 Stat. 3055 (1984) (codified at 49 U.S.C. § 2608 (1984)).

152 *Id.* § 9.

153 See *infra* §. VI.D.

154 Commercial Space Launch Act, § 5(a)(1) (codified at 49 U.S.C. § 2604 (1984)).

155 Commercial Space Launch Act Amendments of 1988, Pub. L. No. 100-657, 102 Stat. 3900 (codified at 49 U.S.C. § 2601 (1988)).

156 Act of July 5, 1994, Pub. L. 103-272, 108 Stat. 1341 (codified at 49 U.S.C. § 101 (1994)).

157 Commercial Space Act of 1998, Pub. L. No. 105-303, 112 Stat. 2843 (codified at 42 U.S.C. § 14701 (1998)).

commercial spaceflight, including a charge that the FAA “promote the development of the emerging commercial human space flight industry.”<sup>158</sup> Nonetheless, the 2004 amendments significantly limited the FAA from promulgating specific rules for human space flight.

The [Commercial Space Launch Amendments Act (CSLAA)] recognized that U.S. companies are developing space vehicles intended to carry humans. As a result, the CSLAA clarified the FAA’s responsibility for regulating commercial human space flight. However, the CSLAA also limited the extent to which AST could regulate the safety of persons onboard until 2012. The Act instructed the FAA that the “regulatory standards governing human space flight must evolve as the industry matures so that regulations neither stifle technology development nor expose crew or space flight participants to avoidable risk . . .” Also, the term “space flight participant” was introduced to characterize non-crew members on board. The term “passenger” was avoided as these individuals will be significantly more aware of the risks and undergo substantial training that is well above the basic requirements of a commercial airline passenger. The CSLAA mandates that space flight participants provide informed consent.<sup>159</sup>

This “moratorium” on passenger safety regulations has been extended several times, although it is set to expire in October 2023.<sup>160</sup> It is important to note that the FAA sees its role in the licensing regime primarily as protecting the safety of the uninvolved public, far more so than in making any sort of determination as to whether the launch in question is a good idea.

The FAA’s safety role was initially confined to protecting the public—namely, people who are not involved in a given launch or reentry—from the hazards posed by these [expendable launch vehicles (ELVs)]. Because the vehicle’s stages are full of propellant with a high explosive yield, the FAA’s regulations require that a launch operator or a federal range have the capability to destroy the vehicle in the event of an anomaly so the launch vehicle does not reach a populated area like a city. The operator drops the rocket’s empty stages in the ocean. The FAA’s regulations require that the areas below be clear of aircraft and shipping, just as it requires such clearances at launch and reentry. The FAA’s regulations for protecting the public address the design, operation, and testing of a vehicle’s flight-termination system, acceptable levels of risk, and vehicle hazards, including debris, toxic releases, and overpressure.<sup>161</sup>

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158 Commercial Space Launch Amendments Act of 2004, Pub. L. No. 108-492, 119 Stat. 3974, preamble (codified at 49 U.S.C. § 70101 (2004)).

159 George Nield et al., *The Origin and Practice of U.S. Commercial Human Space Flight Regulations*, International Astronautical Congress, 7 (2008), [https://www.faa.gov/sites/faa.gov/files/space/additional\\_information/international\\_affairs/THE\\_ORIGIN\\_AND\\_PRACTICE\\_OF\\_U.S.\\_COMMERCIAL\\_HUMAN\\_SPACE\\_FLIGHT\\_REGULATIONS\\_IAC\\_Glasgow\\_Oct\\_2008.pdf](https://www.faa.gov/sites/faa.gov/files/space/additional_information/international_affairs/THE_ORIGIN_AND_PRACTICE_OF_U.S._COMMERCIAL_HUMAN_SPACE_FLIGHT_REGULATIONS_IAC_Glasgow_Oct_2008.pdf).

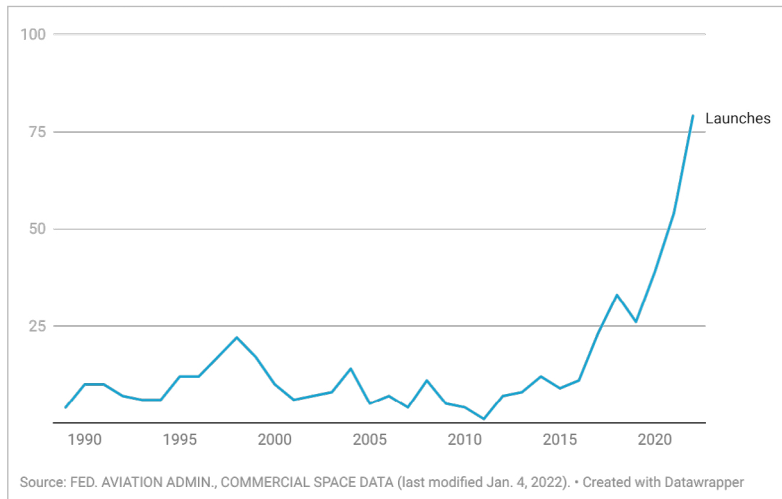
160 See FED. AVIATION ADMIN., HUMAN SPACEFLIGHT (last updated May 17, 2022), [https://www.faa.gov/space/human\\_spaceflight](https://www.faa.gov/space/human_spaceflight) (“Under federal law, the FAA is prohibited from regulating the safety of individuals on board. This legislative ‘moratorium,’ originally established in 2004, and extended three times by Congress, expires in October 2023.”).

161 Laura Montgomery, *Should Congress Extend the Moratorium on Regulating Human Spaceflight?* (Ctr. for Growth and Opportunity, RIF Paper, Feb. 2023), <https://www.thecgo.org/wp-content/uploads/2023/02/Human-Spaceflight-Moratorium-RIF.pdf>.

This authority applies not only to the rockets themselves, but to their payloads, and the FAA has issued several letters related to specific payloads to be sent beyond low earth orbit, and whether it will authorize such payloads to be launched under its payload review authority.<sup>162</sup>

Since it received explicit congressional authority to regulate launches, the FAA has issued over 530 authorizations (either licenses or permits) for space launches.<sup>163</sup> In addition, the FAA has issued a robust set of regulations under Title 14 of the Code of Federal Regulations,<sup>164</sup> and a number of explanatory letters and memos interpreting the FAA's authority in this area.<sup>165</sup>

Figure 1. Licensed Launches Since 1989



As figure 1 indicates, the pace of licensing has picked up substantially over the last few years. The Government Accountability Office (GAO) has questioned whether the FAA can meet the demands of the commercial space sector, even after issuing a set of streamlined regulations in 2020.<sup>166</sup>

FAA also has taken some steps to help the agency keep pace with changes in the industry. For example, in response to recommendations GAO made in 2019, FAA recently assessed its workforce to identify skills and competencies that are needed among its workforce and is working to improve its workload projections to

162 See, e.g., Fed. Aviation Admin. letter to David Weil, SpaceIL (July 30, 2018), [https://groundbasedspacematters.com/wp-content/uploads/2019/08/SpaceIL-Payload-Review-Determination-Letter-07\\_30\\_201812\\_compressed.pdf](https://groundbasedspacematters.com/wp-content/uploads/2019/08/SpaceIL-Payload-Review-Determination-Letter-07_30_201812_compressed.pdf) (favorable payload determination for a private lunar lander); Jeff Foust, *FAA Review a Small Step for Lunar Commercialization Efforts*, SPACE NEWS (Feb. 6, 2015), <https://spacenews.com/faa-review-a-small-step-for-lunar-commercialization-efforts/> (referencing a Dec. 22, 2014, favorable payload review for a lunar habitat proposed by Bigelow Aerospace).

163 SEE FED. AVIATION ADMIN., COMMERCIAL SPACE DATA (last modified Jan. 4, 2022), [https://www.faa.gov/data\\_research/commercial\\_space\\_data/](https://www.faa.gov/data_research/commercial_space_data/).

164 14 C.F.R. Parts 400–460.

165 See FED. AVIATION ADMIN., INTERPRETATIONS SEARCH, [https://www.faa.gov/about/office\\_org/headquarters\\_offices/agc/practice\\_areas/regulations/Interpretations/?year=all&q=%22commercial+space%22&cbSubmit=Search](https://www.faa.gov/about/office_org/headquarters_offices/agc/practice_areas/regulations/Interpretations/?year=all&q=%22commercial+space%22&cbSubmit=Search) (last visited June 14, 2023).

166 See Streamlined Launch and Reentry License Requirements, 14 C.F.R. § 401 (2020), [https://www.faa.gov/sites/faa.gov/files/space/additional\\_information/faq/SLR2\\_Final\\_Rule\\_450\\_2.pdf](https://www.faa.gov/sites/faa.gov/files/space/additional_information/faq/SLR2_Final_Rule_450_2.pdf). The author wonders if a rule is really “streamlined” when it still is 785 pages long. According to the FAA, “The streamlined rule provides a safe, performance-based regulatory approach to commercial space transportation. It promotes safety practices by creating flexibility for operators to meet safety requirements, and by enhancing collaboration among stakeholders. The rule also improves efficiency by encouraging potential and current launch site and reentry operators to suggest and implement design and operation solutions.” LEGISLATION & POLICIES, FED. AVIATION ADMIN., [https://www.faa.gov/space/legislation\\_regulation\\_guidance](https://www.faa.gov/space/legislation_regulation_guidance) (last visited June 15, 2023).

better account for the full range of its regulatory activities and the timeline of its licensing process. Such efforts are critical for ensuring FAA can better anticipate and respond to the growing and evolving commercial space industry and FAA's emerging workforce needs.

The continuing growth in the number of launches places a premium on FAA's ability to safely and efficiently integrate commercial space users into the National Airspace System. However, we reported in 2019, that both FAA officials and selected industry stakeholders said FAA's current approach is inefficient.<sup>167</sup>

Others have echoed those concerns,<sup>168</sup> and the FAA itself recently asked for more than a ten percent increase in its budget as part of the FY2024 budget.<sup>169</sup>

While the FAA has authority to license launches, reentries, and payloads, it does not have explicit authority to regulate *activities* in space beyond making determinations as to whether launches, reentries, and payloads pose a danger to the uninvolved public.<sup>170</sup> This “gap” has been noted before, and while the Obama administration originally intended to task the FAA to license space activities, the Trump administration thought that authority should vest in the Department of Commerce.<sup>171</sup> What both administrations missed, however, is that neither of these agencies has statutory authority to authorize or supervise innovative space uses, and even the current effort by the National Space Council cannot solve the problem without new statutory authority from Congress.<sup>172</sup>

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167 U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-21-105268, COMMERCIAL SPACE TRANSP.: FAA CONTINUES TO UPDATE REGULATIONS AND FACES CHALLENGES TO OVERSEEING AN EVOLVING INDUSTRY, 2, 15 (June 2021), <https://www.gao.gov/assets/gao-21-105268.pdf>.

168 See, e.g., Jeff Foust, *FAA Forecasts Surging Commercial Launch Activity*, SPACENEWS (Feb. 21, 2023), <https://spacenews.com/faa-forecasts-surging-commercial-launch-activity/> (“The Federal Aviation Administration forecasts that commercial launches it licenses could more than double in the next several years, putting an additional strain on the handful of spaceports that host them.”).

