

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Space Innovation)	IB Docket No. 22-271
)	
Facilitating Capabilities for In-Space Servicing, Assembly, and Manufacturing)	IB Docket No. 22-272
)	

Comments of TechFreedom

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Summary

The FCC is a *communications* commission. It lacks a mandate to regulate general, non-communication activities in outer space. Previous efforts by the FCC to bootstrap a general authority over activities Congress never assigned have failed, suggesting that this one will too. This may be for the best, as the NPRM proposes to regulate a wide array of activities on which the Commission lacks any relevant experience. The Commission should instead focus its intention on the important work of crafting frequency interference regulations to allow ISAM to prosper, by making all space service spectrum available for ISAM, and explore the use of non-space frequencies that can be used for ISAM without fear of terrestrial interference. If this nascent industry is to grow in the United States—rather than in some foreign country—it will need regulatory clarity as well as flexibility, and rules that are too flexible end up being vague.

The NPRM does get many issues right, including not requiring applications to include a “planetary protection” plan; the defense of the biosphere from alien life is a concern on which the FCC has nothing in particular to offer. The FCC’s experimental licensing system, on the other hand, is a useful tool for encouraging ISAM development. Further, application processing rounds are superfluous, and the NPRM rightly avoids them. It is also better to defer the costs of regulatory surety bonds, but the Commission might do better yet by eliminating this requirement altogether—as well as by allowing licensees to keep their existing licenses across minor mission modifications.

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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 issued by the Commission in the above-referenced proceeding on February 16, 2024.² In the ISAM NPRM, the Commission seeks comments related to the FCC’s role in regulating the developing in-space servicing, assembly, and manufacturing (ISAM) industry. In support of these 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

¹ 47 C.F.R. §§ 1.415 & 1.419.

² Facilitating Capabilities for In-Space Servicing, Assembly, and Manufacturing, Notice of Proposed Rulemaking (ISAM NPRM or NPRM), FCC 24-21, released February 16, 2024, <https://docs.fcc.gov/public/attachments/FCC-24-21A1.pdf>. The ISAM NPRM was published in the Federal Register on March 15, 2024, 89 Fed. Reg. 18875, and set the comment date as April 29, 2024, and the reply comment date of May 29, 2024. These Comments are timely filed.

that makes experimentation, entrepreneurship, and investment possible, and thus unleashes the ultimate resource: human ingenuity. Wherever possible, we seek to empower users to make their own choices online and elsewhere.

TechFreedom and undersigned counsel have a long history advocating for innovative uses of outer space.³ We have filed comments in numerous FCC proceedings related to outer space regulation.⁴ Undersigned counsel has testified twice before Congress on commercial

³ 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>; J. Dunstan, *Who Wants to Step Up to a \$10 Billion Risk?*, SPACE NEWS (June 25, 2021), <https://space-news.com/op-ed-who-wants-to-step-up-to-a-10-billion-risk/>; *Artemis Accords: One Small Step for NASA, Not So Giant a Leap for Space Law*, TECHFREEDOM (May 15, 2020), <https://techfreedom.org/artemis-accords-one-small-step-for-nasa-not-so-giant-a-leap-for-space-law/>; *Revived National Space Council Could Mean Space Policy Rethink*, TECHFREEDOM (July 7, 2017), <https://techfreedom.org/revived-national-spacecouncil-mean-space-policy-rethink/>; J. Dunstan, "Space Trash:" *Lessons Learned (and Ignored) from Space Law and Government*, 39 J. OF SPACE L. 23 (2013). J. Dunstan, *Earth To Space: I Can't Hear You; Selling Off Our Future To The Highest Bidder*, SPACE MANUFACTURING 11 (1997); J. Dunstan, *Toward a Unified Theory of Space Property Rights*, in SPACE: THE FREE-MARKET FRONTIER (2002); William J. Potts Jr. & J. Dunstan, *Creeping CANCOM: Canadian Distribution of American Television Programming to Alaskan Cable Systems*, 7 PACE L. REV. 127 (1986); J. Dunstan et al., *The Geostationary Orbit: Legal, Technical and Political Issues Surrounding Its Use in World Telecommunications*, 16 CASE WEST. RESERVE J. INT. L. 223 (1984).

