Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Space Modernization for the 21st Century	)	SB Docket No. 25-306
	)	

Comments of TechFreedom

January 20, 2026

Summary

TechFreedom commends the Commission in undertaking this critical rewrite to its space licensing rules, with the foundation of promoting permissionless innovation. The space economy is vastly different today than it was even a decade ago. Launch rights are up, the price per kilogram to orbit has been reduced by nearly an order of magnitude, and the cost to manufacture both the space and ground segment of satellite systems has plummeted. All this has put a significant strain on the ability of the FCC to keep pace with the flood of applications it has experienced in recent years. An "assembly line" designed to "default to yes" through extensive expedited processing is in order.

The present NPRM represents a positive step toward maximizing U.S. leadership in space, while protecting the space commons, all at a time when other countries seek to regulate through a protectionist and precautionary principle approach that will only harm themselves further American leadership in space. Nonetheless, TechFreedom submits that certain aspects of the proposed regulations need revision in order to avoid seriously negative unintended consequences and to meet the ultimate goals the NPRM seeks to foster.

TechFreedom supports the streamlining and modularization of the FCC's forms. Providing simple forms and clear criteria for grant are far superior to the existing system which requires multiple schedules, long narratives, and substantial back-and-forth with Commission staff. We do not support, however, the notion that the rules should allow for a large number of conditional grants. Existing conditions levied on licenses have proven cumbersome and inconsistent.

TechFreedom supports the establishment of additional service types, including the proposed Variable Trajectory Spacecraft System (VTSS). We urge the Commission to go further, and establish at least two additional services, one for VTSS and one for operations of spacecraft beyond the geostationary orbit (what we call "EXO-GEO"). For VTSS, the Commission should consider a regulatory approach that parallels the FAA's approach to licensing aircraft—assign a "tail number" to the satellite and then allow it to notify the FCC of its "flight plan" to conduct operations.

The NPRM also finally tackles the seeming intractable problem of granting "foreign" operators "market access" without going through the full licensing process. It's time severely limit the ability to circumvent FCC processes—DISCO is indeed dead.

Amendments to the existing processing round rules for NGSO systems need further analysis—indeed, such changes may be premature. A yearly processing round window, opening in January and closing at the end of October, will actually slow the pace of grants. Additionally, the proposal to relax deployment milestones will invite speculative applications and spectrum warehousing that must be avoided if the United States is to maintain its edge in commercial space. Finally, TechFreedom supports amending the surety bond requirements, but suggests a "waterfall" approach that recognizes the realities of the current market.

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COMMENTS OF TECHFREEDOM

TechFreedom, pursuant to Sections 1.415 and 1.419 of the Commission's rules,[1] hereby files these Comments in response to the Notice of Proposed Rulemaking in the above-captioned proceeding, adopted by the Commission on October 28, 2025.[2] In support of its comments, TechFreedom submits:

I. About TechFreedom

TechFreedom is a nonprofit think tank dedicated to promoting the progress of technology that improves the human condition. To this end, we seek to advance public policy that makes experimentation, entrepreneurship, and investment possible, and thus unleash the ultimate resource: human ingenuity. TechFreedom has been spent decades on the front

[1] 47 C.F.R. §§ 1.415 & 1.419.

[2] Space Modernization for the 21st Century, Notice of Proposed Rulemaking, SB Docket No. 25-306, adopted Oct. 28, 2025 ("Space Modernization NPRM" or "NPRM"). The Space Modernization NPRM was published in the Federal Register on December 5, 2025, 90 Fed. Reg. 56338 (Dec. 5, 2025), and set the comment date for January 20, 2026, and reply comment date for February 18, 2026. These comments are timely filed.

lines of advocacy for a clear and minimally burdensome regulatory environment for space activities, both in the United States,[3] and abroad.[4]

II. Introduction

TechFreedom applauds "Space Month," the "Build America"[5] agenda, and winning the "Space Race 2.0."[6] The Space Modernization NPRM is the next vital step in ensuring that the United States remains at the forefront of outer space development, with a regulatory environment which promotes innovation, competition, and flexibility.

A. The Outer Space Ecosystem Looks Vastly Different Today Than Even a Decade Ago

In 2015, Air University at Maxwell Air Force Base began a comprehensive study to answer this question: What would happen to our economy and national security if the cost to launch objects into space decreased by an order of magnitude (10x) through the use of

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[3] *See, e.g.,* J. Dunstan, *Regulating Outer Space: Of Gaps, Overlaps, and Stovepipes*, THE CENTER FOR GROWTH AND OPPORTUNITY (July 10, 2023), https://www.thecgo.org/research/regulating-outer-space-of-gaps-overlaps-and-stovepipes/; J. Dunstan, *Regulating the Space Economy is vital for America's Continued Global Leadership*, WASHINGTON EXAMINER (July 15, 2023), https://www.washingtonexaminer.com/opinion/beltway-confidential/2779518/regulating-the-space-economy-is-vital-for-americas-continued-global-leadership/; J. Dunstan, *Bring On the Space Barons*, MEDIUM (Sept. 14, 2021), https://medium.com/@TechFreedom/bring-on-the-space-barons-e425129fbff6.

[4] Comments of TechFreedom on Regulation of the European Parliament and of the Council on the Safety, Resilience and Sustainability of Space Activities in the Union (Nov. 7, 2025), https://techfreedom.org/wp-content/uploads/2025/11/TechFreedom-Comments-to-EU-on-Draft-Space-Act-11-7-25.pdf.

[5] *See* Chairman Carr's Build America Agenda, Fed. Commc'ns Comm'n, https://www.fcc.gov/build-america (last visited Oct. 17, 2025).

[6] Brendan Carr, Chairman, Fed. Commc'ns Comm'n, Remarks on Build America, FCC Doc. No. DOC-415040A1 (Oct. 6, 2025), https://docs.fcc.gov/public/attachments/DOC-415040A1.pdf ("Today, the United States sits at the dawn of a new Golden Age of space innovation. And President Trump has been clear that the U.S. will dominate once again. And America's leadership in space could not come at a better time. That is because we are now in the midst of what I refer to as a Space Race 2.0.").

reusable launch vehicles?[7] How would the military take advantage of these cost savings, and what new challenges would it pose in promoting U.S. interests in space, including defending a potential 10-fold increase in U.S.-related space assets?

One of the fascinating discoveries of that study was that without increased demand for launch services, the cost reductions enjoyed by launch providers would simply be pocketed.[8] If demand for launch services remained stable, launch prices would not fall—profits in the launch industry simply would increase. Only if demand for launch services increased would the market price for launch services fall. The second discovery coming out of this study was that unless substantial changes were made to U.S. space regulatory systems, even if theoretical demand for launch services increased, that demand could not be converted into licensed flights and flyable payloads quickly enough to propagate the cost saving throughout the space ecosystem.[9] In short, the regulatory systems were stuck in the 20th Century. Far worse, since outer space is inherently international, a failure of regulatory reform in the U.S. would simply lead to an exodus of the U.S. aerospace industry to countries which could approve payloads for launch.

1. Launch Costs Have Come Down and Flight Rates Have Increased Exponentially

Most people have seen the "hockey stick" of U.S. launches. It is impressive.

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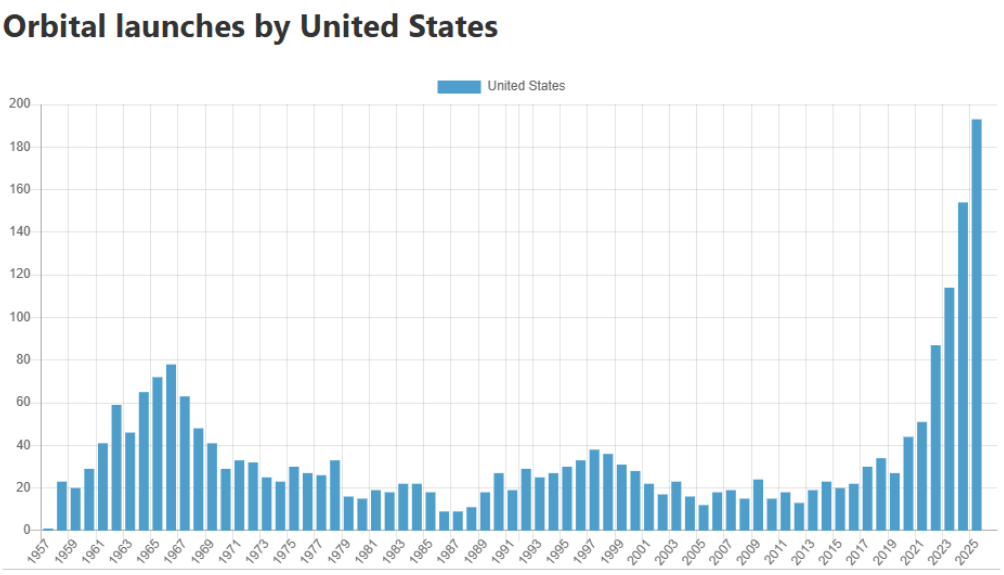
[7] *See, e.g.*, AIR UNIVERSITY, MAXWELL AFB, FAST SPACE: LEVERAGING ULTRA LOW-COST SPACE ACCESS FOR 21ST CENTURY CHALLENGERS 33–34 (2017), https://www.defensedaily.com/wp-content/uploads/post_attachment/157919.pdf. Undersigned counsel wrote the regulatory section of that report.

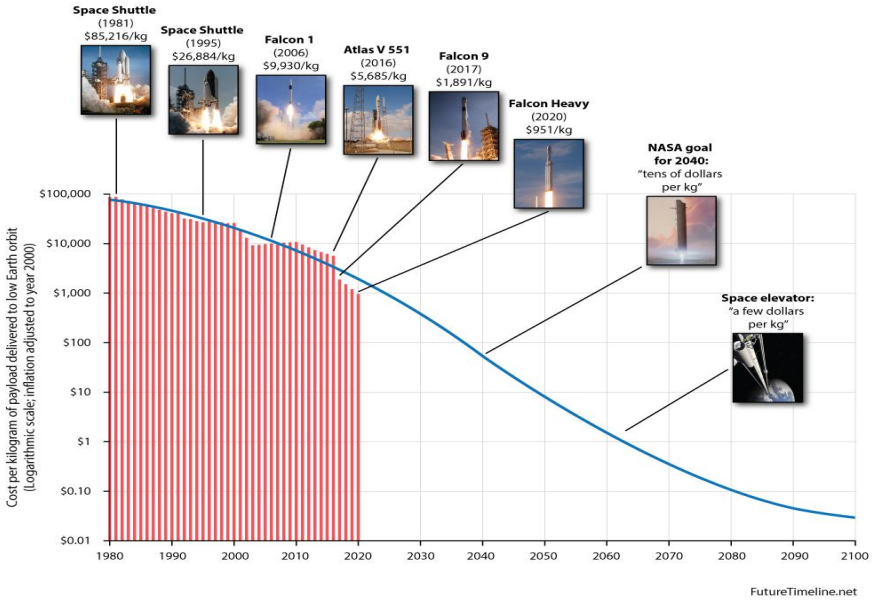
[8] *Id.* at 16.

[9] *Id.* at C-3.



Source: https://spacestatsonline.com/launches/country/usa

Equally important is that this increased flight rate, accomplished mainly through the use of reusable launch vehicles, has substantially reduced the price per pound to orbit.



Source: https://futuretimeline.net/data-trends/6.htm[10]

[10] Note that the scale is logarithmic, so the slope of the curve is actually much steeper than that depicted. We have seen more than an order of magnitude reduction in the price per kilogram to orbit since the Space Shuttle era.