169 Marcia Smith, *FAA Requests More Funding, Staff for Commercial Space Transportation*, SPACEPOLICYONLINE.COM (Mar. 14, 2023), <https://spacepolicyonline.com/news/faa-requests-more-funding-staff-for-commercial-space-transportation/>.

170 See Laura Montgomery, *US Regulators May Not Prevent Private Space Activity on the Basis of Article VI of the Outer Space Treaty 3* (Mercatus Ctr., Working Paper, 2018), <https://www.mercatus.org/research/working-papers/us-regulators-may-not-prevent-private-space-activity-basis-article-vi-outer> (“[P]rivate actors may operate in outer space, even without authorization or supervision, and the FAA and other regulatory agencies may not rely on Article VI to attempt to deny these actors access to space.”). But see John Goehring, *Properly Speaking, the United States Does Have an International Obligation to Authorize and Supervise Commercial Space Activity*, 78 A.F.L. REV. 101 (2018) (arguing that without specific authority to authorize and supervise activities under Art. VI of the OST, such activities are automatically prohibited).

171 See Theresa Hitchens, *White House Nears Plan to Assign Regulatory Authorities for “New” Space Activities*, BREAKING DEFENSE (Feb. 23, 2023), <https://breakingdefense.com/2023/02/white-house-nears-plan-to-assign-regulatory-authorities-for-new-space-activities/> (“While the Obama administration had been eyeing FAA as the regulator of ‘novel’ space activities, the Trump administration’s 2018 Space Policy Directive-3 essentially laid the groundwork to establish Commerce as a one-stop-shop for most, if not all, non-traditional space operations. However, internal bureaucratic wrangling at NOAA, and a skeptical Congress, blocked any real progress toward that goal.”).

172 *Id.* “In the end, though, whatever the administration might propose, Congress is going to want the last word. While sources say there has been some internal Biden administration consideration of using an executive order to shake things out—based on the president’s unilateral authority to enforce the requirements of the 1967 Outer Space Treaty for national governments to exercise supervision of their commercial space actors—it is Congress’s job to provide the statutory authority for the reverts of the various federal agencies. Thus, as [Richard] DalBello [head of the Office of Space Commerce within the Department of Commerce] noted, there is an ongoing ‘dialogue’ between the administration and Congress.”

## 2. FAA Enforcement Authority over Launch and Reentry Activities

Congress granted the FAA enforcement powers under what is now Section 70115.<sup>173</sup> “A person may not violate this chapter, a regulation prescribed under this chapter, or any term of a license issued or transferred under this chapter.”<sup>174</sup> The FAA’s enforcement powers include the authority to “conduct investigations and inquiries,”<sup>175</sup> “take affidavits,”<sup>176</sup> “enter at a reasonable time a launch site, reentry site, production facility, assembly site of a launch vehicle or reentry vehicle, or site at which a payload is integrated with a launch vehicle or reentry vehicle to inspect an object to which this chapter applies or a record or report the Secretary requires be made or kept under this chapter,”<sup>177</sup> and “seize the object, record, or report when there is probable cause to believe the object, record, or report was used, is being used, or likely will be used in violation of this chapter.”<sup>178</sup> The FAA has the authority to suspend or revoke licenses,<sup>179</sup> and civil penalty authority under Section 70115(c).<sup>180</sup>

The FAA recently proposed a fine of \$175,000 against SpaceX for not submitting required pre-launch data on collision avoidance in conjunction with its August 19, 2022, Falcon 9 launch.<sup>181</sup> The FAA has been much more aggressive in suspending or revoking launch licenses under Section 50908.<sup>182</sup>

## D. The Department of Commerce—Still Adrift after All These Years

### 1. Commerce’s Regulatory Authority over Space Activities

Somewhat similar to the National Space Council, the role of the Department of Commerce in outer space regulation has been murky at best. Within the Department of Commerce resides both the Office of Space Commerce and the National Oceanic and Atmospheric Administration (NOAA) (discussed separately below) as it relates to the agency’s regulatory authority over remote sensing. The Secretary of Commerce originally created the Office of Space Commerce in 1988.<sup>183</sup>

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173 49 U.S.C. § 70115.

174 *Id.* § 70115(a).

175 *Id.* § 70115(b)(1)(A).

176 *Id.* § 70115(b)(1)(C).

177 *Id.* § 70115(b)(1)(D)(i).

178 *Id.* § 70115(b)(1)(D)(ii).

179 49 U.S.C. § 70107(c). *See also* 14 C.F.R. § 405.3.

180 49 U.S.C. § 70115(c) (“After notice and an opportunity for a hearing on the record, a person the Secretary finds to have violated subsection (a) of this section is liable to the United States Government for a civil penalty of not more than \$100,000. A separate violation occurs for each day the violation continues.”). *See also* 14 C.F.R. § 406.9; U.S. DEP’T TRANSP. ORDER 2150.3C 8-37 (2022), [https://www.faa.gov/documentLibrary/media/Order/FAA\\_Order\\_2150.3C\\_includingCHGS1-10.pdf](https://www.faa.gov/documentLibrary/media/Order/FAA_Order_2150.3C_includingCHGS1-10.pdf) (discussing procedures under Section 406.9).

181 *See* Press Release, Fed. Aviation Admin., FAA Proposes \$175,000 Fine Against SpaceX for Not Submitting Required Pre-Launch Data (Feb. 17, 2023), <https://www.faa.gov/newsroom/faq-proposes-175000-fine-against-spacex-not-submitting-required-pre-launch-data>.

182 51 U.S.C. § 50909; 14 C.F.R. § 405.3(a); *see also* D. Portee & J. Loftus, *Orbital Debris: A Chronology*, NASA/TP-1999-208856 at 136 (Jan. 1999) (“FAA Yanks Pegasus XL Launch License”), <https://ntrs.nasa.gov/api/citations/19990041784/downloads/19990041784.pdf> (“On December 8, the Federal Aviation Administration (FAA) suspends Orbital Science Corporation’s launch license after learning that the company does not intend to passivate the redesigned HAPS as it had agreed to do when granted its launch license in March 1997. The FAA restores the license after the company agrees to make a software fix to vent residual HAPS propellant.”).

183 *See* OFFICE OF SPACE COM., LEGAL AND DEPARTMENTAL AUTHORITIES OF THE OFFICE OF SPACE COM., <https://www.space>.

Although Congress appropriated money for the office as early as 1990,<sup>184</sup> Congress did not officially recognize or codify its roles, until 1998.<sup>185</sup> Despite numerous calls to separate the Office of Space Commerce from NOAA,<sup>186</sup> it remains underneath NOAA, and is not a “direct report” to the Secretary of Commerce. The role of the Office was amended in 2015, but Congress failed to provide it clear regulatory authority:<sup>187</sup>

The Office shall be the principal unit for the coordination of space-related issues, programs, and initiatives within the Department of Commerce, including—

- (1) to foster the conditions for the economic growth and technological advancement of the United States space commerce industry;
- (2) to coordinate space commerce policy issues and actions within the Department of Commerce;
- (3) to represent the Department of Commerce in the development of United States policies and in negotiations with foreign countries to promote United States space commerce;
- (4) to promote the advancement of United States geospatial technologies related to space commerce, in cooperation with relevant interagency working groups; and
- (5) to provide support to Federal Government organizations working on Space-Based Positioning Navigation, and Timing policy, including the National Coordination Office for Space-Based Position, Navigation, and Timing.<sup>188</sup>

Notwithstanding this lack of actual regulatory authority (or maybe implicitly admitting that no such authority exists), the Department of Commerce’s 2022–2026 Strategic Plan lists as the first strategy of the Office of Space Commerce:

STRATEGY 1: Coordinate regulatory functions across domestic and international stakeholders to promote competitiveness, and increase legal certainty for U.S. commercial space businesses. The Department will convene Federal, state, and international stakeholders as appropriate to identify and act on regulatory issues and opportunities for commercial space businesses with a whole-of-government approach. As commercial space activities expand into new areas and business models, the Department’s Office of Space Commerce will partner with these

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commerce.gov/law/office-of-space-commercialization/ (last visited June 15, 2023).

184 National Aeronautics and Space Administration Authorization Act, Fiscal Year 1991, Pub. L. No. 101-611, 104 Stat. 3188 (codified at 42 U.S.C. 2451 (1991)). The FY1991 budget for the office was \$487,000.

185 Technology Administration Act of 1998, Pub. L. No. 105-309, 112 Stat. 2935 (codified at 15 U.S.C. 271 (1998)).

186 See, e.g., Theresa Hitchens, *White House Nears Plan to Assign Regulatory Authorities for “New” Space Activities*, BREAKING DEFENSE (Feb. 23, 2023), <https://breakingdefense.com/2023/02/white-house-nears-plan-to-assign-regulatory-authorities-for-new-space-activities/>; Marcia Smith, *House Appropriators Continue to Reject Elevating NOAA’s Office of Space Commerce to Department Level – Update*, SPACEPOLICYONLINE.COM (July 13, 2020), <https://spacepolicyonline.com/news/house-appropriators-continue-to-reject-elevating-noaas-office-of-space-commerce-to-department-level/>.

187 U.S. Commercial Space Launch Competitiveness Act, Pub. L. No. 114-90, 129 Stat. 704 (2015), <https://www.congress.gov/114/plaws/publ90/PLAW-114publ90.pdf>.

188 51 U.S.C. § 50702(c).

stakeholders to coordinate regulatory functions that promote competitiveness and increase legal certainty for space businesses. Coordinated regulation will support existing space activities and ensure regulatory frameworks address emerging missions.<sup>189</sup>

While the Office of Space Commerce may have an important function in terms of interagency coordination, Congress never has bestowed on it any actual regulatory powers, especially not the power to promulgate rules related to commercial outer space activities (beyond those related to NOAA's licensing of remote sensing activities).

## 2. Commerce's Enforcement Authority

Given the fact that Congress has never given Commerce any authority to promulgate rules related to space activities, it should come as no surprise that Commerce lacks any specific enforcement powers related to space activities. While Commerce has plenty of enforcement authority in other areas, such as export controls,<sup>190</sup> and certain trade practices such as antidumping,<sup>191</sup> those powers appear to be limited to the specific and not generally applicable to other activities of the agency.<sup>192</sup>

## E. NOAA—Look, but Don't Tell

### 1. NOAA's Regulatory Authority

The one place space regulatory power exists in the Department of Commerce is with NOAA and its authority to regulate and license Earth remote sensing under the Land Remote Sensing Commercialization Act of 1984,<sup>193</sup> subsequently amended in 1992,<sup>194</sup> and 2010.<sup>195</sup> The remote sensing provisions in the U.S. Code reside in 51 U.S.C. Chapter 601.<sup>196</sup> Section 60124 specifically authorizes the Secretary of Commerce to issue regulations related to Earth remote sensing.<sup>197</sup> The rules for commercial remote sensing reside in 15 CFR Part 960.