⁴ TechFreedom's submitted comments include *Revising Spectrum Sharing Rules*, IB Docket No. 21-456 (Aug. 7, 2023); *Single Network Future*, GN Docket No. 23-65 (May 12, 2023); *Expediting Initial Processing*, IB Docket No. 22-411 (Mar. 3, 2023); *Space Innovation*, IB Docket No. 22-271 (Oct. 31, 2022); *Rural Digital Opportunity Fund*, WC Docket No. 19-126 (Sept. 26, 2022); *Revising Spectrum Sharing Rules*, IB Docket No. 21-456 (Apr. 25, 2022); *Reply Comments in Modernizing and Expanding Access*, WT Docket No. 20-133 (Jan. 3, 2022); *OSTP National Orbital Debris Research and Development Plan* (Dec. 31, 2021); *Modernizing and Expanding Access*, WT Docket No. 20-133 (Dec. 2, 2021); *Reply Comments in Allocation of Spectrum*, ET Docket No. 13-115 (Sept. 10, 2021); *Reply Comments in Expanding Flexible Use of the 12.2-12.7 GHz Band*, WT Docket No. 10-443 (July 7, 2021); *Expanding Flexible Use of the 12.2-12.7 GHz Band*, WT Docket No. 20-443 (May 7, 2021); *Use of the 12.2-12.7 GHz Band for Two-Way Mobile Broadband Service at 3*, RM Docket No. 11768 (Oct. 8, 2020).

outer space issues.⁵ The instant proceeding sits at the intersection of spectrum policy and space law, a place we've inhabited for decades. We are uniquely suited to provide commentary in proceeding, especially some of the key principles espoused in the ISAM NPRM.

II. The FCC's Regulatory Powers over Space Operations Are Limited

No one would argue that the FCC lacks primary jurisdiction over frequency allocations and licensing for U.S. entities providing communications services via space. But the ISAM NPRM contemplates that the FCC will take the regulatory lead on ISAM activities, which look very different from traditional communications satellites. The NPRM defines ISAM as:

ISAM refers to a set of capabilities used on-orbit, on the surface of space objects and celestial bodies, and in transit between these regimes. The “servicing” aspect of ISAM includes activities such as the in-space inspection, life extension, repair, refueling, or alteration of a spacecraft after its initial launch, which includes but is not limited to: visually acquire, rendezvous and/or proximity operations, docking, berthing, relocation, upgrading, repositioning, undocking, unberthing, release and departure, reuse, orbit transport and transfer, and timely debris collection and removal. These activities typically include the process of maneuvering close to and operating in the near vicinity of the “client” spacecraft, a set of activities often referred to as rendezvous and proximity operations (RPO). The term “servicing” is also used to describe transport of a spacecraft from one orbit to another, as well as debris collection and removal. “Assembly” refers to the construction of a space system using pre-manufactured components, and “manufacturing” is the

⁵ *Continuing U.S. Leadership in Commercial Space at Home & Abroad: Hearing Before the H. Comm. on Space, Sci., & Tech.*, 118th Cong. (2023), <https://techfreedom.org/wp-content/uploads/2023/07/Space-Governance-Testimony-July-13-2023.pdf>; *Reopening the American Frontier: Exploring How the Outer Space Treaty Will Impact American Commerce and Settlement in Space, Before the S. Comm. on Commerce, Sci., & Transp. Subcomm. on Space, Sci., & Competitiveness*, 115th Cong. (2017) (written testimony of J. Dunstan & Berin Szóka), <https://www.commerce.senate.gov/services/files/A9AD88B2-9636-4291-A5B0-38BC0FF6DA90>, video of hearing available at <https://www.commerce.senate.gov/2017/5/reopening-the-american-frontier-exploringhow-the-outer-space-treaty-will-impact-american-commerce-and-settlement-in-space>.

transformation of raw or recycled materials into components, products, or infrastructure in space.⁶

The problem is that these types of innovative space activities have never before been regulated by the FCC and represent activities that bear no relation to the FCC's normal area of regulatory authority and expertise: satellite communication services. 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."⁷ Our comments in response to the ISAM Notice of Inquiry,⁸ addressed this issue,⁹ 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

⁶ ISAM NPRM ¶ 2 (footnotes omitted). When asked to list the types of services which the term ISAM encompasses, commenters offered up even a more diverse set of space activities. *Id.* ¶ 6 ("The ISAM NOI sought information on the state of the industry for ISAM operations. Astroscale notes that more than 102 companies have undertaken ISAM projects or research, that 18 of those have either partially or fully operational ISAM capabilities, and that 40 expect to be ready within the next 5 years. Operators describe their specific work developing servicing spacecraft, orbital transfer vehicles (OTVs), life extension vehicles, end-of-life servicing spacecraft, refueling depots, space situational awareness spacecraft, commercial inhabitable space stations, lunar landers, and spacecraft conducting science experiments and manufacturing in microgravity." (footnotes omitted)).