2. The Cost to Produce Payloads Is Dropping Rapidly

Even as the price to orbit is decreasing, the price to build payloads is also dropping. Gone are the days of on-off hand-built satellites costing hundreds of millions of dollars. Companies such as Starlink are building satellites on an assembly line, substantially reducing the cost of producing each satellite.[11] Even established companies such as Lockheed Martin are updating and upgrading their satellite manufacturing processes.[12] And new players are jumping in—something virtually impossible as little as a decade ago when rides to space were so expensive, clamping down demand for satellites systems.[13] The United States has rebounded from the disastrous impacts of the ill-advised export regime of the 1980s through early 2000s[14] to once again dominate the world satellite manufacturing market.[15]

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[11] *See, e.g.*, *Satellite Manufacturing And Launch Vehicle Market Size & Share*, MORDOR INTELLIGENCE (Jan. 7 2026), https://www.mordorintelligence.com/industry-reports/satellite-manufacturing-and-launch-systems-market ("The expansion stems from a production shift toward assembly-line methods, which enable hundreds of identical spacecraft to be produced per month, a capability essential for proliferated constellations"); Tom Hausken, *Optics In The New Space Economy*, OPTICA (Sept. 20, 2025), https://www.optica-opn.org/home/newsroom/2025/september/optics_in_the_newspace_economy/ (this industrialization of satellite manufacturing is reflected in market growth: "Manufacturing revenue grew 17% over the previous year" reaching approximately $20 billion in 2024.").

[12] *Accelerating Like Never Before*, LOCKHEED MARTIN (Sept. 22, 2025), https://www.lockheedmartin.com/en-us/news/features/2025/accelerating-like-never-before.html (their new manufacturing facility in Colorado is 'equipped with six parallel assembly lines... This allows us to produce up to 180 spacecraft per year.'").

[13] *See, e.g.*, *Governor Ron DeSantis Announces Terran Orbital Will Invest $300 Million in Florida To Construct The World's Largest State-of-the-art, Commercial Spacecraft Facility*, TERRAN ORBITAL (Sept. 27, 2021), https://terranorbital.com/governor-ron-desantis-announces-terran-orbital-will-invest-300-million-in-florida-to-construct-the-worlds-largest-state-of-the-art-commercial-spacecraft-facility/ ("Terran Orbital's planned development of the world's largest and most technologically advanced satellite manufacturing facility... will consist of ten automated and augmented hangers capable of producing thousands of different types of space vehicles per year.").

[14] *See, e.g.*, *The Decline and Fall of the ITAR Empire*, THE POTOMAC INSTITUTE (2023), https://potomacinstitute.org/steps/index.php/issues/the-decline-and-fall-of-the-itar-empire ("The International Traffic in Arms Regulations (ITAR) is collapsing from excessive bureaucracy").

[15] *See, e.g.*, Cision P.R. Newswire, *Communication Small Satellite Market worth $18.34 Billion by 2030*, THE AI JOURNAL (Jan. 2026), https://aijourn.com/communication-small-satellite-market-worth-18-34-billion-by-2030-exclusive-report-by-marketsandmarkets/ (North America continues to lead the high-volume satellite market, with the region's "communication small satellite market accounted for a 54.1% share in 2025.").

3. The Cost to Produce Ground Segments Is Also Dropping

The same assembly line production approach is also impacting the cost of the ground segment, especially as to NGSO systems.[16] And with this rapid increase in production and employment, in true "Build America" fashion, these companies are training up the next generation of technicians necessary to run these systems and service these platforms.[17]

B. FCC's Processes Have Improved, But Need Further Change

FCC in recent years has done much to streamline the licensing processes for the deluge of new satellite applications that Cheap Access to Space (CATS) has fueled. The Space Modernization NPRM notes the increase in applications, and the quickened pace of grants, especially under the current FCC.[18] But the NPRM also notes that more fundamental changes to its licensing regime are required. "While the Commission has updated some of its licensing rules in recent years in response to these changes, today we initiate this Notice to avoid

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[16] *See, e.g.*, Kimberly Siverson Burke, *Key Takeaways from Starlink's 2025 Progress Report*, QUILTY SPACE (Jan. 6, 2026), https://www.quiltyspace.com/post/key-takeaways-from-starlink-s-2025-progress-report (Starlink's Bastrap manufacturing facility by a million square feet in 2024, its Washington state facility by 700,000 square feet, and together they are producing 170,000 terminals a week).

[17] *See, e.g.*, Alan Boyle, *Amazon's Project Kuiper Satellite Network Sets Up Logistics Site & Training Program*, GEEKWIRE (May 14, 2021), https://www.geekwire.com/2024/amazon-kuiper-satellite-training-program-everett-logistics/ ("Amazon's partnership with Lake Washington Institute of Technology in Kirkland — which is less than a 10-minute drive from the satellite factory — takes the form of a satellite technician certificate program that will prepare students for careers in aerospace assembly and manufacturing. Brian Huseman, Amazon's vice president of public policy and community engagement, said in a news release that the partnership 'will help create a pipeline of future satellite technicians to meet the evolving needs of this area's thriving space and satellite sectors, and give more people the opportunity to take part in Project Kuiper's important mission.'").

[18] Space Modernization NPRM ¶ 5 ("The expansion of the space economy has resulted in significantly more licensing activity at the Commission. The Commission received 295 space station applications and 2,684 earth station applications in 2024.6 In contrast, the Commission received only 124 space station applications and 974 earth station applications in 2016.7 During this time, the complexity, size, and variety of license applications has also changed. Such rapid change in the space economy—and the resulting demands on the Commission's existing licensing system—means our rules and operations must be modernized to match the realities of the space economy. In the face of greater application volume and highly complex, non-traditional systems, the Commission's framework has resulted in slow decision timelines and unpredictable outcomes." Footnotes omitted).

piecemeal reforms going forward and to make the licensing process of the future fast, predictable, and flexible."[19] TechFreedom agrees. This proceeding represents one of the most important regulatory shifts in the history of the FCC.

III. How the FCC Should Approach Regulatory Reform of Its Satellite Rules

A. Fundamental Approaches to Regulation

The Space Modernization NPRM begins with a firm declaration:

> First, we propose a review process to facilitate permissionless innovation. . . . The core of our proposal is an approach to facilitate permissionless innovation which sets forth a set of system features which the Commission generally presumes to be acceptable.[20]

TechFreedom applauds this approach. We've advocated for it elsewhere when it comes to regulating outer space activities.[21] America has prospered precisely because it has encouraged innovation, invention, and entrepreneurship. As we approach the 250th anniversary of the Declaration of Independence, we should not forget that the American founding fathers found innovation to be so important that it appears in Article I, Clause 8 of the U.S. Constitution: "[Congress shall have the power] To promote the progress of science

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[19] *Id.*

[20] Space Modernization NPRM ¶ 13. *See also* Statement of Chair Brendan Carr: "Through an ambitious set of rules designed from first principles, we propose to replace our legacy 'Default to No' mindset with a 'Default to Yes' framework built on permissionless innovation." Statement of Brendan Carr on Space Modernization, https://docs.fcc.gov/public/attachments/FCC-25-69A2.pdf.

[21] *See Testimony of James E. Dunstan before the House Committee on Science, Space, and Technology, Continuing U.S. Leadership in Commercial Space at Home and Abroad* (July 13, 2023), https://republicans-science.house.gov/_cache/files/9/5/95df0d97-2cca-4c31-beb6-68b98de1821f/28F0B5D64069350BAF6C8F97C03A2995918127AA763443C44595501EBA54C2C7.2023-07-13-dunstan-testimony.pdf ("In the same way that Earth sits in the 'Goldilocks' zone of our solar system, not too close to the sun, but not too far away, Congress's task is to find a balance on the continuum between 'permissionless innovation' (where nearly anything goes), and the 'precautionary principle' (where the government must micromanage and approve every activity by U.S. citizens in space)."

and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

The "Patent Clause," as it is known, was so uncontroversial that it is mentioned only once in the Federalist Papers. In Federalist Paper No. 43, James Madison writes: "The utility of this power will scarcely be questioned. The copyright of authors has been solemnly adjudged, in Great Britain, to be a right of common law. The right to useful inventions seems with equal reason to belong to the inventors."[22] President Washington, in the first State of the Union address (which consisted of a mere 1,096 words), said this about the need for Congress to quickly pass a comprehensive patent statute:

> The advancement of agriculture, commerce, and manufactures by all proper means will not, I trust, need recommendation; but I can not forbear intimating to you the expediency of giving effectual encouragement as well to the introduction of new and useful inventions from abroad as to the exertions of skill and genius in producing them at home, and of facilitating the intercourse between the distant parts of our country by a due attention to the post-office and post-roads.[23]

Congress responded quickly; the Patent Act of 1790 was just the third law passed by the newly formed Congress of the United States. Thus, the notion of "permissionless innovation,"[24] runs deep in the American psyche, and serves as a critical starting point when we think about how to regulate the activities of Americans.

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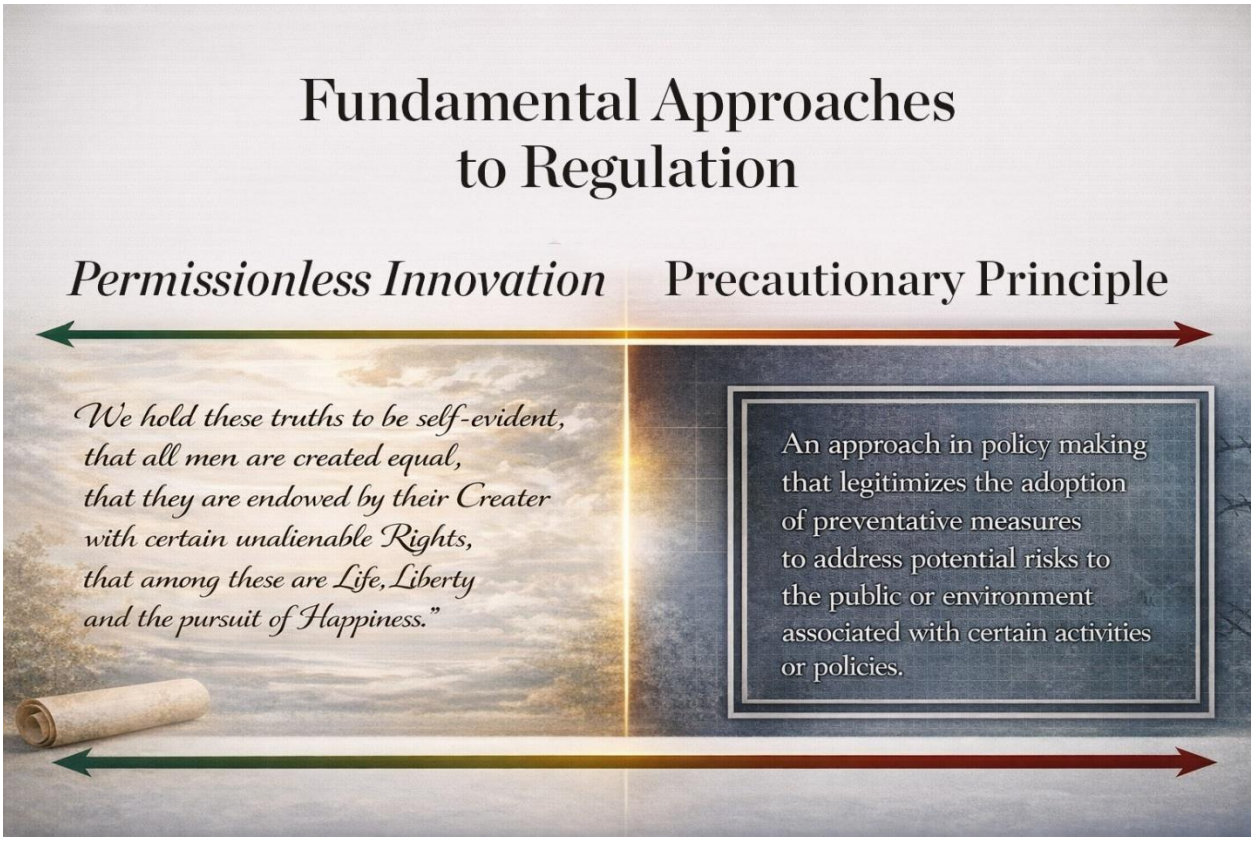
[22] THE FEDERALIST NO. 43 (James Madison).