Placing regulatory authority within an agency that also has operational authority to provide weather and other remote sensing services has produced a rocky history for commercial remote sensing (CRS).<sup>198</sup> NOAA's regulatory authority is also somewhat constrained by the national security

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189 U.S. DEP'T OF COM., 2022–2026 STRATEGIC PLAN 26, <https://www.commerce.gov/sites/default/files/2022-03/DOC-Strategic-Plan-2022%E2%80%932026.pdf>.

190 *See, e.g.*, 50 U.S.C. § 4820.

191 *See* 19 U.S.C. §§ 4371 et seq.

192 *See, e.g.*, 50 U.S.C. § 4820(a) (“In order to enforce *this subchapter*, the Secretary, on behalf of the President, may exercise, in addition to relevant enforcement authorities of other Federal agencies, the authority to . . .”) (emphasis added).

193 Land Remote-Sensing Commercialization Act of 1984, Pub. L. No. 98-365, 96 Stat. 1601 (codified at 15 U.S.C. § 4201 et seq. (1984)).

194 *See* Land Remote Sensing Policy Act of 1992, Pub. L. No. 102-555, 106 Stat. 4163.

195 Act of Dec. 18, 2010, Pub. L. No. 111-314, § 6, 124 Stat. 3444.

196 51 U.S.C. §§ 60101 et seq.

197 51 U.S.C. § 60124 (“The Secretary may issue regulations to carry out this *subchapter*. Such regulations shall be promulgated only after public notice and comment in accordance with the provisions of section 553 of title 5 [the Administrative Procedure Act]”) (emphasis added).

198 For a full discussion of the political history of remote sensing and NOAA, *see* Kenneth P. Thompson, A Political History of U.S. Commercial Remote Sensing, 1984–2007: Conflict, Collaboration, and the Role of Knowledge in the High-Tech World of Earth Observation Satellites (Nov. 20, 2007) (Ph.D. dissertation, Virginia Polytechnic Institute), <https://vtechworks.lib.vt.edu/bitstream/>



concerns posed by a technology that can reveal detailed information about human activity on the planet.

As a large technological system, the global panopticon of earth-imaging satellites has significant political implications that directly impact society. As earth observation systems have steadily advanced in technological sophistication, the U.S. political and bureaucratic institutions have been and will continue to be increasingly challenged to create, develop, refine, and implement policies that both promote the U.S. CRS industry and protect society (primarily in the U.S. but also on the international stage) from perceived threats posed by CRS systems. Such threats include the use of CRS as potential weapons in the hands of terrorists and narco-criminal enterprises, etc. The fact that CRS is considered a dual-use technology (i.e., can be used for military and non-military purposes) has created a rocky relationship between the U.S. CRS industry and USG actors. In other words, the technological capabilities of commercial observation satellites create a plethora of national security concerns and contentious policy issues.<sup>199</sup>

These concerns have resulted in a cumbersome interagency process for review of remote sensing licenses.

The principal Parties to this [Memorandum of Understanding (MOU)] are the Department of Commerce (DOC), Department of State (DOS), Department of Defense (DOD), and Department of the Interior (DOI). The Office of the Director of National Intelligence (ODNI) and the Joint Chiefs of Staff (JCS) provide supporting advice pertaining to their areas of expertise. The Secretary of commerce is responsible for administering the licensing of private remote sensing satellite systems pursuant to the Act and applicable directives, and fulfills this responsibility through the National Oceanic and Atmospheric Administration (NOAA). For remote sensing issues, the Act also grants the authority to the Secretary of State to determine conditions necessary to meet international obligations and foreign policies, and to the Secretary of Defense to determine conditions necessary to meet the national security concerns raised by any remote sensing license application submitted pursuant to the Act and applicable directives, or to any amendment, renewal, or successor thereto. In addition, pursuant to this MOU, NOAA shall also consult with the Director of National Intelligence (DNI) for the views of the Intelligence Community (IC) and with the Chairman of the Joint Chiefs of Staff for the views of the DOD joint operational community.<sup>200</sup>

The market for remote sensing data developed very slowly once Congress “privatized” the Landsat system in the 1980s. Three factors allowed commercial remote sensing to emerge: 1) markets beyond the U.S. government began to develop; 2) remote sensing data could be operationalized

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handle/10919/30235/STS\_Dissertation\_Ken\_Thompson\_2007.pdf.

199 *Id.* at 10.

200 *See* Memorandum of Understanding Among the Departments of Commerce, State, Defense, and Interior, and the Office of the Director of National Intelligence, Concerning the Licensing and Operations of Private Remote Sensing Satellite Systems, 15 C.F.R. App'x D to Part 960 (2017).

through more sophisticated GIS systems; and 3) remote sensing satellite systems became smaller, cheaper, and easier to deploy. What began as a slow (almost non-existent) trickle of applications for commercial remote sensing licenses in the 1980s and 1990s began to rapidly expand until by the mid-2010s, there was a substantial backlog at NOAA, which slowed down processing times substantially.

During a panel session at the Satellite 2017 conference March 7, Tahara Dawkins, director of commercial remote sensing regulatory affairs at NOAA, said that prior to 2011, it took her office an average of 51 days to complete a review of a license application. That timeline, she said, was possible given the similarity in concepts for satellite systems being proposed. The situation is very different today. “What I’m getting in my office now is that, from one application to the next, they just don’t look alike,” she said. “Every week we’re getting applications with technology we just haven’t seen yet. And so we have to look at it and give it a thorough review.” Dawkins also acknowledged that her office is understaffed. “There’s no way we can keep up with the demand of this U.S. industry with the way we have been doing business,” she said.<sup>201</sup>

Congress even got into the act, demanding that NOAA explain why applications that are required to be processed within 120 days<sup>202</sup> still remained ungranted after three years.<sup>203</sup> This ultimately led the Department of Commerce to a significant overhaul of the remote sensing rules in 2020.<sup>204</sup> These changes included a simplified application and review process for remote sensing satellites with lower resolutions.

At this point, I would be remiss not to give a public service announcement about NOAA’s licensing requirements. If you are a U.S. entity planning to operate a private spacecraft with an imager on it, please know that you must comply with NOAA’s regulations. The government has certain national security concerns when it comes to satellite imagery, and these must be considered before authorizing space systems capable of imaging Earth.

Having said that, not all imagers in space need a license. In some cases, imagers used primarily for mission assurance purposes may be totally exempt from NOAA licensing.

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201 Jeff Foust, *Commercial Remote Sensing Companies Seek Streamlined Regulations*, SPACENEWS (Mar. 17, 2017), <https://spacenews.com/commercial-remote-sensing-companies-seek-streamlined-regulations/>.

202 See 51 U.S.C. § 60121(c) (“The Secretary shall review any application and make a determination thereon within 120 days of the receipt of such application. If final action has not occurred within such time, the Secretary shall inform the applicant of any pending issues and of actions required to resolve them.”).

203 See Letter from Lamar Smith, Chair, Committee on Science, Space, and Technology, and Bruce Babin, Subcommittee on Space, to Dept. of Commerce Secretary Penny Pritzker (June 6, 2016), [https://republicans-science.house.gov/\\_cache/files/f/9/f9468fb3-48cc-4135-80ef-c422759328a0/E47E788FF027BFD99F3C4764A9697208.2016-06-06-cls-to-noaa-re-swir-final-to-senior-review.pdf](https://republicans-science.house.gov/_cache/files/f/9/f9468fb3-48cc-4135-80ef-c422759328a0/E47E788FF027BFD99F3C4764A9697208.2016-06-06-cls-to-noaa-re-swir-final-to-senior-review.pdf).

204 See 85 Fed. Reg. 30,790 (May 20, 2020). Interestingly, in promulgating these new rules, the Department of Commerce originally indicated that it intended to expand its regulatory authority to include remote sensing of not just Earth, but other celestial bodies as well. In its final rules, however, it specifically excluded the requirement to acquire a land remote sensing license to view any object other than Earth. See also Laura Montgomery, *NOAA’s Changes to Its Remote Sensing Requirements*, GROUND BASED SPACE MATTERS (May 22, 2020), <https://groundbasedspacematters.com/index.php/2020/05/22/noaas-changes-to-its-remote-sensing-requirements/>.

For those needing a license, thanks to a 2020 rewrite of our rules, the vast majority of imagers may only need simple licenses, with minimal conditions. To promote transparency, most of the license conditions are identified in the governing regulations. Only the most advanced, novel imagers are potentially subject to additional operating conditions based on national security, and even those conditions are time-limited.<sup>205</sup>

In addition to adding much needed clarity to NOAA's rules, these changes (along with increased staffing), have allowed NOAA to significantly reduce processing time for commercial remote sensing applications.

I am proud to say that NOAA's licensing of commercial remote sensing space systems has improved in terms of speed and efficiency. In 2022, the average time to process a new license application was 22 days, a 20% improvement over the previous year. Today, we oversee 92 licenses held by 70 licensees for 1,215 satellites. 415 of those are currently on orbit.<sup>206</sup>

In that same speech, however, Assistant Secretary Morgan demonstrated either confusion over the role of the Department of Commerce, or the tension between NOAA and the Office of Space Commerce (that sits within NOAA).

[After discussion of NOAA's (not the Office of Space Commerce's) regulatory role:] So that is the current regulatory role of the Office of Space Commerce—but there is an active conversation in Washington over whether this should be expanded beyond remote sensing operations. You may recall that Vice President Harris was here in Silicon Valley last August with members of the National Space Council. At that time, she announced the Administration's ongoing work to develop a framework to replace outdated space rules, replacing them with a new rules framework that keeps pace with the pace of private sector innovation—in part to ensure they are conducted safely, efficiently, and sustainably. NOAA is actively engaged and strongly supportive of this process. We stand ready to support the best possible oversight of new commercial space activities in a way that promotes competitiveness and increases legal certainty for U.S. businesses.

As stated in the U.S. Space Priorities Framework, which is this Administration's guiding document on space policy, "U.S. regulations must provide clarity and certainty for the authorization and continuing supervision of non-governmental space activities, including for novel activities such as on-orbit servicing, orbital debris removal, space-based manufacturing, commercial human spaceflight, and recovery and use of space resources."

NOAA and the Department of Commerce view space mission authorization as critical to promoting competitiveness and increasing legal certainty for U.S. commercial space businesses. Through the Office of Space Commerce, we already

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205 Michael Morgan, NOAA Assistant Secretary for Environmental Observation and Prediction, Remarks at SmallSat Symposium 2023 (Feb. 7, 2023), <https://spaceref.com/space-commerce/remarks-by-michael-morgan-noaa-assistant-secretary-for-environmental-observation-and-prediction-at-smallsat-2023/>.

206 *Id.*

play an important role in licensing commercial remote sensing satellites. Our regulatory approach is highly effective in promoting U.S. commercial leadership in space while protecting public interests.<sup>207</sup>

The problem remains, of course, that outside of remote sensing licensing, the Department of Commerce has no statutory regulatory authority. When NOAA attempted to expand its authority to license “missions to conduct remote sensing from an orbit of any celestial body,”<sup>208</sup> commenters pointed out that such increased authority was not supported by the language of the Act. Commerce then backtracked on this proposal.