⁷ See *Ala. Ass'n of Realtors v. Dep't of Health & Hum. Servs.*, 141 S. Ct. 2485, 2489 (2021) ("This claim of expansive authority under § 361(a) is unprecedented. Since that provision's enactment in 1944, no regulation premised on it has even begun to approach the size or scope of the eviction moratorium. And it is further amplified by the CDC's decision to impose criminal penalties of up to a \$250,000 fine and one year in jail on those who violate the moratorium. Section 361(a) is a wafer-thin reed on which to rest such sweeping power." (citations omitted)).

⁸ Space Innovation; Facilitating Capabilities For In-Space Servicing, Assembly and Manufacturing, Notice of Inquiry, 87 Fed. Reg. 56365 (Sept. 14, 2022), <https://www.federalregister.gov/documents/2022/09/14/2022-19748/space-innovation-facilitating-capabilities-for-in-space-servicing-assembly-and-manufacturing> (ISAM NOI).

⁹ See Comments of TechFreedom in Space Innovation; Facilitating Capabilities For In-Space Servicing, Assembly and Manufacturing, IB Docket Nos. 22-271 & 22-272 (Oct. 31, 2022), <https://techfreedom.org/wp-content/uploads/2022/10/TechFreedom-Comments-FCC-ISAM-NOI.pdf>.

aspects of such operations.¹⁰ Other agencies which claim overlapping (or even conflicting) authority have also questioned the FCC's actions in attempting to go it alone in regulating innovative space activities.

It is clear that, given the multiple regulatory schemes across executive branch agencies impacting space commerce generally and orbital debris specifically, commercial space policies must be based on the technical expertise of the whole government. To that end, the [Commerce] Department has contributed to interagency efforts to achieve these shared space policy goals by leading administration efforts to advance space commerce and The President's Space Policy Directives are producing results and increasingly support a thriving space commerce industry in the U.S. As it leads the federal effort to dramatically grow U.S. space commerce, the Department shares the Commission's objective "to ensure continued, safe operations in space and maximize space commerce investments and innovation." Without a collaborative approach across federal agencies and independent authorities this objective cannot be attained.¹¹

In response, the ISAM NPRM merely points to the general "public interest" provisions of the Communications Act as sufficient justification to impose sweeping new regulations on a nascent industry. "Our authority under the Communications Act allows the licensing of

¹⁰ See 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-ab65-0cc7cc0b8209/6F2AFE4C757C5AC039876863E3DF3EBA.2022-09-27-sst-bipartisan-letter-to-fcc-on-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).

¹¹ See Comments of the United States Department of Commerce in Mitigation of Orbital Debris in the New Space Age at 15, IB Docket No. 18-313 (Apr. 5, 2019) <https://www.fcc.gov/ecfs/document/1040509194602/1> (footnote omitted).

ISAM space stations under our existing rules, including rules that consider public interest factors.”¹² That is the sole legal justification in the ISAM NPRM for the proposed regulations—the wafer-thin reed.

A. The NPRM Seeks to Regulate *Activities*, Not *Communications*, in Space

The shortfall with the ISAM NPRM’s jurisdictional justification is that the public interest standard applies to the FCC’s role in regulating communications facilities, whether on Earth or in space. The bulk of the ISAM NPRM, however, focuses on regulating ISAM *activities*, not communication services, thus misreading the public interest standard as a further grant of substantive regulatory authority. Indeed, the communications (spectrum) aspects of ISAM are not even addressed in detail until paragraph 32,¹³ and the Commission spends only eight paragraphs discussing spectrum,¹⁴ ultimately concluding that it will license ISAM activities based on the current spectrum designations in the rules for space services.¹⁵ Were the Commission to remain true to its statutory mandate of “regulating interstate and foreign commerce in communication by wire and radio,”¹⁶ the Commission

¹² ISAM NPRM ¶ 9 (footnote omitted).