[23] President George Washington, State of the Union Address (1790).

[24] *See* ADAM THIERER, PERMISSIONLESS INNOVATION: THE CONTINUING CASE FOR COMPREHENSIVE TECHNOLOGICAL FREEDOM (2014), https://www.amazon.com/Permissionless-Innovation-Continuing-Comprehensive-Technological/dp/0989219348.



Beginning on the regulatory continuum at permissionless innovation in this proceeding is in sharp contrast to the regulatory approach being implemented by the European Union, which often begins at the "Precautionary Principle" and rarely moves toward permissionless innovation.[25] We saw it with the General Data Protection Regulation (GDPR),[26] the Digital Markets Act (DMA),[27] and the EU is heading in the same direction when it comes to regulating

[25] *See The Precautionary Principle*, EUR-LEX, https://eur-lex.europa.eu/EN/legal-content/summary/the-precautionary-principle.html (last visited Jan. 20, 2026).

[26] GDPR.eu, GDPR, https://gdpr-info.eu/ (last visited Jan. 20, 2026). *See also* Winfried Veil, *C.05 Precautionary Principle*, DATAPROTECTION LANDSCAPE (June 7, 2021), https://dataprotection-landscape.com/law/critique-of-data-protection/precautionary-principle ("In the GDPR, the Verbotsprinzip (i.e. precautionary principle) applies: the processing of personal data is generally prohibited unless there is a legal ground for permission.").

[27] Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828, https://eur-lex.europa.eu/eli/reg/2022/1925/oj/eng.

space activities.[28] We pointed this out to the EU Commission in comments we filed in November 2025. "With the Draft EU Space Act, the European Commission has taken its first steps toward comprehensive outer space regulation. Unfortunately, its approach embodies many more aspects of the 'precautionary principle' than of 'permissionless innovation'."[29]

Obviously, we can't have a space regime entirely devoid of regulation, that's not what "permissionless innovation" means. Instead, it means that we should impose the fewest and least burdensome regulations possible to accomplish the statutory and policy goals entrusted to the FCC when it comes to outer space operations. The further left on the continuum depicted above, the better.

B. Goals and Metrics of Success

The Space Modernization NPRM sets forth the objectives of the FCC in reviewing and revising its space regulations:

> With this Notice, we have four main goals: (1) to increase license processing speed; (2) to provide more predictability to applicants and licensees; (3) to provide more flexibility for innovation and for licensees' operations; and (4) to faithfully meet our responsibilities. Pursuit of these goals guides each element of our proposal as we aim to design a system which can efficiently scale with the space economy.[30]

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[28] Proposal for a Regulation of the European Parliament and of the Council on the Safety, Resilience and Sustainability of Space Activities in the Union, 2025/0335 (COD), EUR. PARL. (June 25, 2025) [hereinafter Draft EU Space Act].

[29] TechFreedom, Comments to the European Commission on the Draft Space Act at 5 (Nov. 7, 2025), https://techfreedom.org/wp-content/uploads/2025/11/TechFreedom-Comments-to-EU-on-Draft-Space-Act-11-7-25.pdf. We went on to note: "From a strictly US perspective, this might not be a bad thing, read in a vacuum. The EU establishing overbearing regulations would actually slow, if not halt, the exodus of US aerospace companies seeking flags of convenience from friendlier jurisdictions. If adopted as proposed, few US companies would trade the patchwork quilt of US space regulation for the EU's multi-layer regulatory approach." *Id.* n. 18.

[30] Space Modernization NPRM ¶ 7 (footnote omitted).

These are laudable high-level goals, and many of the suggested revisions to the Commission's rules will advance these goals. If these were the *only* important goals, TechFreedom could support virtually all of the proposed changes. Unfortunately, we predict that, as the NPRM now stands, there could be significant unintended consequences that would actually thwart some of the articulated goals. Therefore, TechFreedom suggests an additional layer of granularity to these goals to maximize the ability of U.S. space entrepreneurs to innovate and help lead America into the High Frontier. We call these "Tier 2 Goals." To wit, when the FCC considers changes to its rules, will they:

1) Lead to better, more complete, and more robust applications that are easier to process by Commission staff, and proposed by applicants who are capable of executing on their plans?

2) Allow the FCC to grant licenses without an excess number of conditions?

3) Promote efficiencies, especially when it comes to spectrum use?

4) Lead to faster deployment and minimize spectrum warehousing?

5) Minimize "moat building"[31] by incumbents and avoid weaponization to slow deployment and innovation?[32]

It is with these additional goals in mind that we provide our comments below.

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[31] *See* TechFreedom Reply Comments on Revising Spectrum Sharing Rules For Non-Geostationary Orbit, Fixed-Satellite Service Systems et al. at 3, 9 (April 25, 2022), https://techfreedom.org/wp-content/uploads/2022/04/TechFreedom-Reply-Comments-4-25-22.pdf ("[T]he FCC can expect, and indeed, can demand, that satellite operators continue to improve their systems to make more efficient use of spectrum.") ("[The FCC] should take the opportunity to reward innovation and spectral efficiency and combat 'moat building' by earlier-round licensees. Only in this way can the FCC truly capitalize on the satellite revolution we are currently witnessing.").

[32] Henceforth in these comments, we will refer to these as "Tier 2 Goals."

C. Beware of the FCC's Limited Statutory Authority in This Area

Finally, we remind the FCC that its statutory authority regarding outer space regulation is limited. The Space Modernization NPRM gives short shrift to this critical issue. The NPRM cites to the Commission's generalized authority in paragraph 7:

> These goals flow directly from the mandates in the Communications Act of 1934, as amended (Act), directing the Commission "to make available, so far as possible, to all people of the United States….world-wide wire and radio communications service" and to "encourage the provision of new technologies and services to the public." Additionally, the Act provides for the regulation and licensing of radio communications, including satellite communications, for the purpose of national defense and in service of the "public convenience, interest, or necessity." We believe these statutory mandates strongly support our goals of greater speed, predictability, and flexibility in the space and earth station licensing process to promote the wide availability and proliferation of communications and new technologies for the public.[33]

Elsewhere, the NPRM acknowledges that the hooks the FCC have for regulation are limited:

> The Commission's statutory authority is rooted in regulating the "apparatus," which in this context includes the "space station," or antenna, as a radiocommunication transmitting device. The space stations in a satellite system that the Commission licenses and regulates are often combined with a "satellite" or "spacecraft" such that interchangeability of these two terms is not a problem. However, as the Commission anticipates that it will continue to receive more new and novel licensing requests, it is important to clearly distinguish these terms to promote clarity in our rules and in matters of statutory authority.[34]

We have warned of FCC overreach in this area before, especially when it comes to innovative space activities, *i.e.*, not providing direct communications services to Earth.

> So, we must begin, as a reviewing court would, by examining the authority of the FCC to regulate ISAM. At best, the FCC's statutory authority in this area is a "wafer-thin reed." Our comments in response to the ISAM Notice of Inquiry, addressed this issue, and the fact that a number of people, including members of Congress with oversight authority over the FCC, have questioned the Commission's statutory authority to regulate space activities, especially the orbital debris aspects of such operations. Other agencies which claim

[33] Space Modernization NPRM ¶ 7 (footnotes omitted).

[34] *Id.* ¶ 32 (footnote omitted).

overlapping (or even conflicting) authority have also questioned the FCC's actions in attempting to go it alone in regulating innovative space activities.[35]

Given that any decision rendered in this proceeding will not receive *Chevron* deference on appeal,[36] it is vital that for each regulatory change adopted, the Commission demonstrate it has statutory authority to do so.[37] In our view, regulations that squarely impact spectrum and interference are wholly within the FCC's statutory authority. Regulations that impact space operations beyond that lie on less firm statutory footing. We will highlight below those areas where the FCC's statutory authority is in question.

IV. Specific Responses to Proposals in the Space Modernization NPRM

As we said at the outset, we support the majority of the proposed regulatory changes set forth in the NPRM. They represent a strong start to bringing the regulatory regime into

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[35] TechFreedom, Comments to the Federal Communications Commission on In-Space Servicing, Assembly, and Manufacturing at 4-5 (Apr. 2024), https://techfreedom.org/wp-content/uploads/2024/04/TechFreedom-FCC-ISAM-Comments.pdf, quoting Ala. Ass'n of Realtors v. Dep't of Health & Hum. Servs., 141 S. Ct. 2485, 2489 (2021) (footnotes omitted). *See also* Letter from Rep. Eddie Bernice Johnson (D-TX), Chairwoman, H. Comm. on Sci., Space, & Tech., Rep. Frank Lucas (R-OK), Ranking Member, H. Comm. on Sci., Space, & Tech. (Sept. 27, 2022), https://republicans-science.house.gov/_cache/files/f/4/f4208cb4-ee5a-4f59-ab650cc7cc0b8209/6F2AFE4C757C5AC039876863E3DF3EBA.2022-09-27-sst-bipartisan-letter-to-fccon-orbital-debris-mitigation.pdf ("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.") (footnote omitted).

[36] Loper Bright Enter. v. Raimondo, 144 S.Ct. 2244, 2273 (2024) ("*Chevron* is overruled.").

[37] A fuller discussion of the FCC's authority to regulate space activities can be found in J. Dunstan, *Regulating Outer Space: Of Gaps, Overlaps, and Stovepipes*, CENTER FOR GROWTH AND OPPORTUNITY at 24-29 (July 10, 2023), https://www.thecgo.org/research/regulating-outer-space-of-gaps-overlaps-and-stovepipes/.

the second quartile of the 21st century, aligning it more closely to the rapidly developing space economy.[38]

A. Revisions to Form 312 Are Long Overdue

The Space Modernization NPRM proposes to modify FCC Form 312 to make it simpler, more modular, and easier for staff to process.[39] We have long called for an upgrade to the basic application for satellite and earth stations. FCC Form 312 long ago lost its ability to serve that purpose, if it indeed ever really worked at all. The requirement for extensive narrative statements, exhibits, and almost guaranteed requests for waivers resulting in myriad license conditions make it ill-suited for today's rapidly changing space ecosystem.

> But let us put it more starkly—the Commission's licensing regime for satellite systems still remains in an analog world that can't possibly keep up with the current pace of the commercial space sector. FCC Form 31210 is totally outdated, prone to user error, and not tied into databases that could provide "go/no go" answers to applicants. Both applicants and competitors can game the system to slow down licensing, and FCC staff is burdened with having to

[38] *See* Space Modernization NPRM ¶ 4 ("This change and rapid growth in the space industry has created new demands on the Commission's resources and raised new questions about how to apply the existing licensing framework to new satellite and earth station technologies."); ¶ 5 ("Such rapid change in the space economy—and the resulting demands on the Commission's existing licensing system—means our rules and operations must be modernized to match the realities of the space economy. In the face of greater application volume and highly complex, non-traditional systems, the Commission's framework has resulted in slow decision timelines and unpredictable outcomes. Therefore, the time has come for the Commission to overhaul its space licensing processes.").

[39] *Id.* ¶ 22, ¶ 36 ("We propose to require applicants to submit their space and earth station applications by completing one or more application pieces depending on the nature of the request. Relying on modularity will mean applicants only need to complete relevant portions of the application and the Commission can efficiently design and update internal review processes for applications.41 We intend for this approach to apply to any type of application, including initial space and earth stations applications, petitions for market access, amendments, modifications, requests for special temporary authority (STA), and any other applications. The key modular pieces of the application materials under our proposal for space station applications include General and Ownership Information on FCC Form 312 – Main Form, Orbital Elements on Schedule O to the FCC Form 312, and Frequency Elements on Schedule F to the FCC Form 312. Earth station applicants would file FCC Form 312 – Main Form and Schedule B to FCC Form 312.").