After considering public comments and pertinent policy considerations, this definition now applies only to (1) remote sensing conducted when in orbit of the Earth, rather than in orbit of any celestial body; and (2) to collecting data that can be processed into imagery of the surface features of the Earth. This definition is based on the definition of “land remote sensing” found at 51 U.S.C. 60101(4). Therefore, systems that can only produce data that cannot be processed into Earth-surface imagery are not required to obtain a license under this final rule.<sup>209</sup>

Given this acknowledgement of its regulatory authority, it would be extremely difficult for Commerce to attempt to grant “mission authorizations” for space activities beyond Earth remote sensing without further statutory authority from Congress.

## 2. NOAA’s Enforcement Authority over Remote Sensing

Congress afforded the Department of Commerce certain enforcement authority in the remote sensing statute, including issuing civil penalties.<sup>210</sup> The enforcement provisions of Commerce’s

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<sup>207</sup> *Id.*

<sup>208</sup> Department of Commerce, Licensing of Private Remote Sensing Space Systems, Notice of Proposed Rulemaking, Docket No. 100903432–9396–01, 84 Fed. Reg. 21,282, 21,283 (May 14, 2019), <https://www.govinfo.gov/content/pkg/FR-2019-05-14/pdf/2019-09320.pdf>.

<sup>209</sup> Department of Commerce, Licensing of Private Remote Sensing Space Systems, Final Rule, Docket No. 200407–0101, 85 Fed. Reg. 30,790, 30,796 (May 20, 2020).

<sup>210</sup> 51 U.S.C. § 60123(a).

Functions.—In order to carry out the responsibilities specified in this subchapter, the Secretary may—

- (1) grant, condition, or transfer licenses under this chapter;
- (2) seek an order of injunction or similar judicial determination from a district court of the United States with personal jurisdiction over the licensee to terminate, modify, or suspend licenses under this subchapter and to terminate licensed operations on an immediate basis, if the Secretary determines that the licensee has substantially failed to comply with any provisions of this chapter, with any terms, conditions, or restrictions of such license, or with any international obligations or national security concerns of the United States;
- (3) provide penalties for noncompliance with the requirements of licenses or regulations issued under this subchapter, including civil penalties not to exceed \$10,000 (each day of operation in violation of such licenses or regulations constituting a separate violation);
- (4) compromise, modify, or remit any such civil penalty;
- (5) issue subpoenas for any materials, documents, or records, or for the attendance and testimony of witnesses for the purpose of conducting a hearing under this section;
- (6) seize any object, record, or report pursuant to a warrant from a magistrate based on a showing of probable cause to believe that such object, record, or report was used, is being used, or is likely to be used in violation of this chapter or the requirements of a license or regulation issued thereunder; and
- (7) make investigations and inquiries and administer to or take from any person an oath, affirmation, or affidavit concerning any matter relating to the enforcement of this chapter.

authority are contained in 15 CFR Section 960.17.<sup>211</sup> This includes the ability to utilize the Department of Commerce’s Civil Procedures contained in 15 CFR Part 904,<sup>212</sup> and the procedure for issuing civil penalties.<sup>213</sup> One commenter has noted, however, related to the ability of the U.S. government to stop dissemination of sensitive information (so-called “shutter control”), that because Commerce’s civil penalty authority is limited to \$10,000, “a licensee might simply decide that the cost of compliance is more than the price of punishment.”<sup>214</sup> I am unable to find any examples of the Department of Commerce using its civil penalty authority.

## F. NASA—Experts in Science and Engineering but without Regulatory Expertise

### 1. NASA’s Regulatory Authority

For many, when they think of outer space, they think of NASA. There was a long period in which many commercial space ventures were viewed with high skepticism, the argument being that if the space endeavor was important, NASA would be doing it. Indeed, there was a certain “giggle factor” related to space activities that were neither telecommunications related, nor conducted by NASA.<sup>215</sup> You can’t really blame people, as NASA has been given a significant role in outer space *exploration*. That comes from NASA’s enabling statute, the National Aeronautics and Space Act of 1958.<sup>216</sup> The functions of NASA, as envisioned in 1958 were to:

- (1) plan, direct, and conduct aeronautical and space activities;
- (2) arrange for participation by the scientific community in planning scientific measurements and observations to be made through use of aeronautical and space vehicles, and conduct or arrange for the conduct of such measurements and observations; and
- (3) provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof.<sup>217</sup>

Congress provided some regulatory authority to NASA, “to make, promulgate, issue, rescind, and amend rules and regulations governing the manner of its operations and the exercise of the powers vested in it by law.”<sup>218</sup> Nonetheless, NASA is not a regulatory agency.<sup>219</sup>

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211 15 C.F.R. § 960.17.

212 15 C.F.R. §§ 904.1 et seq.

213 15 C.F.R. § 904.100 et seq.

214 Brad Townsend, *The Remote Sensing Revolution Threat*, 15 STRATEGIC STUD. Q. 10 (2021), [https://www.airuniversity.af.edu/Portals/10/SSQ/documents/Volume-15\\_Issue-3/Townsend.pdf](https://www.airuniversity.af.edu/Portals/10/SSQ/documents/Volume-15_Issue-3/Townsend.pdf). The author goes on to say, “A provider could also maliciously conclude that the value of the shutter-controlled imagery is worth much more than the fine and sell it despite the government order.” *Id.*

215 See Jeff Foust, *Mining Issues in Space Law*, SPACE REV. (May 9, 2016), <https://www.thespacereview.com/article/2981/1> (quoting James Dunstan’s presentation at a Secure World Foundation conference, *The Giggle Factor Is Gone*). See also *What If an Asteroid Was About to Hit Earth? Scientists Ponder Question*, RTL TODAY (Apr. 30, 2019), <https://today.rtl.lu/news/science-and-environment/a/1340995.html> (“The idea that the planet Earth may one day have to defend itself against an asteroid used to elicit what experts call a ‘giggle factor.’ But that was prior to NASA establishing its Planetary Defense Coordination Office in 2016.”).

216 National Aeronautics and Space Act of 1958, Pub. L. No. 85-568, 72 Stat. 426 (codified at 42 U.S.C. 2451 (1958)).

217 *Id.* § 203(a).

218 *Id.* § 203(b).

219 See NAT’L AERONAUTICS AND SPACE ADMIN., PRELIMINARY PLAN FOR RETROSPECTIVE ANALYSIS OF EXISTING REGULATIONS (May 18, 2011), <https://obamawhitehouse.archives.gov/files/documents/2011-regulatory-action-plans/>

Congress has amended the NASA Act numerous times.<sup>220</sup> Of particular import to this discussion, and in determining whether NASA has any regulatory authority over commercial activities in space, the 1958 NASA Act did not contain either the terms “industry,” or “commercial.” The issue of NASA’s interface with commercial space ventures has slowly crept into the NASA statute, most notably with the addition of Section 102(b) in 1985.

The Congress declares that the general welfare of the United States requires that the National Aeronautics and Space Administration (as established by title II of this Act) seek and encourage, to the maximum extent possible, the fullest commercial use of space.<sup>221</sup>

Congress in 1991 again directed NASA to “seek and encourage, to the maximum extent possible, the fullest commercial use of space; and encourage and provide for Federal Government use of commercially provided space services and hardware, consistent with the requirements of the Federal Government.”<sup>222</sup> In neither of these two instances, however, did Congress order NASA to “regulate” or “authorize” commercial use of outer space.

14 CFR Chapter V contains the rules and regulations promulgated by NASA over the years.<sup>223</sup> The vast majority of these regulations address truly internal operations of NASA.<sup>224</sup> Other rules touch on tangential commercial activities, such as Part 1214, which relates to International Space Station (ISS) crew and use of the NASA insignia.<sup>225</sup> Probably the most important NASA regulation touching on commercial space is contained in Part 1245, which prescribes regulations for the waiver of rights of the government of the United States to inventions made under NASA contract.<sup>226</sup> Finally,

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NationalAeronauticsandSpaceAdministrationPreliminaryRegulatoryReformPlan.pdf (“NASA is not fundamentally a public regulatory agency.”).

220 *See, e.g.*, National Aeronautics and Space Administration Authorization Act of 1964, Pub. L. No. 88-113, 77 Stat. 141, 144 (1963); National Aeronautics and Space Administration Authorization Act of 1972, Pub. L. No. 92-68, 85 Stat. 174, 177 (1971); National Aeronautics and Space Administration Authorization Act of 1974, Pub. L. No. 93-74, 87 Stat. 171, 174-5 (1973); National Aeronautics and Space Administration Authorization Act, Pub. L. No. 94-39, 89 Stat. 218, 222 (1975); National Aeronautics and Space Administration Authorization Act of 1979, Pub. L. No. 95-401, 92 Stat. 857, 860 (1978); National Aeronautics and Space Administration Authorization Act of 1980, Pub. L. No. 96-48, 93 Stat. 345, 348 (1979); National Aeronautics and Space Administration Authorization Act of 1982, Pub. L. No. 97-96, 95 Stat. 1207, 1210 (1981); National Aeronautics and Space Administration Authorization Act of 1984, Pub. L. No. 98-52, 97 Stat. 281, 285 (1983); National Aeronautics and Space Administration Authorization Act of 1985, Pub. L. No. 98-361, 98 Stat. 422, 426 (1984); National Aeronautics and Space Administration Authorization Act of 1988, Pub. L. No. 100-147, 115, 101 Stat. 860, 866 (1987); National Aeronautics and Space Administration Authorization Act of 1989, Pub. L. No. 100-685, 102 Stat. 4083, 4093, (1988); National Aeronautics and Space Administration Authorization Act of 1989, Pub. L. No. 100-685, 102 Stat. 4083, 4090-1 (1988); National Aeronautics and Space Administration Authorization Act of 1991, Pub. L. No. 101-611, 104 Stat. 3188, 3197 (1990); National Aeronautics and Space Administration Authorization Act of 1993, Pub. L. No. 102-588, § 509, 106 Stat. 5107, 5129 (1992); National Aeronautics and Space Administration Authorization Act of 2000, Pub. L. No. 106-377, § 1(a)(1), 114 Stat. 1441 (2000).

221 Subsection (c) was added by the National Aeronautics and Space Administration Authorization Act of 1985, Pub. L. No. 98-361, § 110(a), 98 Stat. 422, 426 (1984), and required a relettering of the subsequent subsections. *See also* Section 203(a)(4), which also added that NASA shall “seek and encourage, to the maximum extent possible, the fullest commercial use of space.”

222 Section 203(a)(4)-(5), added by the 1991 NASA Authorization Act, Pub. L. No. 101-611, § 107, 104 Stat. 3188, 3197.

223 14 C.F.R. ch. V, National Aeronautics and Space Administration.

224 *See, e.g.*, 14 C.F.R. § 1203a (NASA Security Areas); § 1203b (arrest authority and use of force by NASA security for personnel); § 1206 (dealing with FOIA requests); § 1213 (release of information to news and information media); § 1232 (care and use of animals in conduct of NASA activities).