¹³ See ISAM NPRM Part C, beginning at paragraph 32.

¹⁴ *Id.* ¶¶ 32-39. It is interesting to note that the ISAM NPRM dedicates five paragraphs to discussing DEI (Digital Equity and Inclusion) issues related to ISAM activities, nearly as much as it spends talking about spectrum.

¹⁵ *Id.* ¶ 35 (“We propose not to limit service allocation designations that might be possible for ISAM operations so long as the requested operations can justifiably fit within the service allocation definition. As such, we propose to continue our current practice of assessing whether an applicant’s proposed ISAM operations fall within the applicant’s desired service allocation(s) on a case-by-case basis.”).

¹⁶ 47 U.S.C. § 151.

should have ended this proceeding with a Declaratory Ruling stating that it would continue to use its existing space service frequencies and designations to license ISAM hardware.

But that’s not what the ISAM NPRM is about. Instead of limiting itself to licensing the frequencies to be used in ISAM activities to minimize potential electronic interference between ISAM operations and communications satellites, or interference between ISAM operators, the NPRM proposes to regulate the activities themselves, the vast majority of which have nothing to do with “interstate and foreign commerce in communication.”¹⁷

By analogy, just because the U.S. Postal Service can regulate the weight of mail and the size of your mailbox,¹⁸ that doesn’t authorize them to regulate the foliage you plant in your front garden next to the mailbox. Or closer to home, when the FCC implemented the Positive Train Control (PTC) mandates of Congress to help protect passengers and freight on the nation’s railroads,¹⁹ it didn’t attempt to regulate hazardous materials transported via rail or to limit the emissions of diesel engines in the name of the “public interest.” Yet that is exactly what the ISAM NPRM proports to do—to allow the FCC to determine whether a particular ISAM activity should be approved, using a myriad of largely undefined criteria, most of which have nothing to do with spectrum or interference issues.

¹⁷ *Id.*

¹⁸ See, e.g., *Curbside Mailboxes*, USPS, <https://www.usps.com/manage/mailboxes.htm> (last visited Apr. 26, 2024).

¹⁹ See Rail Safety Improvement Act of 2008, Pub. L. No. 110-432, § 104, 122 Stat. 4848, 4857 (2008), amended by Positive Train Control Enforcement and Implementation Act of 2015, Pub. L. No. 114-73, § 1302, 129 Stat. 568, 576 (2015).

B. Prior FCC Attempts to Bootstrap Regulatory Authority Have Not Fared Well on Appeal

In many ways, the ISAM NPRM is reminiscent of the FCC's attempt to create a "broadcast flag" for television receivers, because it found it in the public interest to promulgate rules to protect the copyrighted content of broadcasts. The DC Circuit saw right through this sham:

Great caution is warranted here, because the disputed [] regulations rest on no apparent statutory foundation and thus appear to be ancillary to nothing. Just as the Supreme Court refused to countenance an interpretation of the second prong of the ancillary jurisdiction test that would confer "unbounded" jurisdiction on the Commission, we will not construe the first prong in a manner that imposes no meaningful limits on the scope of the FCC's general jurisdictional grant.²⁰

Similarly, In *NAB v. FCC*,²¹ the FCC attempted to bootstrap regulatory authority related to foreign-government sponsored programming to require broadcast stations to "independently confirm the sponsor's status, at both the time of the lease and the time of any renewal, by checking the Department of Justice's Foreign Agents Registration Act website and the FCC's U.S.-based foreign media outlets reports."²² The problem, the court found, was that this latter requirement was nowhere articulated in the statute. The FCC argued that the language of Section 317 was broad enough to encompass the layering on of this additional requirement. The court disagreed:

[T]he FCC argues that even if § 317(c) does not affirmatively authorize it to require searches of the federal sources, it can require the searches as part of its general authority to "prescribe appropriate rules and regulations to carry

²⁰ *Am. Library Ass'n. v. Fed. Commc'ns Comm'n*, 406 F.3d 689, 702-03 (D.C. Cir. 2005) (citations omitted).

²¹ *Nat'l Ass'n of Broads. v. Fed. Commc'ns Comm'n*, 39 F.4th 817 (D.C. Cir. 2022).