> manually pore over applications and then work with applicants to correct errors that the application process itself should automatically flag.[40]

The NPRM recognizes this fundamental problem.[41] TechFreedom totally supports this approach to updating the Commission's forms and application process.[42] We also support an approach to licensing which relies more heavily on bright lines, clear criteria,[43] and applicant certifications.[44] We further support the concept that each licensee should have a "parent" Form 312 on file with the Commission to which future "child" applications could attach.[45] As

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[40] Comments on Expediting Initial Processing of Satellite and Earth Station Applications & Space Innovation, IB Docket Nos. 22-411 & 22-271, at 4 (Mar. 3, 2023), https://techfreedom.org/wp-content/uploads/2023/03/TechFreedom-Comments-Satellite-Streamlining-3-3-23.pdf.

[41] Space Modernization NPRM ¶ 42 ("The Commission often receives applications with incomplete, inconsistent, and inaccurate information, and staff have generally engaged in a time-consuming process of guiding applicants on how to correct and amend applications so that they are acceptable for filing.").

[42] *See id.* ¶ 19 (""Enhanced Application Design. Our proposed framework also seeks to dramatically increase processing speeds and lower burdens on applicants by using modularity, standardization, and certifications. With such reforms we seek to reduce unnecessary burden on applicants while also facilitating application routing as part of the licensing assembly line. Our vision is that the application itself will be designed so that the Commission can easily determine completeness and then appropriately route the request to expedited processing or for focused review of one or more elements. Further, a modular design will also support future changes to application requirements.").

[43] *Id.* ¶ 37 ("We also propose in many of these information requirements to shift away from requiring narratives and demonstrations and shift to requiring more straightforward pieces of information. In making these changes we propose to replace the current Schedule S and much of the narrative required for space station applicants with two new schedules to the FCC Form 312[.]").

[44] *Id.* ¶ 23 ("Perhaps most important to enhancing the application process, our proposal introduces a series of certifications concerning the bright-line elements that carry a public interest presumption. These certifications are specific to the type of proposed system, such as GSO or NGSO, and applicants will certify affirmatively or negatively as to whether their proposed system meets these prespecified elements. Not only do these certifications allow us to relieve applicants of certain showings, but these certifications can be used to quickly identify specific areas where targeted review is needed. Applicants who provide a negative certification—that is, applicants who certify that their system will not meet a bright-line standard that the Commission has determined to be in the public interest—will be required to submit additional information so the Commission may make a determination as to whether the application is in the public interest. But in the case of an affirmative certification, applicants generally will only need to submit system design information collected in non-narrative form.").

[45] *Id.* ¶ 22 ("One particular example of the flexibility and reduced burden afforded by the modular license approach that we propose is that entities be able to complete the FCC Form 312 – Main Form with basic contact and ownership information without immediately seeking an authorization request. Then, all future license requests from one applicant could be associated with the single FCC Form 312 – Main Form so applicants only need to submit this information once (and keep one form updated) and so all requests and licenses associated with an entity can easily be identified.").

discussed more fully below, the tradeoff for this approach must be transparency and accountability.[46] For this reason, TechFreedom supports the proposal to require that Form 312 be signed under penalty of perjury by an officer of the applicant.[47]

We are less sanguine, however, about the use of "conditional grants," by which applicants could be awarded a conditional license without having to submit key data required for full review.[48] In our mind, this violates the goal of meeting Tier 2 Goal numbers 1 and 2: fostering fully mature and complete applications that can be reviewed once by Commission staff without the need to revisit the same issues several times, and granting applications free of cumbersome conditions. We've spoken often in the past about the inefficiencies and downright danger of a regulatory system which grants applications with long and sometimes inconsistent conditions.[49]

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[46] *See infra* Sec. IV.H.

[47] Space Modernization NPRM ¶ 42 ("Should an additional requirement be added so that the attestation be made by an officer of the applicant filing the FCC Form 312 – Main Form to better ensure that the information is complete, consistent, and accurate since the submission might be taken more seriously by leadership of the entity filing the authorization if an officer has to attest?").

[48] *Id.* ¶ 25 ("Second, we propose to update our rules to provide the opportunity for applicants to request conditional grants in situations where such flexibility will fit better with the applicant's planning and design process. For example, we are proposing to grant authorizations conditioned on the applicant submitting a future satisfactory orbital debris showing prior to launch. This change would provide applicants more flexibility as to when they can submit their application to the Commission while still finalizing their system design.").

[49] *See* Mitigation of Orbital Debris, IB Docket No. 18-313, 8-9 (June 27, 2024), https://techfreedom.org/wp-content/uploads/2024/06/TechFreedom-Orbital-Debris-Refresh-Comments-6-27-24.pdf ("The Commission has reacted to the development of the space economy not by promulgating new rules to recognize these changes, but rather by imposing more and more conditions on licenses. While such conditions are a common practice in FCC licensing, in most communications services regulated under the Communications Act, those conditions are limited and applied consistently across licensees. More fundamentally, those conditions generally are tied to clear, specific rules that everyone can understand. For example, broadcast power levels, and AM daytime and nighttime operating limits, printed on licenses are clear and easy to understand. The number of conditions tacked on to these licenses has remained relatively constant over the years. The practice of the Space Bureau and its predecessor related to the satellite services has been different, however, with each new license seemingly issued with more and more conditions, many of which reference vague rules or policies, or constitute negotiated agreements between the applicants and FCC staff to fill gaps in Commission rules.") (footnotes omitted).

It is possible that the modularization of applications might be implemented such that a conditional grant system as proposed could work, but more detail is required, and more important, the Commission needs to think through whether such a system will be abused by applicants to gain an advantage (*e.g.*, improper placement into a processing round for a satellite system that is not ready to proceed) for an application that is only half-baked. There is also the danger of the proverbial "camel's nose," once an applicant can obtain a conditional grant, Commission attempts to revoke the grant will be met with "reliance" arguments. At the very least, any conditional grant must make clear that the licensee is proceeding at its own risk.[50]

B. Alternative Types of Licenses

The Space Modernization NPRM proposes to establish new license types for services that do not fit into the traditional GSO/NGSO satellite communications categories. The new category could be called "Variable Trajectory Spacecraft Systems" ("VTSS").[51] TechFreedom supports new categories of licenses but submits that lumping everything other than GSO/NGSO communications services into a single category is too limiting.

1. There Should Be at Least Two New Service Designations

As a starting point, the Commission should consider at least two new service designations. First would be the VTSS service for the types of operations described in the NPRM that operate between low earth orbit (LEO) and geostationary orbit (GSO). A second

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[50] *See* Space Modernization NPRM ¶ 126 ("Commencement of operations following a conditional grant would be at the operator's own risk, including adverse final action on the application or conditions imposed on the authorization following completion of staff review.").

[51] *Id.* ¶ 26. The Commission seeks comment on what to name this service, including calling it the "Weird Space Stuff" service. Our vote goes for "Spacey McSpace Stuff" (SMcS).

service should be established for spacecraft operating beyond GSO (e.g., lunar orbit, lunar surface, Mars, and beyond). We suggest adopting the name "EXO-GEO."[52] The reason for this bifurcation is that the operating environment and need for coordination to avoid harmful interference are vastly different for these types of operating arenas. VTSS systems, because they aim to interact with existing on-orbit assets, likely will be operating in the most congested regions of space. Spectrum coordination and Space Traffic Management (STM) needs will be high. EXO-GEO operations, in contrast, will be operating in far less cluttered environments from both a mass and frequency transmission standpoint. Regulatory requirements on such system can be far more lenient, and the Commission has the opportunity now to implement a highly flexible and non-burdensome regulatory regime that can anchor America's push to develop the Moon and other celestial bodies.

Further, because VTSS systems, as their name imply, will be transiting through multiple orbits, the need for the timely and accurate dissemination of ephemeris data is vital to avoid collisions.[53] The need for that data, at least for the next decade or so, in the context of lunar or Mars operations is far less important, and the probability of significant changes

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[52] EXO-GEO is easier to say than "EXO-GSO," and GEO and GSO, while different technically, are often used interchangeably.

[53] Whether the FCC has the statutory authority to require its licensees to provide that data to third parties, as proposed in paragraph 7 of the NPRM remains an open question, especially in light of SPD-3, Section 5(b)(ii) which designates the Department of Commerce as the lead agency on space traffic management (STM). President's Space Policy Directive 3 (SPD-3) (June 18, 2018), https://trumpwhitehouse.archives.gov/presidential-actions/space-policy-directive-3-national-space-traffic-management-policy/. As we've repeatedly said, Congress needs to step in to provide clearer statutory authority to all agencies with regulatory responsibilities over space activities. *See supra* note 21, at 3 ("What should a National Space Act look like? After West Virginia v. EPA, I think Congress needs to do four things: 1) Congress needs to assign clear regulatory authority to an agency or small set of agencies with minimal gaps and overlaps; 2) Congress must provide explicit rulemaking authority to that agency or agencies to create the rules of the road for space activities in the 21st century; 3) Congress must provide explicit enforcement powers to its chosen space agencies so that we have a "cop on the beat" to ensure compliance both with domestic law and the United States' obligations under international law; and 4) Understanding that some overlap is inevitable, and that there must be interagency coordination, ensure that the coordination process is as transparent as possible.").

to ephemeris data for EXO-GEO operations is far lower than for VTSS operations. For these reasons we suggest the Commission adopt at least these two new service categories.

2. The Commission Should Consider Moving to a "Tail Number" Approach to Licensing Innovative Non-Communications Services

Ideally, for VTSS systems that do satellite servicing in variable orbits, the Commission could adopt a licensing system far closer to what the FAA has done with aircraft tail numbers.[54] Each spacecraft would have a unique tail number (or call sign),[55] and the applicant would specify the spectrum which the spacecraft is capable of using. Implementing software defined radios (SDR),[56] modern spacecraft are capable of transmitting in multiple frequency bands, changeable in space by uploading new software. The license would thus reflect the frequency bands that the spacecraft can possibly use. Prior to any deployment or RF transmission, the VTSS operator would file a notification with the FCC similar to an FAA flight plan, specifying the mission parameters, including mission duration, ephemeris data, frequencies requested for the operation, and a coordination exhibit showing that those

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[54] *See Aircraft Registration*, FED. AVIATION ADMIN., https://www.faa.gov/licenses_certificates/aircraft_certification/aircraft_registry (last visited Jan. 20, 2026).

[55] The Space Modernization NPRM suggests that a licensee could specify a network of VTSS spacecraft consolidated under a single call sign. Space Modernization NPRM ¶ 67 ("Specifically, we propose to require VTSS applicants to submit information about the number of spacecraft they seek authority for as part of the system, the range of altitudes at which those space stations will operate, and the anticipated amount of time the space station(s) are expected to operate in any particular phase of a mission."). TechFreedom submits that associating a single call sign or tail number to a specific spacecraft would make tracking and notifications of any change in mission operations easier on all parties involved.

[56] *See Software Defined Radios (SDRs) for space and satellite applications*, SATSEARCH (Mar. 20, 2025), https://blog.satsearch.co/2022-06-27-software-defined-radios-sdrs-for-space-and-satellite-applications.

frequencies can be used in that mission without causing harmful interference.[57] That data would be associated with the tail number for the duration of mission.[58]

3. Non-Communications Services Licensed Under This New Regime Should Not Be Subject to Many Requirements Attaching to Licensees Delivering Communications Services

Here we must revisit our warnings above about the FCC exceeding its statutory authority. Remember, the Commission's entire basis for this regulatory undertaking is this:

> These goals flow directly from the mandates in the Communications Act of 1934, as amended (Act), directing the Commission 'to make available, so far as possible, to all people of the United States….world-wide wire and radio communications service' and to 'encourage the provision of new technologies and services to the public.'[59]

If the service in question does not involve providing communication services to the public, where is the statutory authority to regulate these activities? Again, we believe that the Commission has authority as it relates to the communications devices used on these spacecraft to ensure no harmful interference to other users, but beyond that, it is highly questionable whether the FCC has any authority to regulate any other aspect of these activities, or otherwise impose regulatory burdens on such licensees.