225 14 C.F.R. § 1214. Sections 1214.403 and 1214.602, for example, prohibit ISS crew from selling “mementos” carried up to the ISS. Similarly, Section 1221.100 prohibits the use of the NASA insignia by NASA employees which “in any manner that would imply that NASA endorses a commercial product, service, or activity or that material of a nonofficial nature represents NASA’s official position.” 14 C.F.R. § 1221.110(b)(5).

226 14 C.F.R. § 1245, amended in 2015. *See* Patents and Other Intellectual Property Rights, Final Rule, Docket No. NASA-2015-0001,

Part 1266 imposes cross-waiver of liability requirements, which essentially relieves the government of liability for activities onboard ISS, which includes commercial activities (although the word “commercial” does not appear).<sup>227</sup>

Beyond the regulations contained in Title 14 of the CFR, commercial entities doing business with NASA are often subject to the Federal Acquisition Regulations (FAR), NASA FAR Supplement (NFS).<sup>228</sup> NASA and commercial companies can sometimes avoid the cumbersome NFS requirements by entering into Space Act Agreements under NASA’s “other transactions” authority.<sup>229</sup> NASA has used this authority to great effect within the past decade, saving NASA an extensive amount of money.<sup>230</sup> But to be clear, these Space Act Agreements are contracting methods, not regulations in the purest sense of the term.

NASA also issues NASA Interim Directives (NIDs) related to its interaction with commercial entities.<sup>231</sup> Yet these NIDs still involve essentially contractual relationships with a direct involvement of NASA as one party (e.g., owner and operator of the ISS), rather than rules handed down by NASA regulating the activities of commercial entities outside of its relationship with NASA.

To see how these regulations and contracts work in practice, the Axiom-1 mission provides an interesting model. Axiom Space launched its Axiom-1 mission to the ISS on April 8, 2022, the first purely private mission to ISS.<sup>232</sup> In order to gain NASA approval to dock with the ISS, Axiom entered into a very detailed agreement with NASA, which required Axiom to purchase \$10 million in insurance for any potential damage done to ISS during the stay.<sup>233</sup> Efforts to effectively determine NASA’s cost in hosting the Axiom-1 crew was abandoned as not practical.<sup>234</sup> So, rather

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80 Fed. Reg. 19,196 (Apr. 10, 2015), <https://www.govinfo.gov/content/pkg/FR-2015-04-10/pdf/2015-08145.pdf>.

227 14 C.F.R. § 1266.

228 48 C.F.R. § 1801 et seq., Title 48, ch. 18, <https://www.hq.nasa.gov/office/procurement/regs/NFS.pdf>.

229 See 51 U.S.C. § 20113(e) (NASA is authorized “to enter into and perform such contracts, leases, cooperative agreements, or other transactions as may be necessary in the conduct of its work and on such terms as it may deem appropriate, with any agency or instrumentality of the United States, or with any State, Territory, or possession, or with any political subdivision thereof, or with any person, firm, association, corporation, or educational institution.”). See also NAT’L AERONAUTICS & SPACE ADMIN. OFFICE OF GENERAL COUNSEL, SPACE ACT AGREEMENTS GUIDE (Feb. 25, 2013), [https://www.nasa.gov/sites/default/files/files/NAII\\_1050-1C\\_NASA\\_Advisory\\_Implementing\\_Instruction\\_Space\\_Act\\_Agreements\\_Guide\\_Tagged.pdf](https://www.nasa.gov/sites/default/files/files/NAII_1050-1C_NASA_Advisory_Implementing_Instruction_Space_Act_Agreements_Guide_Tagged.pdf).

230 See, e.g., Dennis Stone, *A New Era in Space Flight: The COTS Model of Commercial Partnerships at NASA*, PROCEEDINGS OF THE 13TH REINVENTING SPACE CONFERENCE (2018), [https://link.springer.com/chapter/10.1007/978-3-319-32817-1\\_12](https://link.springer.com/chapter/10.1007/978-3-319-32817-1_12); Eli Dourado, *A 2006 NASA Program Shows How Government Can Move at the Speed of Startups*, CTR. FOR GROWTH AND OPPORTUNITY (Mar. 15, 2021), <https://www.thecgo.org/benchmark/a-2006-nasa-program-shows-how-government-can-move-at-the-speed-of-startups/> (“A COTS-style contract is not a panacea, but the program demonstrates an alternative approach to procurement that has considerable strengths. In particular, it lets feisty newcomers like SpaceX contribute to government programs while still moving at the speed of startups, not the speed of government. If SpaceX had instead signed on to a cost-plus program to develop a NASA-owned vehicle to deliver cargo to the ISS, the company would have faced the same incentive every other contractor does—to slow down—and might have lost its soul.”).

231 See, e.g., NASA Interim Directive (NID): Use of International Space Station (ISS) for Commercial and Marketing Activities, Human Exploration and Operations Mission Directorate (June 6, 2019), [https://www.nasa.gov/sites/default/files/atoms/files/nid\\_8600\\_121\\_tagged.pdf](https://www.nasa.gov/sites/default/files/atoms/files/nid_8600_121_tagged.pdf).

232 See *The Next Giant Leap for Humanity Starts Here. And Now.*, AXIOM SPACE, <https://www.axiomspace.com/ax1> (last visited June 29, 2023).

233 See Ana Guzman, *NASA Enables First Private Astronaut Mission to Station*, NASA (Apr. 5, 2022), <https://www.nasa.gov/leo-economy/nasa-enables-first-private-astronaut-mission-to-station>. See also NASA, COMMERCIAL LOW-EARTH ORBIT DEVELOPMENT PROGRAM (CLDP) PRIVATE ASTRONAUT MISSION (PAM) MISHAP PREPAREDNESS & CONTINGENCY PLAN, REV D (Mar. 24, 2022), [https://sma.nasa.gov/docs/default-source/sma-disciplines-and-programs/mishap-investigation/commercial-low-earth-orbit-development-program.pdf?sfvrsn=b1cbc2f8\\_4](https://sma.nasa.gov/docs/default-source/sma-disciplines-and-programs/mishap-investigation/commercial-low-earth-orbit-development-program.pdf?sfvrsn=b1cbc2f8_4) (calculating potential damage possible to ISS by commercial astronaut visitations).

234 Irene Klotz, *With Axiom-1 Mission, NASA Enters New Commercial Regime*, AVIATION WEEK NETWORK (Apr. 1, 2022), <https://aviationweek.com/shows-events/space-symposium/axiom-1-mission-nasa-enters-new-commercial-regime> (“Calculating costs for some of the other station systems that the Ax-1 crew will use, such as carbon dioxide scrubbers, is not practical—at least not during these early days of private travel to the International Space Station (ISS), which is owned and operated by five government space agencies.”).

than trying to adopt rules related to commercial crew visitation to ISS, NASA chose to “regulate” through contract. Literally holding the keys to ISS’s front door, NASA could demand contractual protections rather than try and promulgate broader regulations related to commercial activity onboard ISS.<sup>235</sup>

Ultimately, the unanswered question is the extent of NASA’s authority to issue regulations for commercial activities that do not directly impact NASA operations. On the one hand, Section 203 allows the NASA Administrator to “to make, promulgate, issue, rescind, and amend rules and regulations governing the manner of its operations and the exercise of the powers vested in it by law.” NASA apparently has interpreted this statutory authority narrowly, as can be seen in the rules promulgated in 14 CFR Part Chapter 5. This makes sense if this provision is interpreted based on NASA’s overall statutory authority as contemplated by Congress in 1958. With the addition of language related to commercial operations, however, an aggressive NASA might decide that it too wants in on the regulatory game, and push to promulgate rules over commercial operations that do not touch directly on its “operations.”

## 2. NASA’s Enforcement Authority

The argument that NASA’s regulatory authority is limited to procedural, or “housekeeping” functions is buttressed by the fact that neither its authorizing statute, nor any regulations actually outline NASA’s enforcement authority. For example, in its 2011 “Preliminary Plan for Retrospective Analysis of Existing Regulations,”<sup>236</sup> the only references to “enforce” related to the spacecraft commander rights to “enforce order and discipline,”<sup>237</sup> and restrictions on lobbying that are to be enforced through penalties.<sup>238</sup> The only reference to “penalties” refers to enforcing the Fraud Civil Penalties Act of 1986.<sup>239</sup>

On the contract side of things, NASA has flexed its muscle threatening or issuing monetary penalties to its contractors.<sup>240</sup> It routinely suspends or revokes contracts when contractors breach or otherwise fail to perform, or when NASA priorities change.<sup>241</sup>

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235 In determining whether NASA needs additional regulatory authority, Congress should fully review NASA’s history of entering into contracts that protect its assets. Indeed, it may be that NASA may be able to continue using its contracting authority as a proxy for commercial regulations, as least for the foreseeable future.

236 NASA, PRELIMINARY PLAN FOR RETROSPECTIVE ANALYSIS OF EXISTING REGULATIONS (2011), <https://obamawhitehouse.archives.gov/files/documents/2011-regulatory-action-plans/NationalAeronauticsandSpaceAdministrationPreliminaryRegulatoryReformPlan.pdf>.

237 *Id.* at 8.

238 *Id.* at 11.

239 *Id.* at 11.

240 See, e.g., *NASA Considering \$10 million Penalty for Rocket’s Maker*, N.Y. TIMES (Nov. 20, 1986), <https://www.nytimes.com/1986/11/20/us/nasa-considering-10-million-penalty-for-rocket-s-maker.html> (“Officials at the Marshall Space Flight Center here are considering penalizing the maker of the space shuttle booster rocket, Morton Thiokol Inc., \$10 million because of the Challenger disaster, a space agency official said today.”).

241 See, e.g., GAO, NASA: ASSESSMENTS OF MAJOR PROJECTS 75 (2022), <https://www.gao.gov/assets/gao-22-105212.pdf> (NASA cancels the Plasma Diagnostics Package from the Solar Electric Propulsion project after failure of design review).



## G. Department of Defense and the Space Force—Keepers of National Security

Of all the vital roles that the Department of Defense plays in American society, regulating commercial outer space activities doesn't come swiftly to mind. Because DoD is entrusted with protecting our national security, however, it has an oversized impact on commercial space, which goes beyond the nearly \$30 billion budget of the Space Force, much of which flows into the private sector in the form of research, development, and testing of space defense (and dual use) systems.<sup>242</sup> But DoD's interest in space is not limited to the Space Force, as one report estimates that there are more than 60 organizations with military space interests or responsibilities within DoD.<sup>243</sup> Thus, DoD is a major player in outer space.