²² *Id.* at 819 (citing *In the Matter of Sponsorship Identification Requirements for Foreign Government-Provided Programming*, 36 FCC Rcd. 7702, ¶ 35 (2021)).

out the provisions” of § 317. A generic grant of rulemaking authority to fill gaps, however, does not allow the FCC to alter the specific choices Congress made. Instead, the FCC must abide “not only by the ultimate purposes Congress has selected, but by the means it has deemed appropriate, and prescribed, for the pursuit of those purposes.”²³

The fundamental problem with the ISAM NPRM is that Congress has never made the “specific choice” to grant the FCC statutory authority to regulate space activities beyond communications. Moreover, even within the Executive Branch of government, it is highly unclear that the FCC has a mandate to regulate ISAM. An agency cannot perceive a gap in inter-agency jurisdiction and simply jump in to fill that gap,²⁴ especially where, as here, the President has already assigned the key lead on space traffic management (a key component of combatting future orbital debris) to another agency.

To ensure safe coordination of space traffic in this future operating environment, and in recognition of the need for DoD to focus on maintaining access to and freedom of action in space, a civil agency should be the focal point for this collision avoidance support service. The Department of Commerce should be that civil agency.

The Secretaries of Commerce and Transportation, in consultation with the Chairman of the FCC, will assess the suitability of incorporating these updated standards and best practices into their respective licensing processes, as appropriate and consistent with applicable law.²⁵

Ultimately, rules that focus on ISAM beyond licensing the spectrum necessary for such operations may well be overturned by the courts. Moreover, rules and policies which allow

²³ *Id.* at 820 (quoting *Colorado River Indian Tribes v. Nat’l Indian Gaming Comm’n*, 466 F.3d 134, 139-40 (D.C. Cir. 2006)).

²⁴ For a fuller discussion of the gaps in space regulations, see Dunstan, *Regulating Outer Space*, *supra* note 3.

²⁵ See 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/>.

the FCC to pick and choose what types of ISAM activities it likes are easily challenged as arbitrary and capricious.

C. The NPRM Fails to Establish the FCC's Expertise over ISAM Activities

Again, no one questions the FCC authority over spectrum licensing, or its expertise in eliminating the “cacophony of competing voices,”²⁶—radiofrequency interference. The ISAM NPRM touts this expertise.²⁷ But what the NPRM fails to do is establish any expertise by the FCC or its staff over actual ISAM operations, other than referencing the small number of licenses it has issued.²⁸ No reference is made to FCC experience in actually conducting rendezvous and proximity operations (RPO),²⁹ in-space servicing,³⁰ assembly,³¹ or manufacturing.³² In short, the FCC is proposing to regulate things that none of its staff has ever done.

²⁶ See *Red Lion Broad. Co. v. Fed. Commc'ns Comm'n*, 395 U.S. 367, 376 (1969) (discussing the history of the Communications Act).

²⁷ See, e.g., ISAM NPRM ¶ 7 (“We issue this NPRM in line with that call, while recognizing that the Commission, with over 50 years of expertise in regulating satellites, is one of several government agencies charged with regulation and oversight of commercial activities in space.”); ¶ 8, n. 39 (“Some commenters note that the Commission has significant experience in licensing and is well-positioned to develop policies and procedures in the ISAM arena.”).

²⁸ *Id.* ¶ 4.

²⁹ The six references in the ISAM NPRM to RPO all involve private party operations, see, e.g., *id.* ¶ 4, nn. 12 & 13, or comments made about the state of the ISAM industry. *Id.* ¶ 26 (“Aerospace asserts that some ADR technologies, such as tow truck, robotics, and RPO technologies, are at a high level of readiness and reliability, while other technologies, including for capture and stabilization of debris with high spin or tumble rates, are at a much lower level of technological readiness and reliability.” (footnote omitted)).

³⁰ See, e.g., *id.* ¶ 6 (in-space servicing references relate solely to industry activities).

³¹ There are no references in the NPRM to any prior FCC activity related to assembly activities in space.

³² See, e.g., ISAM NPRM ¶ 6 (manufacturing references relate solely to industry activities).