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[57] AI tools are emerging today which can make these noninterference showings far easier. *See, e.g.*, *Understanding the Role of AI in RF Spectrum Monitoring*, EVERYTHINGRF (July 4, 2025), https://www.everythingrf.com/community/understanding-the-role-of-ai-in-rf-spectrum-monitoring.

[58] Assuming that the Commission the authority to require the licensee to disseminate that information to third parties, this would be part of the notification ("flight plan") process. *See* Space Modernization NPRM ¶ 69 ("We currently propose adding a rule that requires all space station licensees to share ephemeris data more broadly, which is discussed further below"); ¶ 70 ("In addition to the rule requiring space station licensees to share ephemeris data, we propose to require VTSS applicants to certify whether they will share propagated ephemeris and covariance data prior to and during any planned maneuvers or rendezvous and proximity operations.").

[59] *Id.* ¶ 7.

C. The FCC Should Modify its "Market Access" Processes to Require FCC Licenses in Most Instances

The Space Modernization NPRM for the first time in nearly 30 years takes a comprehensive look at revising the way in which the FCC deals with foreign operators who seek to provide communications services to the United States.[60] Rather than being required to hold FCC licenses, these entities, often incorporated[61] in the United States but holding foreign spectrum authorizations, are allowed to provide service into the U.S. after filing a petition seeking "market access." We have often commented on how such "foreign" entities (again, many of which are U.S. companies), are treated differently, and often more favorably, than U.S. licensees.[62]

The FCC previously has concluded that it is required to provide foreign entities access to U.S. markets based on the World Trade Organization (WTO) Agreement on Basic

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[60] *Id.* ¶¶ 78-83.

[61] Throughout this section, we use the term "incorporation" broadly to apply to corporations, as well as to limited liability companies, partnerships, and other legal structures sanctioned and under the jurisdiction of any U.S. state.

[62] *See* Comments on Single Network Future & Space Innovation, GN Docket No. 23-65 & IB Docket No. 22-271, at 13 (May 12, 2023), https://techfreedom.org/wp-content/uploads/2023/05/TechFreedom-Comments-SCS-5-12-23.pdf ("Moreover, the FCC's "open skies" policies have led to a flight offshore to seek licenses from other jurisdictions without either expertise or inclination to regulate in the public interest. This flight has included many U.S. companies, who have found "flag of convenience" jurisdictions that will license their operations far quicker and more cheaply than can the FCC); Comments on Expediting Initial Processing of Satellite and Earth Station Applications & Space Innovation, IB Docket Nos. 22-411 & 22-271, at 11-13 (Mar. 3, 2023), https://techfreedom.org/wp-content/uploads/2023/03/TechFreedom-Comments-Satellite-Streamlining-3-3-23.pdf, pp. 11-13 ("One of the true travesties of the existing satellite licensing system is the fact that "foreign" applicants for market access often are treated better than applicants that seek a direct license from the FCC. From our understanding, for example, domestic applications are vetted at the acceptance stage to determine whether their orbital debris showings are sufficient, whereas such showings in market access petitions are not reviewed until a later stage. This must end. Processing of applications for an FCC license should mirror as closely as possible the processing of petitions for market access, and at no time should market access petitions be subject to less stringent, or different, review.") (footnotes omitted). *See also* Space Modernization NPRM, ¶ 83 (implicitly acknowledging this problem in saying "it is our intention to ensure that operators who are granted authorization to access the U.S. market via a petition for declaratory ruling do not receive an advantage over entities holding a U.S. satellite license.").

Telecommunication Services, as implemented by the "DISCO II" order.[63] If ever there was a time to declare that "disco is dead,"[64] it is in this proceeding. The NPRM does this in paragraph 81:

> We seek comment on whether to change our market access rules to prohibit applicants who seek registration by the United States under the processes defined in the Registration Convention from receiving authorization to access the U.S. market via a petition for declaratory ruling and instead require those entities to hold an FCC space station license. We seek comment on whether to require entities that seek registration from the United States to hold a U.S. space station license pursuant to our licensing authority under section 301(f) of the Act, the stated purpose of which is "to maintain the control of the United States over all the channels of radio transmission," and section 303(r) of the Act, which directs the Commission to make such rules and prescribe such restrictions to carry out the provisions of the Act and "any international radio [ ] communications treaty or convention, or regulations annexed thereto, including any treaty or convention insofar as it relates to the use of radio, to which the United States is or may hereafter become a party."[65]

TechFreedom supports the Commission's proposal, with certain caveats necessary to ensure both U.S. compliance with its international law and WTO commitments, and to minimize the opportunity for other nations or multinational organizations[66] to retaliate against U.S. entities in their markets. First, TechFreedom urges the FCC to end the "charade of the foreigner." It is time to eliminate forever "flags of convenience" in spectrum licensing.[67]

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[63] Space Modernization NPRM ¶ 78, n. 131 (citing Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Service in the United States, IB Docket No. 96-111, Report and Order, 12 FCC Rcd 24094 (1997) (DISCO II Order)).

[64] *See Disco is dealt death blow by fans of the Chicago White Sox*, History (July 21, 2025), https://www.history.com/this-day-in-history/July-12/disco-is-dealt-death-blow-by-fans-of-the-chicago-white-sox.

[65] Space Modernization NPRM ¶ 81 (footnotes omitted).

[66] *See supra* note 4.

[67] *See Reopening the American Frontier: Exploring How the Outer Space Treaty Will Impact American Commerce and Settlement in Space: Before the Senate Committee on Commerce, Science, & Transportation Subcommittee on Space, Science, and Competitiveness*, 115th Cong. (2017) (written testimony of James E. Dunstan & Berin Szoka), https://www.commerce.senate.gov/services/files/A9AD88B2-9636-4291-A5B0-38BC0FF6DA90, https://medium.com/@TechFreedom/testimony-of-jim-dunstan-before-the-senate-subcommittee-on-space-science-and-competitiveness-d1b0223878e5.

Entities which are incorporated in the United States, at any level of their legal structure, should not be eligible to apply for market access, even if they have received a spectrum license from a different country. They should be required to apply for an FCC license to provide services to the United States. Second, in instances where an entity can fully demonstrate that it has no formal legal ties to the United States, the FCC should thoroughly review the foreign spectrum license to ensure that the issuing nation is fully capable of meeting its obligations of "authorization" and "supervision" of the entity under the 1967 Outer Space Treaty, including registering the spacecraft under the Registration Convention, and otherwise agreeing to abide by all international obligations imposed by the outer space treaty regime.[68] Finally, as proposed in the NPRM, truly foreign entities seeking to provide services into the United States should not be able to proceed under the NPRM's proposed expedited processing regulations.[69]

There are strong legal reasons to modify the FCC's approach to foreign authorizations. As the NPRM points out, these entities are seeking the legal protection of the United States, and are imposing international liability on the U.S., in requesting that the United States assume the responsibility, and potential liability, for the actions of foreign entities.[70] If the U.S. is to step up to these responsibilities, then it needs to truly be able to "authorize" and

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[68] *See* James E. Dunstan, *Who wants to step up to a $10 billion risk?* SPACENEWS (June 25, 2021), https://space-news.com/op-ed-who-wants-to-step-up-to-a-10-billion-risk.

[69] Space Modernization NPRM ¶ 117 (noting that an exception to expedited processing would be "Market Access. Requests for market access would need to be reviewed in light of market access rules addressing whether applicants' home administrations have opened access to U.S. companies.").

[70] *Id.* ¶ 81 ("Under the Registration Convention, States register space objects in a registry maintained by each State in order to provide information regarding each space object to the U.N.," citing Convention on Registration of Objects Launched into Outer Space, adopted Sep. 15, 1976, 28 U.S.T. 695, 1023 U.N.T.S. 15 (Registration Convention). The United Nations maintains an online index of objects launched into outer space available at https://www.unoosa.org/oosa/osoindex/search-ng.jspx?lf_id=.).

"supervise" those foreign entities under Article VI of the Outer Space Treaty.[71] Further, as the NPRM makes note, Section 301 of the Communications Act directs the FCC to issues licenses "to maintain the control of the United States over all the channels of radio transmission."[72] TechFreedom agrees that this licensing arrangement is fully within the FCC's authority, as it relates to spectrum licensing and foreign entities.

TechFreedom disagrees, however, with the inference raised by paragraph 83 that additional measures might be necessary in light of the possibility that the European Union might adopt a protectionist system as part of comprehensive space legislation.[73] The proposals set forth in the NPRM accomplish the much needed goal of harmonizing treatment of foreign entities. Going further risks a race to the bottom in space regulation by countries with which we have much more in common than differences—indeed, allies must work together to advance democratic principles in outer space, as we have noted:

> While the EU and US can have strong differences in many areas of policy, our alignments far exceed those disagreements. When it comes to outer space development, to date, our disagreements have been small, while our alignment has been close, especially when compared with our mutual adversaries, notably Russia and China. Only by working together can Western democracies ensure that the rules of the road for outer space reflect the centuries of our shared values, and only such an approach to space governance can unleash the full potential of outer space to improve life here on Earth.[74]

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[71] 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, Jan. 27, 1967, RES 2222 (XXI) [hereinafter OST]. *See also* Space Modernization NPRM ¶ 82 (is an FCC license "necessary so that the United States can maintain 'authorization and continuing supervision' over the space object?").

[72] Space Modernization NPRM ¶ 81 (citing 47 U.S.C. § 301).

[73] *Id.* ¶ 83.

[74] *See supra* note 4 at 11.

The way to push back against European Union protectionism is not to engage in the same protectionist practices, but to work with our allies through diplomatic channels to find commonality and mutually beneficial solutions.[75]

D. Application Handling and Timetables

The Space Modernization NPRM proposes a revamped processing regime, the so-called "assembly line" for applications.[76] TechFreedom agrees with many of the suggested processing changes, but thinks several further revisions are necessary. TechFreedom agrees that the FCC should pursue expedited processing wherever possible.[77] The timelines proposed will decrease substantially processing times for all but the most difficult applications.[78] But as the NPRM points out, this will only be possible if applicants also up

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[75] Indeed, the quickly increasing space economic sector needs to be front and center in future U.S. trade talks. Leveraging President Trump's August 13, 2025 Executive Order on commercial space, Exec. Order No. 14,335, Enabling Competition in the Commercial Space Industry, 90 Fed. Reg. 40,219 (Aug. 13, 2025).this administration (and future administrations) must elevate outer space as a major part of our future trade discussions. *See* Mija Aleksandraviciute, Stephen Michael Impink, & Robert Seamans, *Industrial policy for the final frontier: Governing growth in the emerging space economy*, BROOKINGS (Sept. 23, 2025), https://www.brookings.edu/articles/industrial-policy-for-the-final-frontier-governing-growth-in-the-emerging-space-economy/.

[76] Space Modernization NPRM ¶ 3 ("With these goals in view, our proposal in this Notice designs a "licensing assembly line" to process space and earth station applications with great efficiency and at the speed and scale required by the 21st century space economy. Like a physical assembly line, we seek to move standardized application materials in direct paths from one stage of the review process to the next in a highly predictable way. Given the nature of our licensing duties, our assembly line will be designed so applications can be routed along different paths and segmented for review based on specific aspects of a request. By modernizing processes in our rules, we aim to set the stage for increasing automation over time. In this way, we expect—like actual assembly lines—that the space review processes can become more efficient and dramatically accelerated while improving the quality of the Commission's licensing work for the American people.").

[77] *Id.* ¶ 16 ("One key element of this approach that we propose is an expedited processing pathway. We propose that an application will be placed on public notice for seven days and then be granted quickly in most circumstances if it: (1) meets certain presumed acceptable criteria that the Commission has found to be in the public interest; (2) does not request waivers; and (3) is not subject to certain limited "exceptions" to expedited processing.") (footnote omitted).