### 1. DoD's Regulatory Authority

DoD has established the “DoD Regulatory Program,”<sup>244</sup> which lists as its “authority” the Administrative Procedures Act,<sup>245</sup> the Federal Register Act,<sup>246</sup> the Unfunded Mandates Reform Act,<sup>247</sup> the Regulatory Flexibility Act,<sup>248</sup> the Paperwork Reduction Act,<sup>249</sup> and the Congressional Review Act.<sup>250</sup> DoD has issued a number of regulations over the years, contained in Title 32 of the Code of Federal Regulations, which include the FARs.<sup>251</sup> As with NASA's regulations, however, most of Title 32 (apart from the FARs), relate to the internal operations of the various defense branches.<sup>252</sup>

DoD also has a major impact on commercial space, especially given its historic role in space situational awareness (SSA).<sup>253</sup> DoD participates in a number of interagency groups, often designated

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242 See U.S. DEP'T OF DEFENSE, SPACE FORCE FOCUSES ON PARTNERSHIPS, SPIRIT, COMBAT READINESS (2023), <https://www.defense.gov/News/News-Stories/Article/Article/3330161/space-force-focuses-on-partnerships-spirit-combat-readiness/> (“The U.S. Space Force's \$30 billion budget request for Fiscal Year 2024 is about \$3.9 billion over what was enacted for the service in FY2023. More than 60% of the Space Force budget, about \$19.2 billion worth, is aimed at research, development, testing and evaluation.”). By comparison, NASA's FY2024 budget request is \$27.2 billion. NASA, FY2024 BUDGET ESTIMATES, [https://www.nasa.gov/sites/default/files/atoms/files/nasa\\_fy\\_2024\\_cj\\_v2.pdf](https://www.nasa.gov/sites/default/files/atoms/files/nasa_fy_2024_cj_v2.pdf).

243 Robin Dickey, *Building Normentum: A Framework for Space Norm Development* at 3, CTR. FOR SPACE POL'Y AND STRATEGY (July 2021), [https://csp.s.aerospace.org/sites/default/files/2021-07/Dickey\\_BuildingNormentum\\_20210706.pdf](https://csp.s.aerospace.org/sites/default/files/2021-07/Dickey_BuildingNormentum_20210706.pdf), citing GAO, DEFENSE SPACE ACQUISITIONS: TOO EARLY TO DETERMINE IF RECENT CHANGES WILL RESOLVE PERSISTENT FRAGMENTATION IN MANAGEMENT AND OVERSIGHT (2016), <https://www.gao.gov/assets/680/678697.pdf>.

244 See U.S. DEP'T OF DEFENSE, *Regulatory Authorities*, <https://open.defense.gov/Regulatory-Program/Authorities/> (last visited June 29, 2023).

245 5 U.S.C. §§ 551–559. Interestingly, the DoD is actually exempt from the APA's procedural requirements for rulemaking. 5 U.S.C. § 552(a). See also TODD GARVEY, CONGRESSIONAL RESEARCH SERVICE, A BRIEF OVERVIEW OF RULEMAKING AND JUDICIAL REVIEW, CONGRESSIONAL RESEARCH SERVICE 6 (2017), <https://sgp.fas.org/crs/misc/R41546.pdf>.

246 44 U.S.C. ch. 15.

247 Pub. L. 104-4, 109 Stat. 48 (1995).

248 5 U.S.C. §§ 601-612.

249 44 U.S.C. ch. 35.

250 5 U.S.C. Chapter 8. Note that none of these statutes is DoD-specific in terms of the regulatory authority established by Congress.

251 48 C.F.R. Chapter II, Defense Acquisition Regulations System. See *Title 48 Federal Acquisition Regulations System*, U.S. DEP'T OF DEFENSE, <https://open.defense.gov/Regulatory-Program/Rules/Title48OSDrules/> (last visited June 29, 2023).

252 For example, Title 32 includes Chapter V for the Department of Army, Chapter VI for the Department of Navy, and Chapter VII for the Department of Air Force. *Id.*

253 See 10 U.S.C. § 2274 (“Beginning January 1, 2024, the Secretary may provide space situational awareness services and information to, and may obtain space situational awareness data and information from, non-United States Government entities.”); AMERICAN SPACE SITUATIONAL AWARENESS AND FRAMEWORK FOR ENTITY MANAGEMENT ACT, H.R. REP. NO. 115-1106 PART 1, at 6 (2018), <https://www.congress.gov/115/crpt/hrpt1106/CRPT-115hrpt1106.pdf> (“The Department of Defense will continue

so by Congress.<sup>254</sup> DoD sometimes wields a veto (many times silent) on other agency actions vis-à-vis the commercial space sector.<sup>255</sup> During the period in which virtually all space hardware sat on the “munitions list” under the International Trafficking in Arms Regulations (ITAR), many commercial space companies complained about not being able to receive export licenses because of objections raised by DoD.<sup>256</sup> Others have complained that the FCC’s ability to allocate additional frequencies for space usage has been stymied by DoD efforts to maintain control of its legacy communications systems.<sup>257</sup> And as noted above, some military analysts have argued that without clear authority to “authorize” and “supervise” activities under Article VI of the OST, innovative uses of outer space are prohibited.<sup>258</sup>

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its role in SSA activities by maintaining its catalog of space objects but is eager to transfer SSA information management and services to the appropriate civilian agency, the Department of Commerce. This transition would greatly improve access to SSA data and services in the United States and promote a safer operational environment in space.”).

254 See, generally, United States of America’s reporting on national implementation of the Guidelines for the Long-term Sustainability of Outer Space Activities, Committee on the Peaceful Uses of Outer Space Scientific and Technical Subcommittee, Feb. 6–17, 2023 (noting the Department of Defense’s role vis-à-vis other U.S. agencies related to spectrum (at 10), space object registration (at 12), SSA and orbital debris (at 17–22), space weather (at 26), using lasers in space (at 32)); see also *Oversight of Satellite Export Controls: Hearing Before the Subcomm. on Int’l Econ. Pol’y, Exp. and Trade Promotion of the S. Comm. on Foreign Rel.*, 106th Cong. (2000), <https://www.govinfo.gov/content/pkg/CHRG-106shrg68770/html/CHRG-106shrg68770.htm> (noting DoD’s role in reviewing requests for export licenses for space technologies under the International Trafficking in Arms Regulations (ITAR); RICHARD A. BEST, JR., CONGRESSIONAL RESEARCH SERVICE, *IMAGERY INTELLIGENCE: ISSUES FOR CONGRESS* (2002), <https://irp.fas.org/crs/RL31369.pdf> (discussing DoD’s role in reviewing remote sensing applications).

255 See, e.g., Youssef Sneifer, *The Implications of National Security Safeguards on the Commercialization of Remote Sensing Imagery*, 19 SEATTLE U. L. REV. 539, 561 (1996), <https://digitalcommons.law.seattleu.edu/cgi/viewcontent.cgi?article=1484&context=sulr> (“Under the existing domestic legal regime, the degree of certainty and predictability essential for commercial development is missing. Concerns exist over the lack of a clear legal standard regarding when and how these national security safeguards will be invoked. Additionally, uncertainty is created by the lack of a clear definition of the term ‘national security’ and the complex maze of interagency consultations during the process of licensing.”).

256 See, e.g., Michael Gold, *The Wrong Stuff: America’s Aerospace Export Control Crisis*, 87 NEB. L. REV. 521, 524 (2008), <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1025&context=nlr> (“[O]ne must begin by filing a Technical Assistance Agreement (“TAA”). The TAA is a broad general document describing what kind of collaboration will take place, the type of information that will be shared, and who the foreign parties are. Drafting a TAA can take anywhere from a month to half a year (depending upon the complexity of the project) and is submitted to the Department of State’s Directorate of Defense Trade Controls (“DDTC”). Depending on their backlog and the nature of the TAA, it usually takes anywhere from three to six months for the DDTC to respond. More often than not, TAAs with Russian entities are approved, but gaining approval is only the beginning of a lengthy and difficult process. When a TAA involving space hardware and Russia is approved, it inevitably will include numerous pages of ‘provisos.’ These provisos are requirements that companies must abide by, such as 24-hour monitoring of all hardware, including the mandatory presence of U.S. Government officers during any ‘technical’ conversations, etc.”). See also U.S. DEP’T OF DEFENSE, PGI 225.79 (2023), [https://www.acq.osd.mil/dpap/dars/pgi/pgi\\_hm/PGI225\\_79.htm](https://www.acq.osd.mil/dpap/dars/pgi/pgi_hm/PGI225_79.htm) (“PGI 225.7901-2 (1) DoD Focal Point on Export Controls. (i) Within DoD, the focal point on export controls is the Defense Technology Security Administration (DTSA). Official authorities and responsibilities of DTSA are established in DoD Directive 5105.72.”).

257 See, e.g., Dawn S. Onley, *DOD Continues to Dog FCC on Spectrum Use*, GCN (Feb. 3, 2002), <https://gcn.com/2002/02/dod-continues-to-dog-fcc-on-spectrum-use/285536/> (“On the eve of a Federal Communications Commission vote on whether to approve the use of ultra-wideband technology across all radio frequency bands, the Defense Department continued to push FCC to protect military-only bands.”); Sandra Erwin, *Pentagon Presses on with Campaign to Overtake FCC’s Ligado Order*, SPACENEWS (May 25, 2020), <https://spacenews.com/pentagon-presses-on-with-campaign-to-overtake-fccs-ligado-order/> (“DoD has been leading an all-out campaign to kill Ligado’s 5G network plans on grounds that the FCC is allowing the company to use L-band spectrum that is adjacent to the Global Positioning System. DoD says a terrestrial broadband network in that spectrum band will interfere with GPS signals.”); Peter Rysavy, *No Magic Spectrum Sharing Solutions*, FIERCE WIRELESS (Apr. 6, 2021), <https://www.fiercewireless.com/regulatory/no-magic-spectrum-sharing-solutions-rysavy/> (“Together, the FCC plan and the DoD responses demonstrate that dynamic spectrum sharing (as envisioned by DoD) [in the 3100–3550 MHz band] is not a realistic option for widespread 5G commercial networks.”).

258 See John Goehring, *Properly Speaking, the United States Does Have an International Obligation to Authorize and Supervise Commercial Space Activity*, A.F.L. REV., Vol. 78, 101, 101 (2018) (arguing that without specific authority to authorize and supervise activities under Art. VI of the OST, such activities are automatically prohibited).

Doing business with DoD often entails complying with the costly and cumbersome Federal Acquisition Regulation (FAR).<sup>259</sup> Like NASA, however, DoD continues to explore,<sup>260</sup> and in many cases utilize, its “Other Transactions Authority.”<sup>261</sup>

The federal government’s use of Other Transaction Authority (OTA) agreements has exploded in recent years, thanks in large part to a surge in popularity within the Department of Defense (DoD). Rather than a contract, grant, or cooperative agreement, OTAs are an acquisition approach that pursues innovation by enabling certain federal agencies to access goods and services outside of the traditional acquisition system.<sup>262</sup>

It is unclear whether the Space Force will embrace OTAs with the same enthusiasm as DoD.<sup>263</sup> Indications are, however, that the Space Force will continue to embrace this contracting method,<sup>264</sup> including increased utilization of the Space Development Agency as a contractor using OTAs.<sup>265</sup> As with NASA’s Space Act Agreement OTAs, DoD and the Space Force can, in many ways, regulate through contract, rather than promulgating rules that directly impact the commercial space sector writ large.