As we pointed out in our comments to the ISAM NOI, this is in sharp contrast to other agencies, which have shown experience and expertise in this area.³³ The ISAM NPRM admits that the FCC must look to other federal agencies for help in regulating ISAM. “We expect to continue to rely on the expertise of our fellow agencies as appropriate and note that our regulations on these issues are evolving in tandem with other government efforts.”³⁴ The ISAM NPRM especially looks to, and in many instances defers to, the expertise of NASA.³⁵

³³ See *supra* note 9, p. 9 (“The NOI itself fails to speak directly to the FCC’s expertise in this area, other than citing five licenses (two of which were experimental) issued to entities seeking to engage in ISAM activities. This is in sharp contrast to other federal agencies that have been looking toward, and supporting, ISAM activities for years. And the FCC’s short excursion into ISAM activities is dwarfed by the decades of study and development in both the government and private sector.” (citing experience of DARPA, U.S. Space Force, FAA, and NASA in ISAM)).

³⁴ ISAM NPRM ¶ 8 (footnote omitted).

³⁵ NASA is referenced 18 times in the ISAM NPRM. See, e.g., ¶ 8, n. 40 (“our space station licensing rules contemplate that applicants use NASA’s debris assessment software for preparing their orbital debris mitigation plans.”); n. 41 (“Space Policy Directive-3 (“SPD-3”) charged NASA, in coordination with other agencies and in consultation with the FCC, to lead efforts to update orbital debris mitigation standard practices (ODMSP) for missions operated or procured by U.S. government agencies and that best practices derived in part from the ODMSP should be incorporated into future rulemaking and licensing actions, and noting that the Commission’s orbital debris update was aiming to do just that. Furthermore, the United States Novel Space Activities Authorization and Supervision Framework repeated this call and charged NASA, in consultation with the FCC, with leading the reevaluation process every two years.” (citations omitted); ¶ 24 (“Our orbital debris mitigation requirements are also based on the United States government’s Orbital Debris Mitigation Standard Practices (ODMSP) developed by NASA.” (footnote omitted)).

The response of the FCC³⁶ and some commenters³⁷ is that the FCC will *acquire* experience in regulating ISAM operations as it develops and enforces a whole new set of rules. Since the FCC sets application and regulatory fees based on the FCC staff involved,³⁸ this literally means that ISAM operators will enjoy the pleasure of paying for government regulators to come up to speed to understand, and then regulate, their industry. What this also means is that, at least in the next few years, if not for a decade or more, the FCC will have to rely on other expert agencies in making its licensing decisions. The ISAM NPRM admits to this.³⁹

Ultimately, the fundamental question must be asked: If the FCC lacks expertise and must rely on other federal government agencies for input in order to regulate ISAM, why is the Commission proposing ISAM regulations that go beyond its core mission of licensing

³⁶ See, e.g., ISAM NPRM ¶ 14 (case-by-case review of applications “will allow the Commission to continue to develop a record on ISAM while gaining more experience licensing radio frequency use for ISAM space stations, allowing the Commission to be in the best position to propose additional rule modifications if needed for ISAM space stations in the future.”); ¶ 38 (“we recognize the benefit of expanding our experience with authorizing communications operations in support of ISAM missions.”); ISAM NPRM Initial Regulatory Flexibility Analysis ¶ 3 (“The Commission’s proposed approach in the NPRM to license ISAM space stations under its current rules, and to review ISAM applications on a case-by-case basis, will provide the industry with flexibility while ISAM capabilities develop, and will enable the Commission to continue developing a record on ISAM while gaining further experience licensing radio frequency use for ISAM space stations.”).

³⁷ See, e.g., ISAM NPRM ¶ 11, n. 51 (“suggesting the Commission’s rules ‘should rely on experience from initial missions instead of attempting to regulate every aspect of the broader ISAM ecosystem from the start.’” (citing comments of ULA at 4)).

³⁸ See J. Dunstan, *The Arrival of the Federal Computer Commission?*, REGULATORY TRANSPARENCY PROJECT (Aug. 27, 2021), <https://rtp.fedsoc.org/blog/the-arrival-of-the-federal-computer-commission/> (“Notably, the FCC is one of the very few federal independent agencies that is funded completely through licensing and regulatory fees.”).

³⁹ ISAM NPRM ¶ 8 (“We expect to continue to rely on the expertise of our fellow agencies as appropriate, and note that our regulations on these issues are evolving in tandem with other government efforts.” (footnote omitted)); n. 40 (“[O]ur space station licensing rules contemplate that applicants use NASA’s debris assessment software for preparing their orbital debris mitigation plans.”).

spectrum on a non-interference basis? The answer is obvious—the FCC *wants* to regulate ISAM activities writ large. But without clear statutory authority, and without proven expertise, any rules that emerge from this proceeding will be highly suspect.