[78] *Id.* ¶ 98 (Public Notice or response within 30 days of filing; seven (7) day Public Notice period for applications eligible for expedited processing, fifteen (15) or 30 day Public Notice period for other applications; applicant notification within 60 days for reasons for further delay in granting an application).

their game by providing the Commission with substantially complete applications.[79] A further discussion of what constitutes "completeness" is warranted within the context of this proceeding; one person's "complete" could be another person's "half-baked." TechFreedom urges the FCC to work with stakeholders to better define completeness standards, possibly within the context of a series of "industry days" or roundtables. Ultimately, all parties need to know, prior to filing, that their applications are "substantially complete." Unfortunately, the current draft rules lacks sufficient specificity to provide future applicants with the guidance they need, especially since the cost to enter the space ecosystem has dropped such that the FCC is seeing many new applicants who lack a long history of dealing with the FCC and its rules.[80] Further articulation of completeness standards could accelerate the FCC's ability to "default to yes."[81]

1. The FCC Should Adopt Additional Rules to Limit Petitions to Deny or Information Objections

If regulation is to keep pace with technological process, the regulatory process must be more an assembly line. The NPRM aspires to get there. But a regulatory system which allows anyone to hit the "STOP!" button soon grinds to a halt (or by analogy, destroys itself because of the wear and tear induced by systems that frequently stop and start the assembly line). Reforms are also necessary to limit the ability of competitors to "throw a wrench into

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[79] *Id.* ¶¶ 99-101.

[80] *See id.* ¶ 101 ("To provide applicants with clarity and a more predictable standard, we propose to clearly articulate the standard for completeness before an application can be accepted for filing and placed on public notice. Accordingly, we propose to include a new rule section in part 100 defining the standard for completeness, stating, 'An application will be considered complete if, under the relevant rule section(s), all required information, forms, certifications, and showings are included in the application.' We believe this definition focuses on whether all required materials have been provided rather than involving a determination on the merits of an application.") (citing Appendix A at §§ 100.131, 132, footnote omitted).

[81] *See* Statement of Chairman Brendan Carr, *supra* note 20.

the works" by filing oppositions and petitions to deny. One only has to look at virtually every application for an NGSO system to see how broken this system has become. The NPRM attempts to deal with this problem through limiting the time in which oppositions may be filed.[82] This is a good start, but insufficient. There are plenty of well-heeled, entrenched operators who have lawyers fully spooled up and ready to hurl wrenches, even on tightened timelines.

In addition to truncated timelines, therefore, TechFreedom submits that additional constraints should be imposed on oppositions to applications. First, opposers, through their attorneys, should be required to declare, under penalty of perjury, that they have reviewed the relevant FCC rules, and applicable precedent, and that they are raising a good faith objection. In this way, opposers could not cite economic harm as the basis of their opposition.[83] Further, claims of interference would need to be raised in a technical report authored by a certified engineer, also subject to a good faith declaration.[84] Finally, any party filing an opposition or informal objection outside the time limits proscribed would have to file a waiver request, as proposed in the NPRM,[85] and that waiver request would be subject

[82] Space Modernization NPRM ¶¶ 102-104.

[83] *See* Viasat, Inc. v. Fed. Commc'ns Comm'n, 47 F.4th 769, 780 (D.C. Cir. 2022) ("We do not question that space congestion attributable to SpaceX may impose economic costs on Viasat itself. But we do not think that Viasat (or its shareholders, officers, employees, customers, suppliers, or other stakeholders) can fairly be described as having personally suffered a nuisance, aesthetic, or other environmental injury from congestion in outer space.").

[84] This is the one area where the tight timeframes might need to be extended. TechFreedom proposes that if someone seeks to oppose an application based on a claim on interference, that they would file a notice within the shorter timeframe, but then have an additional 30 days to file such a technical report.

[85] Space Modernization NPRM ¶¶ 104 ("To encourage timely filings, we propose to include in part 100 the requirement that any commenter, petitioner, or filer request a waiver of the rules when filing outside of a designated filing window." Footnote omitted.).

to the *WAIT Radio*[86] "high hurdle." All of these limitations on filing oppositions would smooth the pathway toward final grant of applications.

2. The FCC Should Use This Opportunity to Clearly Declare That NEPA Does Not Apply to Outer Space

One category which has seen significant abuse in recent years are oppositions to applications (and modifications thereto), that claim that the FCC has failed to properly conduct an environmental assessment under the National Environmental Policy Act (NEPA). Traditionally, the FCC has concluded that satellite licensing is a "categorical exclusion" to full NEPA review,[87] without addressing the fundamental question of whether NEPA itself applies to activities in outer space.[88] Recently, the FCC has teed up this issue for further comment, based on the 2023 amendments to NEPA.[89]

> The amended NEPA excludes "extraterritorial activities with effects located entirely outside of the jurisdiction of the United States from the MFA definition." The Commission issues licenses under parts 5, 25, and 97 for satellite and space-based communications. Parties have alleged in some cases that satellites in orbit can create impacts on the atmosphere from launches and reentries, impacts from satellites reflecting sunlight, and orbital debris

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[86] WAIT Radio v. Fed. Commc'ns Comm'n, 418 F.2d 1153, 1157 (D.C. Cir. 1969) ("Presumptions of regularity apply with special vigor when a Commission acts in reliance on an established and tested agency rule. An applicant for waiver faces a high hurdle even at the starting gate.").

[87] *See, e.g.*, Space Exploration Holdings, LLC, DA 26-36 ¶ 27 (Jan. 9, 2026) (Authorization and Order), https://docs.fcc.gov/public/attachments/DA-26-36A1.pdf.

[88] *See* In re Space Exploration Holdings, LLC, 36 FCC Rcd. 7995, ¶ 77 (2021) (SpaceX Second Modification Order), *aff'd sub. nom.* Viasat v. Fed. Commc'ns Comm'n, 47 F.4th 769 (D.C. Cir. 2022) ("As a threshold matter, we note that it is not clear that all of the issues raised by these parties are within the scope of NEPA or related to our action in approving SpaceX's Third Modification application. We further observe that several of the issues presented to the Commission raise novel questions about the scope of NEPA, including whether NEPA covers sunlight as a source of "light pollution" when reflecting on a surface that is in space. We note that NEPA is a procedural statute intended to ensure that Federal agencies consider the environmental impacts of their actions in the decision-making process. We find that we do not need to evaluate and determine whether NEPA applies to the novel issues raised by Viasat and The Balance Group in order to act on SpaceX's application. Instead, for purposes of our analysis, and out of an abundance of caution, we will assume that NEPA may apply and consider the concerns raised in the record before us under the standard set forth in section 1.1307(c) of our rules.").

[89] Fiscal Responsibility Act of 2023, Pub. L. No. 118-5, 137 Stat. 10 (2023) (amending 42 U.S.C. § 4321 et seq.).

> caused by increased collisions in space. We seek comment on whether the amended NEPA resolves any question as to whether some or all of these concerns are within the scope of NEPA. We propose that space-based operations be excluded from NEPA because they are "extraterritorial activities" with effects located entirely outside of the jurisdiction of the United States. We seek comment on this proposal. We ask commenters to define with specificity the "extraterritorial activities" at issue along with the "effects" that may or may not occur within the jurisdiction of the United States. Are there space-based operations that take place within U.S. jurisdiction and otherwise subject to NEPA? Are there other ways in which the statutory definition of MFA, including the associated exclusions, should inform our determinations regarding satellite and space-based communications?[90]

TechFreedom filed comments in that proceeding arguing that not only is it clear from the 2023 NEPA amendments that NEPA does not apply to outer space activities, but that that question can, and should be, answered under prior legal precedent severely limiting the extraterritorial application of U.S. statutes beyond the borders of the United States.[91] TechFreedom filed amicus briefs in two prior appeals of FCC orders in which the FCC prevailed, but in which neither court addressed the fundamental legal question of applicability of NEPA to outer space.[92]

To avoid further and near constant litigation on this issue, the FCC must—whether in this proceeding, the NEPA update proceeding, or the orbital debris proceeding—once and

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[90] Modernizing the Commission's National Environmental Policy Act Rules, WT Docket No. 25-217, 90 Fed. Reg. 40295, ¶ 33.

[91] Comments on Modernizing the Commission's National Environmental Policy Act Rules, WT Docket No. 25-217 (Sept. 18, 2025), https://techfreedom.org/wp-content/uploads/2025/09/TechFreedom-Comments-NEPA-9-18-25.pdf. TechFreedom also filed comments in the Commission's orbital debris "refresh" proceeding, making similar arguments. Mitigation of Orbital Debris, IB Docket No. 18-313 (June 27, 2024), https://techfreedom.org/wp-content/uploads/2024/06/TechFreedom-Orbital-Debris-Refresh-Comments-6-27-24.pdf.

[92] *See* Brief for TechFreedom as Amicus Curiae Supporting Fed. Commc'ns Comm'n, The International Dark-Sky Association, Inc. v. Fed. Commc'ns Comm'n, No. 22-1337 (D.C. Cir. Ct. App. 2023), https://techfreedom.org/wp-content/uploads/2023/06/TF-22-1337-International-Dark-Sky-Association-Inc.-v.-FCC.pdf; Brief for TechFreedom as Amicus Curiae Supporting Respondent, Viasat, Inc. v. Fed. Commc'ns Comm'n, 47 F.4th 769 (D.C. Cir. 2022) (No. 21-1123), https://techfreedom.org/wp-content/uploads/2021/09/File-Stamped-TechFreedom-Amicus-Brief-Viasat-v-FCC.pdf.

for all declare that, as it applies to spacecraft licensing, the FCC can process applications without having to rely on a categorical exclusion because NEPA does not apply to outer space activities.[93]

E. The NPRM's Proposed Changes to Processing Rounds Raise Substantial Concerns

As we stated in our *ex parte* filing in response to the draft NPRM issued in this proceeding,[94] TechFreedom has significant concerns related to modifying the Commission's processing round rules for NGSO systems.[95] Focusing back on our suggested Tier 2 goals, we question whether an annual processing round, as suggested, will actually lead to better applications that can be processed more quickly, supporting the goal of allowing faster deployment of new and innovative satellite systems.

While moving quickly to update and revise outdated rules is necessary, the NPRM appears to jump the gun on suggesting an annual processing round for NGSO systems. Initially suggesting a window between January 1 and December 31 of each year in the draft NPRM,[96] the final NPRM issued proposes a window between January 1 and October 31 of each year.[97] We have often commented when the FCC has engaged in a "ready-fire-aim"

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[93] In its most recent order, *supra* note 87 ¶ 27, the environmental impacts on the United States from launches and reentries are best left to the FAA, which licenses such activities ("We reiterate that the FAA conducts environmental review of the environmental effects of rocket launches, and has thus reviewed or is reviewing any potential impacts from SpaceX's launches. Under NEPA, an agency need not undertake environmental review that is already conducted by another agency.") (footnote omitted).

[94] Comments on Space Modernization for the 21st Century, SB Docket No. 25-306 (Oct. 20, 2025), https://techfreedom.org/wp-content/uploads/2025/10/TechFreedom-Ex-Parte-Comments-10-20-25.pdf.

[95] Space Modernization NPRM ¶¶ 132-139.

[96] *Id.* ¶ 133.