## 2. DoD’s Enforcement Authority

The DoD has broad enforcement powers under the FARs,<sup>266</sup> including recovery of treble damages for false claims made in defense procurement.<sup>267</sup> Both civil penalty and criminal prosecutions

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259 Federal Acquisition Regulation, 48 CFR ch. 1-99.

260 See e.g., Fast Space Study, *supra* note 24 (“Based on our analysis, we recommend the Air Force should use Other Transaction Authorities (OTAs) to fund commercial partnerships with private space industry leaders. A compelling partnership marries the comparative advantages of both the U.S. government and private industry. The government supplies capital, deep technical expertise and fixed infrastructure beyond the ability of any company to sustain, and the possibility of future purchases if they succeed. Industry capitalizes on their entrepreneurial business models, profit motives, innovative cultures, and extensive research and development to build the technical systems of a Fast Space architecture. A partnership funded through OTAs could put a virtuous cycle of cost reduction into motion to make Fast Space a reality for the joint force.”).

261 10 U.S.C. § 4021 (2009).

262 Gregory Sanders & Rhys McCormick, *Trends in Department of Defense Other Transaction Authority Usage*, CTR. FOR STRATEGIC AND INT’L STUDIES (May 22, 2022), <https://www.csis.org/analysis/trends-department-defense-other-transaction-authority-usage>. See also, John Dobriansky & Patrick O’Farrell, *Other Transaction Authority: Acquisition Innovation for Mission-Critical Force Readiness*, DEFENSE ADVANCED RESEARCH PROJECTS AGENCY (July 2018), <https://acquisitioninnovation.darpa.mil/docs/Articles/Contract%20Management%20Dobriansky%20OTA.pdf>.

263 See Theresa Hitchens, *Did the Space Force Just Ruin OTAs for Everyone?*, BREAKING DEFENSE (Jan. 6, 2021), <https://breakingdefense.com/2021/01/did-the-space-force-just-ruin-otas-for-everyone/> (“A contracting slip-up by the Space Force has inspired new scrutiny of a streamlined acquisition process known as Other Transaction Authority (OTA). OTAs have soared in popularity in recent years, but a story by the *Washington Post*—which said a Space Force contractor ‘acted fraudulently’ and derided OTAs in general as a ‘loophole’—has given skeptics new ammunition in their fight for restrictions.”).

264 See Nathan Strout, *Space Force Expects \$1 billion in Contracts in First Year of Space Enterprise Consortium Reloaded*, C4ISRNET (Sep. 8, 2021) <https://www.c4isrnet.com/battlefield-tech/space/2021/09/08/space-force-expects-1-billion-in-contracts-in-first-year-of-space-enterprise-consortium-reloaded/> (“The U.S. Space Force has ramped up use of its Space Enterprise Consortium, pushing out \$1 billion in contracts for prototyping efforts in its first year under new management. That marks a significant increase. From 2017 through about the end of 2020, the consortium issued a total of just \$856 million in contracts. For context, the Space Force requested \$17.4 billion for the entire service for fiscal 2022. Initially established in 2017, the Space Enterprise Consortium was set up as an Other Transaction Authority, a contracting tool that enables faster contracting, connects the government with nontraditional vendors and speeds up system development with rapid prototyping.”).

265 See SPACE DEVELOPMENT AGENCY, ABOUT US, <https://www.sda.mil/home/about-us/> (last visited June 29, 2023).

266 See 10 U.S.C. Part V – Acquisition (2020); 48 C.F.R. § 203.906 (remedies) (2022); 48 C.F.R. § 252.203-7001 (debarment–disqualification) (2010).

267 31 U.S.C. § 3729, 1985 amendments, Pub. L. 99–145, title IX, §931(b), Nov. 8, 1985, 99 Stat. 699.

for violations of the FARs are common.<sup>268</sup> This once again demonstrates that DoD’s real power to regulate the commercial space sector stems from its ability to award (and recapture) money.

## VII. Orbital Debris—Everything Wrong with Space Regulation

Thus far I’ve discussed the perceived “gaps” in regulatory authority related to commercial outer space, especially for innovative space uses such as ISAM. There is one area where there isn’t a gap in regulations, but rather a substantial and sometimes inconsistent overlap in agency regulation. It regards orbital debris and pollution to the space environment. Orbital debris is a problem and requires a certain level of regulation in order to preserve the “commons” of space. I’ve written about it before and have supported efforts to establish a regulatory regime for orbital debris.<sup>269</sup> Much of the commentary related to orbital debris, including some of the visuals,<sup>270</sup> however, convey a picture of low Earth orbit (LEO) as a heavily congested freeway where satellites are constantly dodging each other and catastrophic pileups are only a few seconds away.<sup>271</sup> Even with the advent of large constellations of LEO satellites, there is still a lot of space in outer space.

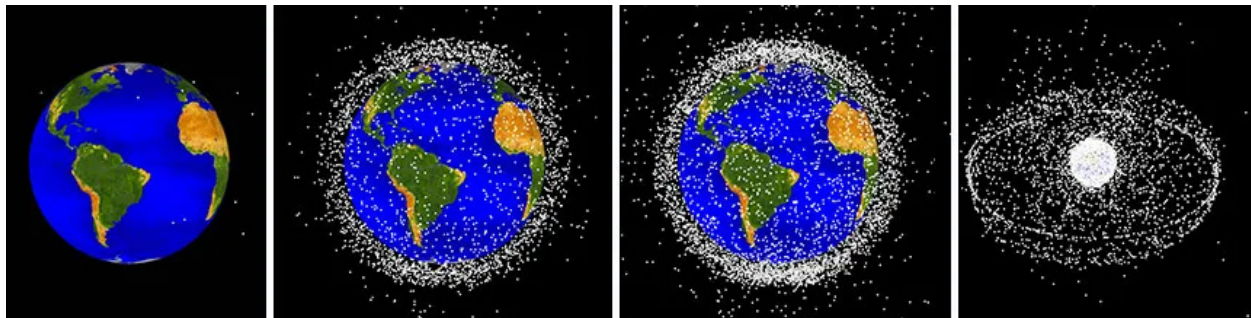
Space is big, there can be no doubt of that. For instance, the total area of the 800-kilometer orbital sphere encompasses 664 million square kilometers (or 411

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268 See, e.g., Press Release, Department of Justice, Military Contractors Convicted for \$7 Million Procurement Fraud Scheme (Mar. 29, 2023), <https://www.justice.gov/opa/pr/military-contractors-convicted-7-million-procurement-fraud-scheme>.

269 Dunstan, *supra* note 42. See also James E. Dunstan, *Do We Care About Orbital Debris at All?*, SPACE NEWS (Jan. 30, 2018), <https://spacenews.com/op-ed-do-we-care-about-orbital-debris-at-all/>; Dunstan, *supra* note 27; Letter from TechFreedom to Senators Hickenlooper and Lummis in response to the Senate Space Subcommittee’s hearing entitled Space Situational Awareness, Space Traffic Management, and Orbital Debris: Examining Solutions for Emerging Threats Hearing (July 22, 2021), <https://techfreedom.org/wp-content/uploads/2021/07/Letter-to-Senate-Space-Subcommittee-7-21-21.docx-1.pdf>.

270 For example, some graphic depictions of the buildup of orbital debris since the beginning of the space age are quite ominous, mainly because it is almost impossible to provide the necessary scale on context to these numbers. See, e.g., Anna Sekscinska, *Space Debris: Over 170 Million Objects Are Orbiting the Earth That Can Cause a Serious Problem*, THE SECRETS OF THE UNIVERSE, <https://www.secretsoftheuniverse.in/space-debris-problem/> (last visited June 29, 2023).



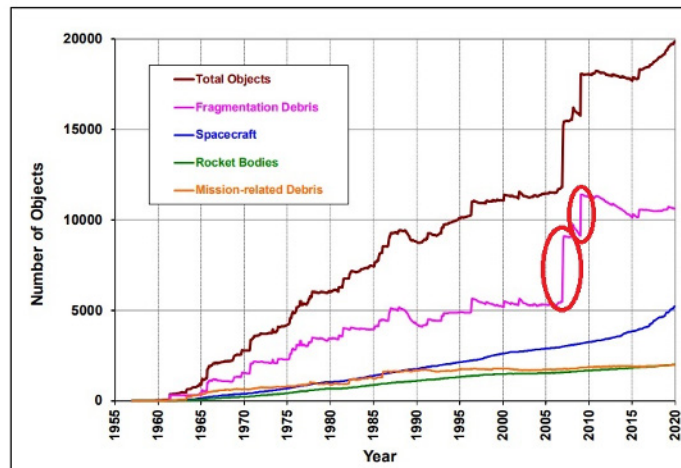
271 See, e.g., Joseph Kurt, *Triumph of the Space Commons: Addressing the Impending Space Debris Crisis without an International Treaty*, 40 WM. & MARY ENV'T L. & POL'Y REV. 305 (2015) (“[T]he issue of ever-increasing space debris [is] the greatest environmental crisis unknown to most people.”); Shane Chaddha, *A Tragedy of the Space Commons?* (April 8, 2010) (manuscript at SSRN), <https://ssrn.com/abstract=1586643> (“Space actors, whether State-sponsored, civilians or commercial, are, too, affected by the space debris population. Human lives are endangered: astronauts undertaking extra-vehicular activities or even the paying public enjoying commercial human spaceflights run the risk of colliding with pieces of debris. The continuing growth of debris in heavily used orbital regions, like Low Earth Orbit (LEO) and Geostationary Earth Orbit (GEO), not causes minor or complete abruptions to space operations, but potentially could prevent launches of planned space vehicles; thus, denying future access to, and use of, outer space. Further to stifling space development, the quality of the space environment is degrading, therefore.”).

million square miles) of area. Were the approximately 1000 currently operating satellites all bunched in this one orbit (which they obviously are not), each would have some 664,000 square kilometers (411,000 square miles) in which to operate.<sup>272</sup>

Granted, I wrote this in 2013, and since then more than 2000 additional satellites have been launched into LEO. But even accounting for this increase, each satellite today has over 200,000 square kilometers (158,000 square miles) in which to operate.

The problem, of course, is that travelling at speeds in excess of 17,000 mph, collisions in space can be catastrophic, resulting in many thousands of new pieces of debris. The “jumps” in orbital debris have resulted from a very few collisions, one of which was done on purpose.<sup>273</sup> The larger red circle in figure 2 represents new debris caused by the 2007 Chinese anti-satellite (“ASAT”) test, in which China purposefully destroyed its Fengyun-1C weather satellite. The total debris cloud created by the ASAT explosion is estimated to be between 2,392 and 3,000 trackable pieces of debris. One estimate of the total debris produced exceeds 100,000 pieces. The second red circle represents the increase in debris caused by the 2009 collision between an arguably controllable Iridium 33 satellite and the derelict Cosmos 2251 satellite. This collision produced over 2,200 pieces of trackable debris.<sup>274</sup>

Figure 2. Growth of Orbital Debris Objects Over Time by Object Type



Notwithstanding this threat to the future use of space, and especially certain LEO orbits, Congress has not provided specific regulatory authority to any agency when it comes to orbital debris. This hasn't stopped multiple agencies from promulgating rules related to orbital debris, including:

- The FCC<sup>275</sup>
- The FAA<sup>276</sup>

272 Dunstan, *supra* note 42, at 25.

273 See TechFreedom Comments on OSTP Request for Comment on: National Orbital Debris Research and Development Plan (Dec. 31, 2021), <https://techfreedom.org/wp-content/uploads/2022/01/TechFreedom-Comments-OSTP-Orbital-Debris-Strat-Plan.pdf>.