[97] *Id.* ¶ 134.

approach to regulatory solutions before the problem space has been properly bracketed,[98] and this issue falls into the category where a Notice of Inquiry is warranted. While the NPRM does propose a specific rule related to processing rounds,[99] paragraph 136 of the NPRM asks thirteen separate questions, many of which cast doubt on the efficacy of the specifics proposed in the draft Section 100.141.[100]

More important, the discussion in paragraphs 132-139 fails to lay the fundamental predicate: exactly what is the problem the proposed rule will solve? It also fails to consider

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[98] Revising Spectrum Sharing Rules for Non-Geostationary Orbit, Fixed Satellite Service Systems, IB Docket No. 21-456 (Aug. 7, 2023), https://techfreedom.org/wp-content/uploads/2023/08/Satellite-Spectrum-Sharing-8-7-23-TechFreedom-Comments.pdf; TechFreedom and the International Center for Law & Economics Reply Comments on Modernizing the E-rate Program for Schools and Libraries at 4 n.8 (Nov. 7, 2013), http://docs.techfreedom.org/E_Rate_Reply_Comments.pdf ("Indeed, the FCC should have issued a Notice of Inquiry before issuing this NPRM for precisely this reason—a mistake the FCC all too often makes, frequently putting the Commission in the awkward position of being on the verge of rulemaking without first properly exploring the facts on the ground. This is the worst kind of putting the cart before the horse."); Expanding Flexible Use of the 12.2-12.7 GHz Band, WT Docket No. 20-443, at 3 (May 7, 2021), https://techfreedom.org/wp-content/uploads/2021/05/TF-Comments-12-GHz-NPRM-4-7-21.pdf ("The Commission Should Have Issued a Notice of Inquiry (NOI), not a Notice of Proposed Rulemaking"); Petition for Rulemaking of FUSE, LLC To Establish a New Content Vendor Diversity Report, MB Docket No. 22-209, at 5 (July 22, 2022), https://techfreedom.org/wp-content/uploads/2022/07/TechFreedom-Comments-7-22-22.pdf ("If the Commission moves forward at all, it should begin a proceeding by issuing a broad Notice of Inquiry (NOI) rather than an NPRM"); *Congress, not FCC, should Decide Future of Internet Regulation*, TECHFREEDOM (May 15, 2014), https://techfreedom.org/congress-not-fcc-should-decide-future-of/ ("[T]here was no need to rush today's NPRM, as Commissioners Rosenworcel and Pai noted."); *FCC Violates Basic Legal Principles in Rush to Regulate Set-Top Boxes*, TECHFREEDOM (Feb. 18, 2016), https://techfreedom.org/fcc-violates-basic-legal-principles-in-rush-to/ ("FCC Chairman Tom Wheeler . . . insist[s] that 'this is just the beginning of a fact-finding process.' Do not believe him. If that were true, the FCC would issue a Notice of Inquiry to gather data to inform a regulatory proposal. Instead, the FCC has issued a Notice of Proposed Rulemaking. That means the FCC Chairman has already made up his mind, and that the agency is unlikely to adjust course.").

[99] *See* Space Modernization NPRM at 134 (proposed new Section 100.141).

[100] *Id.* ¶ 136 ("Does the shift from a 30-day filing window to a full calendar year provide applicants with the intended benefits of increased predictability and flexibility? Should the Commission consider an alternative or additional process to open a processing round based on a request or petition to do so? Should the application window for processing round be three or six months instead of a full calendar year to minimize the risk that less qualified applicants submit strategically upon seeing other submissions rather than because they are ready to submit on their own merits? If processing rounds are shorter, should there be multiple processing rounds in a calendar year? What other structures or methodologies would provide applicants with the best opportunity to maximize the benefits of processing rounds? Are there potential consequences or complications that may result from the proposed annual processing round framework?").

or analyze whether the solution will introduce unintended consequences that make the cure worse than the disease.[101] For example, paragraph 133 posits the problem as a structure with a lead application triggering a 30-day filing window where:

> interested entities have a limited window of time to prepare and file these competing applications before the cut-off date. As a result, competing applications often lack significant technical, operational, or other fundamental system details to demonstrate a proposal for a viable system, consequently leading to extended review timelines and leaving other applicants in the same processing round unable to fully assess and plan for their own operations and coordination obligations.[102]

If the problem needing a solution is that incomplete competing applications cause processing delays, thus slowing down grants, wouldn't the better solution be to merely widen the filing window to 60 or 90 days to give competing applicants sufficient time? Introducing a completely different system utilizing a filing window that runs for a full year would introduce more delay, not less. For example, under the current processing rounds, say Company A was set to file a "lead" application on January 2 that would trigger a new processing round. Competing applications would have to be filed in February, and then processing would begin. Under the proposed new Section 100.141, Company A could be ready to file on January 2 but would inevitably wait until October 31 to see what other applications were filed, and for processing to begin, an actual delay of 270 days over the current system.

Under the current system, there is every incentive for Company A to file as soon as possible to begin the processing round cycle. Under a new Section 100.141, there would be zero incentive, and, in fact, a huge disincentive, to file on January 2. If you knew that

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[101] Note, for example, that Space Modernization NPRM paragraph 133 jumps to the "solution" of a new Section 100.141 before the problems it purports to solve are even discussed.

[102] *Id.* ¶ 133.

processing would not begin until after the October 31 window closed, why file early? Why have your application out there for others to see, to copy, or to use to against you in marketing discussions?[103]

The only benefit this proposal seems to have is the tentative conclusion that it would ease the processing burden on staff, but even that benefit is far from clear. There is no evidence in the record that, for example, the only reason for applications being incomplete is because thirty days is not enough time to develop and file a complete and clean application. It could be equally true that Companies B, C, D, etc. might not be able to produce a substantially complete application if given a full year.[104] Indeed, if the processing burdens on FCC staff are the actual problem the FCC needs to solve, the other proposed modifications to processing rules would better address these issues.

F. Combining Relaxed Deployment Milestones and an Annual Processing Window Would Invite Spectrum Warehousing

The area in which the NPRM seems to veer significantly away from the goals stated at the outset (and from our proposed Tier 2 Goals), is in the combining of an annual processing round and relaxed deployment milestones for NGSO systems, ostensibly to align the FCC milestones with ITU's standards.[105] The problem is that the ITU standards are woefully

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[103] The NPRM asks whether the inherent delays caused by an annual processing round could be ameliorated by holding multiple processing rounds in a year. *Id.* at 136. If the Commission proceeds with this framework, TechFreedom suggest that the Commission specify two processing rounds a year with the filing dates of January 1-April 30, and June 1-September 30.

[104] And speaking of "letter perfect," while it appears that the Draft Space NPRM proposes to better define "completeness," *see* Draft Space NPRM ¶¶ 98-100, there is no guarantee that these clarifications alone will prompt applicants to file applications which require less staff processing time. If this fix alone were sufficient, then there would be no need for annual processing rounds. At most a widening of the window to 60 or 90 days coupled with stricter return of deficient applications would solve the alleged problem.

[105] *Id.* ¶¶ 168-172.

obsolete and encourage the filing of "paper constellations" since the ITU's "bringing-into-use" period requires the deployment of only one satellite within the first seven years after license grant, and then the deployment of only ten percent (10%) of the constellation within nine years of grant.[106]

Milestones are important. They are perhaps the best tool the Commission has to confront the problem of spectrum warehousing. Moreover, as mentioned above, the space economy has changed radically in terms of cost reductions throughout the acquisition chain and the time required to go from concept to orbit. This supports not relaxing milestones, but possibly even tightening milestone requirements. As such, TechFreedom opposes eliminating the milestone requirements for GSO systems.[107]

TechFreedom further opposes relaxing deployment milestones for NGSO systems that are part of a processing round. Processing rounds provide licensees with substantial and valuable spectrum rights as protections against subsequent processing rounds, which remain in place for ten years. In-round competitors must coordinate with these licensees, and down-round competitors must protect them against interference. But think about the following scenario if the Commission relaxes the milestones to the ITU requirement: Let's say Applicant A is granted a license in the 2026 processing round for a 100-satellite constellation. Applicant B is granted a license in the 2027 processing round for a similar 100 satellite constellation. Applicant B deploys quickly, exceeding the current (now former under this scenario) deployment milestone, deploying 50 satellites (50 percent) by 2032, and all

[106] *Id.* ¶ 171, citing ITU Res-35 (REV. WRC-23); ITU Radio Regulations, Article 11, Section II, Nos. 11.44. Appendix A at § 100.147(a).

[107] *Id.* at 170.

100 satellites (100 percent) by 2035. Applicant A sees the new relaxed guidelines and deploys at the minimum ITU rate—it launches its first satellite in 2033, and only 10 satellites by 2035. So, in 2035, Applicant A has only 10 satellites in orbit, while Applicant B has 100. Yet Applicant B must not only protect Applicant A's ten satellites in orbit, it must also protect the 90 other satellites that are either sitting on the bench somewhere on Earth or are nowhere to be found in the development process.

But it gets worse. By 2032, with 50 satellites in orbit, Applicant B can provide at least a minimum viable service (MVS), and probably much more than that, and total service in 2035. Applicant A, however, with its 10 satellites in orbit in 2035, would be offering virtually no service at all. Unlike with terrestrial milestones, where ten percent deployment will provide 100 percent service to that 10 percent deployed area, the physics of NGSO systems demand significantly more satellites in orbit to achieve MVS. Yet Applicant A enjoys full protection from Applicant B. That is what loosening deployment milestones will do; it would be the antithesis of Build America.

TechFreedom therefore urges the Commission to reject attempts to loosen its milestone requirements for GSO and NGSO systems.[108]

[108] Because VTSS and EXO-GEO applications have far more significant engineering hurdles to overcome, and because they are not subject to processing rounds, TechFreedom supports the elimination of milestones for these services. *See Id.* at ¶ 172 ("We do not propose to implement milestone requirements for recipients of a VTSS license. We believe that VTSS licensees do not need the same milestones as NGSO licensees because VTSS will often involve shorter duration missions due to the satellites moving around in and between orbits. Additionally, we believe that VTSS licenses will typically involve smaller satellite systems that will likely not raise spectrum warehousing concerns which the main issue milestones are meant to address.").

G. Bonding Should Reflect the Realities of 21st Century Engineering Capabilities

While the "stick" of milestones is vital to ensure that applicants are serious and capable of building their new satellite systems, where the Commission can provide some relief is on the bonding side of the regulatory process. With the advent of assembly line manufacturing techniques for satellites, flexible and modular satellite buses, and with the availability of many launch providers, some with very short launch manifests, the road to deployment of NGSO systems is not linear. Most of the risk and expense is front-loaded for these systems. If a satellite constellation can get past Critical Design Review (CDR), and initial deployment of its first round of satellites, it is highly likely that the entire constellation can be deployed, absent a financing failure.

First, we believe that surety bonds should apply only to two groups of licensees, GSO systems and NGSO systems subject to a processing round. While the NPRM suggests that the surety bond be dropped for GSO systems,[109] because GSO slots are so scarce because of the two-degree space requirements,[110] and because GSO satellites/systems still tend to be large and expensive, TechFreedom believes that the FCC should maintain bond requirement for GSO licensees.

Second, TechFreedom urges the Commission to think carefully about any bonding system that penalizes larger constellations, especially those operating in lower orbits. In engineering NGSO systems, there is a critical tradeoff between number of satellites, satellite replacements, orbital altitude, and power needed to close the link budget back to Earth.