274 *Id.* at 9–10.

275 47 C.F.R. § 25.114(d)(14) (1991) (Each applicant for a frequency license involving a satellite must provide “A description of the design and operational strategies that will be used to mitigate orbital debris, including the following information: . . .”).

276 See 14 C.F.R. § 417.129 (2006) (“A launch operator must ensure for any proposed launch that for all launch vehicle stages or

- NOAA<sup>277</sup>
- NASA<sup>278</sup>
- U.S. Government Orbital Debris Mitigation Standard Practices (ODMSP)<sup>279</sup>

The problem with having all these regulations (and guidelines) issued by different agencies is that they are not completely parallel—some of the requirements can be different as the agencies themselves. This results in applicants, especially those that need multiple licenses (e.g., a NOAA remote sensing license, an FAA payload license, and an FCC frequency license for the same satellite), finding themselves having to file different orbital debris mitigation filings with these agencies. If any agency disagrees with those filings the applicant would have to amend the filings made to other agencies as they wind their way through the licensing labyrinth. Again, none of these regulations were issued pursuant to explicit congressional statute. They are the result of each agency determining that such regulations are within its “public interest” or other broad authority.

The lack of clear congressional regulatory authority has allowed some parties to push agencies into rendering decisions, or even addressing issues, over which they have no authority or expertise. For example, satellite operator ViaSat, with the help of a group known as “The Balance Group,” challenged the FCC’s grant of authority to SpaceX to modify the orbit of its Starlink satellites on the grounds that the FCC had failed to comply with the National Environmental Policy Act (NEPA) by not conducting a full environment assessment of this change in orbit. The D.C. Circuit ultimately rejected these claims, including finding that The Balance Group lacked standing.<sup>280</sup> TechFreedom filed an *amicus* brief in the case, arguing that NEPA does not apply to outer space.<sup>281</sup> Although there was lively debate at oral argument on the issue of the applicability of NEPA to outer space,<sup>282</sup> ultimately the Court did not have to reach that issue, concluding that the FCC had properly addressed issues related to the environmental concerns raised in the case.<sup>283</sup> But so long as Congress remains silent on who should regulate orbital debris, agencies and private litigants will push for solutions that may ultimately serve neither the needs of the American people nor the international space community.

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components that reach Earth orbit” that there is no contact between launch vehicle and payload; b) no debris generation from energy sources; and c) there is a safeing of systems and disposal after mission end of life.).

277 15 C.F.R. Part 960 (2020), Appendix 1 (“The applicant will submit a plan for post-mission disposition of any remote sensing satellites owned or operated by the applicant. If the satellite disposition involves an atmospheric re-entry the applicant must provide an estimate of the total debris casualty area of the system’s components and structure likely to survive re-entry.”).

278 NASA, PROCESS FOR LIMITING ORBITAL DEBRIS, NASA-STD-8719.14A (which puts into effect NASA Procedural Requirement 8715.6 and includes reference to NASA-Handbook (NASA-HDBK) 8719.14).

279 See NASA, U.S. GOV’T ORBITAL DEBRIS MITIGATION STANDARD PRACTICES NOV. 2019 UPDATE (2019), [https://orbitaldebris.jsc.nasa.gov/library/usg\\_orbital\\_debris\\_mitigation\\_standard\\_practices\\_november\\_2019.pdf](https://orbitaldebris.jsc.nasa.gov/library/usg_orbital_debris_mitigation_standard_practices_november_2019.pdf) (although the ODMSP guidelines apply to DoD operations in space, as one commenter has pointed out, DoD routinely grants itself waivers of these guidelines); See Quentin Verspieren, *The U.S. Air Force Compliance with the Orbital Debris Mitigation Standard Practices* (Amotech Tech Technical Papers, 2020), <https://amotech.com/TechnicalPapers/2020/Orbital-Debris/Verspieren.pdf>.

280 *Viasat, Inc. v. FCC*, 47 F.4th 769 (D.C. Cir. 2022). As to the Balance Group, the court concluded “the Group has given us no insight into how it relates with its members. Two purported members submitted affidavits, but neither describes involvement in the Group beyond a bare assertion of membership. And the Group’s own affidavit, submitted by its operating officer, makes no reference to membership. Again, we are left with no basis to determine whether the requisite elements of standing have been met—an issue on which the Group bore the burden of proof.” (Internal citations omitted).

281 Brief for TechFreedom as Amici Curiae Supporting Appellant, *Viasat, Inc. v. FCC*, 47 F.4th 769 (D.C. Cir. 2022).

282 See Transcript of Oral Argument, *Viasat, Inc. v. FCC*, D.C. Cir. (2021) (No. 21-1123).

283 There is little doubt but that this issue will arise again, and that at some point, the courts will have to decide whether NEPA applies to activities strictly within outer space.

## VIII. Is There a Path Forward to a Rational Regulatory Environment for Commercial Space?

Gaps and overlaps. Stovepipes. Inconsistent and redundant regulations. That's the current state of the regulatory environment for commercial space operations faced with trying to become licensed in the United States. Each regulation has a cost (both on agencies and applicants) that has long been noted,<sup>284</sup> and inconsistent regulations can drive those costs up exponentially. Most important for this discussion is the fact that, because of the inherently international nature of space operations, commercial entities will seek out jurisdictions for licensing that afford the quickest and cheapest path to close a business case, even if those licenses come from jurisdictions that have not become signatories to the key international treaties or otherwise lack any real regulatory oversight system or expertise in space operations.<sup>285</sup>

What is the path forward for creating a more rational regulatory system? First, notwithstanding the National Space Council's call for agencies to reform their regulatory regimes,<sup>286</sup> after the Supreme Court decision in *West Virginia v. EPA*,<sup>287</sup> reform efforts must come from Congress, with clear statutory authority provided to the relevant agencies and hopefully, guardrails to keep agencies from promulgating inconsistent or redundant regulations. In crafting such a "Space Regulatory Act," Congress should comprehensively address these issues, assign regulatory authority where it is needed, but also limit those regulations as much as possible. The specific issues that need to be addressed in this legislation, introduced above, are:

- What should the FAA's regulatory responsibilities be (launch, reentry, payloads, other operations)?
- What is the overall role of the Department of Commerce?
  - Should Commerce or FAA be in charge of space traffic management (STM)?
  - If Commerce handles STM, how can outer space and national air space be integrated?

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284 See GAO-107970, COSTS AND BENEFITS OF GOV'T REGUL. (1978), <https://www.gao.gov/assets/107970.pdf>; Harry Mamaysky, Ruoke Yang, & Charles Calomiris, *Measuring the Cost of Regulation: A Text-based Approach* (CATO INST. RSCH. BRIEFS IN ECON. POL'Y No. 228, Aug. 19, 2020), <https://www.cato.org/research-briefs-economic-policy/measuring-cost-regulation-text-based-approach> ("Regulation is often justified by the gains to the public that come from outcomes such as cleaner water and air, safer travel, less-dangerous products, and more-honest advertising. The costs of regulation are borne by the firms that must comply with them. Costs can be roughly categorized into two sets: operational costs and compliance risks.").

285 See Dunstan, *supra* note 27 (pointing out that an applicant seeking market access to the United States from the FCC held a license from Papua New Guinea, which in addition to having no expertise in outer space regulation or management, was not even a signatory to either the 1971 Liability Convention or the 1974 Registration Convention—the key international treaties that are implicated by issues related to orbital debris); Letter from TechFreedom to Senators Hickenlooper and Lummis in Response to the Senate Space Subcommittee's Hearing Entitled Space Situational Awareness, Space Traffic Management, and Orbital Debris: Examining Solutions for Emerging Threats Hearing (July 22, 2021), <https://techfreedom.org/wp-content/uploads/2021/07/Letter-to-Senate-Space-Subcommittee-7-21-21.docx-1.pdf> (pointing out the loophole of granting foreign licensees access to U.S. markets when the foreign government is little more than a "flag of convenience.").

286 See Jeff Foust, *White House Requests Proposals for Regulating Novel Commercial Space Activities*, SPACENEWS (Sept. 12, 2022), <https://spacenews.com/white-house-requests-proposals-for-regulating-novel-commercial-space-activities/>.

287 See 142 S. Ct. 2587 (2022).

- What is the role of the FCC in space? Is it limited to allocating and licensing frequencies or does the “public interest” standard imply more regulatory authority than that?<sup>288</sup>
- What agency should promulgate rules related to orbital debris, and should this power be exclusive (i.e., other federal agencies should defer to the lead agency)?
- In instances where interagency coordination is necessary, what measures should be instituted to force transparency (with due regard to national security interests), ensure timely resolution, and remove “black box” vetoes without accountability?
- What agency, if any, should “authorize” and “supervise” space activities that fall outside the traditional norms of telecommunications, launch, and/or remote sensing? Is there a role for “permissionless innovation” in outer space?
- What role is there in a comprehensive regulatory regime for non-governmental standard setting organizations? As other types of technologies have developed, the United States has looked to such organizations that have significant technical expertise, in many instances far more expertise than any agency might possess.<sup>289</sup>

As I said at the outset, drafting a comprehensive U.S. Space Act is beyond the scope of this paper. This discussion nonetheless should provide guidance to Congress in such a drafting exercise.

## Conclusion

Undertaking comprehensive legislation to overhaul the space regulatory systems is no small task. The failure of Congress to comprehensively address these issues is also a creature of the fact that jurisdiction over space is spread out among several congressional committees, making a whole-of-government approach to regulatory reform that much more difficult. Given what is at stake in terms of American leadership in space and promoting the United States as the “go to” jurisdiction for space authorization, however, Congress needs to move quickly to tackle these complex and intertwined issues. Failure to do so leaves the United States vulnerable—vulnerable to other jurisdictions that will happily authorize U.S. companies to conduct space activities under their watch (for a fee and/or tax revenues, of course); vulnerable to adversaries who can dictate the actions of their private actors through other legal and political means; and vulnerable to those who wish to handicap the United States and other free-market countries by removing the profit incentive to develop the vast resources of outer space for the benefit of all humans. The stakes are that large.

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<sup>288</sup> In my estimation, the FCC’s role should be limited solely to frequency issues.

<sup>289</sup> For instance, the Wi-Fi standards Americans now heavily rely on were created (and are maintained) by the IEEE LAN/MAN Standards Committee. *See IEEE 802 LMSC*, <https://www.ieee802.org> (last visited June 29, 2023). The 5G communications protocol driving so much of the debate on wireless telecommunications policy (ranging from spectrum needs to broadband deployment to “digital discrimination”) is a product of the 3rd Generation Partnership Project (3GPP), which itself serves to unite the activities of seven different telecommunications standards organizations (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, and TTC).