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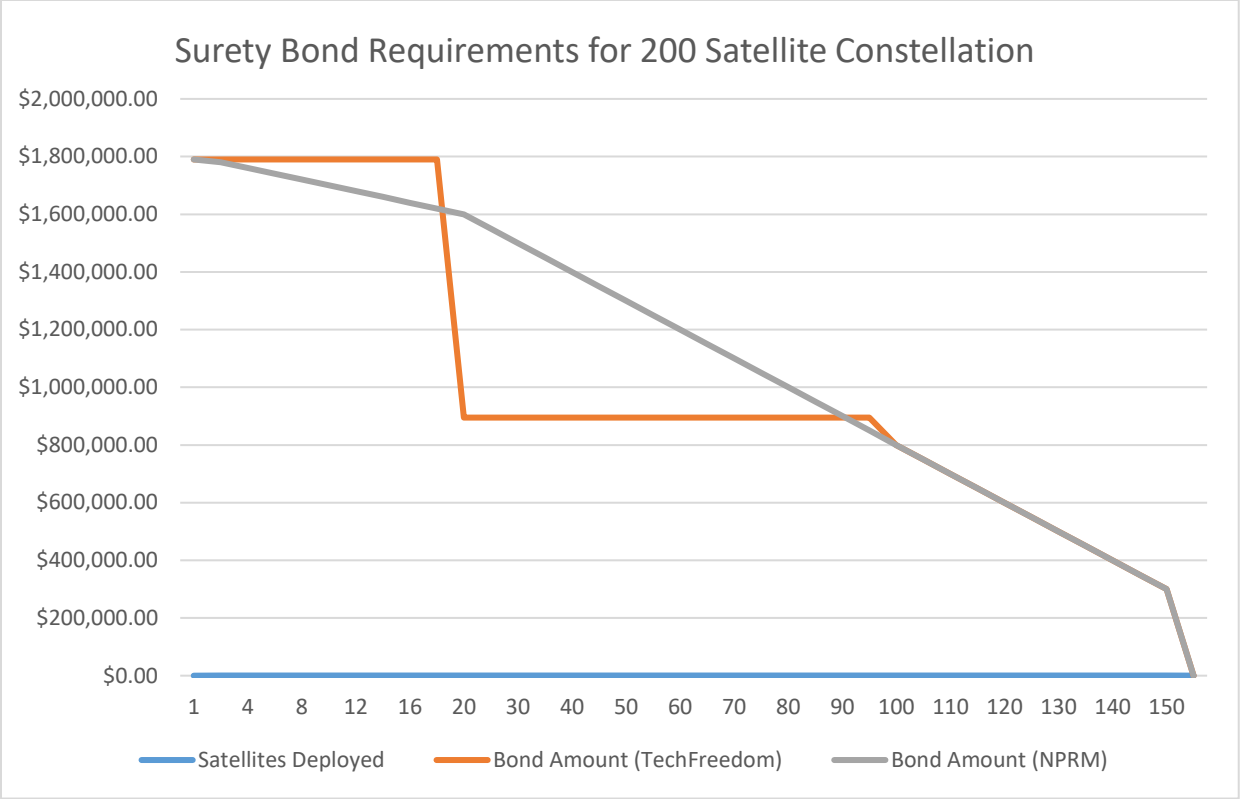
[109] *Id.* ¶ 176.

[110] 47 CFR § 25.103. *See also* Space Modernization NPRM ¶ 213 (proposing a slight modification of the two-degree spacing rules).

Lower orbital altitudes allow for much lower power operations to close the link budget, and by extension, lower interference (both because of lower power and tighter look angle). The tradeoff for this engineering approach is that it requires a larger number of satellites to achieve full coverage, and the need to replace satellites because of orbital decay. In contrast, to reach the same level of coverage and service with fewer satellites, those satellites must be in higher orbits, operating at higher power. Since satellites in higher orbits stay up longer if not purposefully deorbited, they represent a larger threat of orbital debris. To preserve the safety of the space environment, the FCC should take no regulatory steps that encourage licensees to propose higher altitudes and higher power operations. The under-200/over-200 threshold proposed in paragraph 176 should be examined within this context, because depending on the equation used to set the bond, it might encourage applicants to specify fewer satellites.

Finally, TechFreedom agrees with the general approach in the NPRM of having bonds decrease over time rather than increase.[111] But rather than having the bond roll off in a linear fashion, TechFreedom suggests that most of the bond should be released after ten percent deployment. By that point, the licensee would have demonstrated that it has properly engineered its system, and that it is on track for a sustained deployment. Our proposal would then hold the bond at that fifty percent level until fifty percent of the constellation is deployed, at which point the bond would be reduced in a linear fashion, as proposed in the NPRM. In the graph below, the Commission's proposed linear decrease in the bond is depicted with a gray line. Our proposal is depicted in orange.

[111] Space Modernization NPRM ¶ 178.



By adopting this "waterfall" bond reduction, the licensee would see a substantial decrease in the money it would be required to spend to keep its bond in place for the period between its 10 percent and 50 percent deployment. This could be particularly important for satellite systems which require a larger percentage of satellites deployed to reach MVS. The system is technically viable, but the licensee may be struggling to generate sufficient revenue or additional financing to bridge the gap until MVS revenues can be achieved. TechFreedom believes the investment community would be particularly attracted to this alternative, as they are familiar with such "waterfall" structures in investment documents.[112]

[112] *See, e.g.*, Akilesh Ganti, *Distribution Waterfalls in Private Equity: A Comprehensive Guide*, INVESTOPEDIA (Aug. 22, 2025), https://www.investopedia.com/terms/d/distribution-waterfall.asp.

H. License Terms and Renewals Should Reflect Technical Capabilities

The Space Modernization NPRM proposes to increase the license term from 15 to 20 years for GSO and NGSO systems.[113] TechFreedom supports the change for NGSO systems,[114] but opposes it for GSO systems. GSO systems, operating outside the Van Allen Belt, are subject to a much more severe radiation environment, making it difficult to engineer such satellites with a design life of more than 15 years.[115] In 2018 at least four GSO satellites suffered failures, all of which were beyond their 15-year design life.[116] GSO satellites running out of fuel, suffering explosions, or with degraded operational control ("Zombiesats"),[117] are a true threat to a sustainable space environment.

For this reason, TechFreedom strongly encourages the FCC to maintain the 15 year license period for GSO satellites. Operators should be allowed to file for a renewal of its

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[113] Space Modernization NPRM ¶ 185.

[114] TechFreedom supports the proposal to align market access grants (presumably those which will not be subject to the FCC's direct licensing authority) with the U.S. satellite systems they close resemble. *Id.* at 188 ("we note that we currently do not generally establish a term for market access grantees, instead frequently conditioning the grant of U.S. market access on continued authorization by the non-U.S. administration. We propose establishing a definitive market access term length, whether established at 15 or 20 years, or an alternative term, on market access grantees to establish consistent rules for these operators and domestic satellite licensees, which would be consistent with our requirements under the World Trade Organization (WTO) agreements, since this term length would establish parity of treatment and non-discrimination between U.S. and foreign licensed satellites, including those from WTO member countries." Footnote omitted).

[115] *See Changing Satellite Design Performance*, VIRTUS SOLIS (Jan. 29, 2025), https://virtussolis.space/blog/changing-satellite-design-performance ("The average satellite launched today [into GSO] is expected to last 15 years.")

[116] *See* James E. Dunstan, *Do We Care About Orbital Debris At All?*, SPACENEWS (Jan. 30, 2018), https://spacenews.com/op-ed-do-we-care-about-orbital-debris-at-all/. *See also* Caleb Henry, *Companies Are Flying Old Satellites Longer*, SPACENEWS (Aug. 11, 2020), https://spacenews.com/companies-are-flying-old-satellites-longer-study-finds/ ("Nearly a third of commercial geostationary communications satellites in orbit are operating beyond their design lives, a far higher figure than in previous years, according to a study. Research firm TelAstra of Los Angeles found that in 2020, some 31% of commercial geostationary comsats remained in service past their expected retirement, more than double the number of satellites putting in extra time in 2009.").

[117] *See* Brian Weeden, *Dealing With Galaxy 15*, THE SPACE REVIEW (May 24, 2010), https://www.thespacereview.com/article/1634/1.

license, but if it intends to operate a satellite beyond 15 years, it should provide substantial data to the Commission which demonstrates: 1) that the satellite retains enough station keeping fuel to both operate for another five years *and* sufficient fuel to move to a safe "graveyard" orbit at end of life (EOL);[118] 2) an analysis of the failure rate of all similar satellites based on the satellite bus manufacturer; and 3) a declaration from a principle of the licensee, signed under threat of perjury, that the licensee has no reason to believe that the satellite is currently operating within normal parameters and that the licensee has no reason to believe that the satellite will not be able to operate properly for the entire renewal period.[119] If we really care about space sustainability and orbit debris, then the Commission should adopt these proposals and jettison the idea of a blanket extension of all GSO licenses.

I. Ensuring Proper Compliance with All Rules is the Key to a Workable Regulatory System

Streamlined processing and less burdensome regulations are vital to keep the United States in the forefront of space development. But the flip side of less proscriptive regulations and a reliance on permissionless innovation is compliance and accountability. If the FCC wishes to rely more on applicant and licensee certifications, then compliance measures must have teeth.[120] It's not enough for licensees years later, after they've vitiated a certification to

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[118] More generally, TechFreedom agrees with the proposal in the NPRM to require applicants and licensees to certify that they will abide by the FCC's orbital debris rules related to end-of-life satellite disposal. Space Modernization NPRM ¶ 224 ("We propose to add a requirement that space station operators must operate their systems in accordance with the orbital debris mitigation and end-of-life disposal plans that they provide to the Commission in their applications. We also propose to require applicants to notify the Commission of any significant changes to the ODMP, statements, and disclosure within 30 days of the change.").

[119] In the event that the licensee cannot make this showing, but indicates that it will launch a new satellite during the renewal period, then the licensee should provide a detailed timeline of when the new satellite will be launched, along with a declaration that the licensee know of no reason why the existing satellite should not be able to function until such time as the new satellite is in position.

[120] *See* Space Modernization NPRM ¶¶ 248-252.

say, "never mind."[121] TechFreedom supports aggressive compliance measures, as set forth in the NPRM:

> [W]e propose that the Commission could address non-compliance through a variety of other means, including by revoking or terminating a license, requiring cessation of transmissions, placing an entity in an "authorization freeze" status (i.e., no additional authorizations may be granted until an issue is resolved), or pausing launch authorization for continued deployment under an existing license. Unlike some other areas under the Commission's jurisdiction, space activities are uniquely complex in that addressing violations of certain rules can be more complicated, if not nearly impossible, if the violation stems from a space station already deployed and in orbit, for example, if space station connectivity fails, if an operator is unable to address or reduce risks to other deployed systems, or if a space station is unable to safely deorbit.[122]

This should include, as proposed at paragraph 251, that the Commission can make a determination that the applications of a particular operator are not in the public interest if that "operator has a history of anomalous events, or other noncompliance with our rules, such as unlicensed operations."[123]

J. Miscellaneous Comments

Below we provide short comments on a few more miscellaneous provisions of the NPRM which do not require substantial explanation.

1) We agree with the definitions proposed at paragraph 32 of the NPRM,[124] but suggest that the Commission include in the final order a clear statement that all

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[121] Daryl Huff, *Nevermind - Emily Litella*, YOUTUBE (July 4, 2015), https://www.youtube.com/watch?v=OjYoNL4g5Vg.

[122] Space Modernization NPRM ¶ 250.

[123] *Id.* at 251. To avoid undo weaponization of this power, of course, the Commission should fully document the history of noncompliance and offer the applicant or licensee the opportunity to demonstrate why such a finding is not valid as a matter of fact and/or law. Such decisions by the FCC should be appealable to the courts.

[124] *Id.* ¶ 32.

definitions related to different types of spacecraft acknowledge that they all are subsumed in the definition of "object, or "space object" for purposes of the international treaty regime.[125]

2) TechFreedom opposes the proposal to allow a licensee to have a single call sign for satellites operating in multiple GSO slots.[126] TechFreedom believes that this will cause confusion within the space community. Each GSO slot should have its own unique call sign(s).

3) The NPRM asks whether the FCC should submit ITU filings prior to any application being filed.[127] While we understand the vital role the FCC plays in interfacing with the ITU, and the fact that "applicants" are responsible for ITU cost recovery fees, TechFreedom submits that entities requesting that the FCC submit an ITU filing on its behalf at least have filed the FCC Form 312 – Main Form. That way the FCC will have a record of the applicant.

V. Conclusion

TechFreedom commends the Commission in undertaking this critical rewrite of its space licensing rules. With the additional suggestions made herein, we believe that Parts 25 and 100 can fully be brought into the 21st century. Proceeding in this way will maximize the opportunity for U.S. leadership in space, while protecting the space commons, all while other

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[125] *See, e.g.*, OST Art. VII ("Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the Moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the Moon and other celestial bodies.").

[126] Space Modernization NPRM ¶¶ 51, 57.

[127] *Id.* at 165.

countries to regulate through a protectionist and precautionary principle approach that will only further American leadership in space.

Respectfully submitted,

_____/s/_____
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