III. ISAM Rules Must Have Clear Standards, Procedures, and Processing Deadlines

A. ISAM Doesn't Lend Itself to a Unified Regulatory Approach

While ISAM is a convenient acronym, throwing four words together doesn't necessarily translate into a cohesive grouping, something we all should have learned from Sesame Street.⁴⁰ The definition of ISAM in the NPRM shows how very different some of these activities actually are.⁴¹ NASA, which has pioneered much of the development of ISAM technologies, lists a far wider range of capabilities and activities than the FCC acknowledges in the ISAM NPRM. In its *In-space Servicing, Assembly, and Manufacturing (ISAM) State of Play 2023 Edition*,⁴² NASA lists the following “capabilities areas”⁴³ as being part of ISAM:

- Robotic Manipulation
- RPO, Capture, Docking, and Mating
- Relocation
- Planned Repair, Upgrade, Maintenance, and Installation
- Unplanned or Legacy Repair and Maintenance
- Refueling and Fluid Transfer

⁴⁰ See Sesame Street, *One of These Things*, YOUTUBE (July 16, 2010), <https://www.youtube.com/watch?v=6b0ftfKFEJg> (“[O]ne of these things is not like the other, one of these things doesn't belong.”).

⁴¹ *Id.* ¶ 2.

⁴² 2023 ISAM STATE OF PLAY, NASA, <https://www.nasa.gov/wp-content/uploads/2023/10/isam-state-of-play-2023.pdf>. Of note, in this 171-page document, NASA mentions the FCC exactly once, at footnote 59, referencing the technical report filed by Space Logistics, LLC in reference to its application for the MEV-2 servicing mission of Intelsat IS-1002. *Id.* at 162, n. 59. MEV-2 is referenced in the ISAM NPRM at paragraph 4 & note 13.

⁴³ *Id.* at 1.

- Structural Manufacturing and Assembly
- Recycling, Reuse, & Repurposing
- Parts and Goods Manufacturing
- Surface Construction
- Inspection and Metrology⁴⁴

NASA further looked at organizations and missions related to ISAM, charted these against the capabilities areas, and then plotted them against the technology readiness level (TRL) of these capabilities:⁴⁵

Name	Organizations	Robotic Manipulation	RPO, Capture, Docking, and Mating	Relocation	Planned Repair, Upgrade, Maint., and Installation	Unplanned or Legacy Repair and Maintenance	Refueling and Fluid Transfer	Structural Manufacturing & Assembly	Recycling, Reuse, and Repurposing	Parts and Goods Manufacturing	Surface Construction	Inspection and Metrology
HST	NASA		Blue	Blue	Blue	Blue						
ISS	Multiple (NASA, International, Commercial)	Blue	Blue	Blue	Blue	Blue	Blue					Blue
MEV	Northrop Grumman		Blue	Blue								Blue
ETS-VII	NASDA (now JAXA)	Yellow	Yellow									
Orbital Express	DARPA, NASA	Yellow	Yellow		Yellow		Yellow					Yellow
ISM	NASA								Yellow	Yellow	Yellow	
RRM	NASA GSFC	Yellow				Yellow	Yellow					Yellow
OSAM-2	NASA, Redwire	Red						Red				Red
OSAM-1	NASA, Maxar, Tethers Unlimited	Red	Red			Red	Red	Red				Red
RSGS	DARPA, Northrop Grumman	Red	Red			Red						Red

■ Operational Mission Uses Capability
 ■ Flight Demonstration Advances Capability
 ■ Planned Flight Demonstration Advances Capability

Figure 2: Operational missions and flight demonstrations have used and advanced ISAM capabilities, and planned missions will demonstrate more. Robotic Manipulation; RPO, Capture, Docking, and Mating; and Inspection and Metrology capability areas have been used in most of these missions, and the ISS has used and demonstrated many of these ISAM capability areas.

⁴⁴ *Id.* at 9-10.

⁴⁵ *Id.* at 10.

The Department of Defense also takes a much broader approach to defining ISAM:

ISAM is that suite of capabilities used on-orbit, on the surface of celestial bodies and in transit between these regimes which includes repairing and refueling spacecraft, building structures, and fabricating components in space as needs arise . . . [T]hese could allow global space operators to increase satellite lifetimes; move, tug, or deorbit satellites to avoid debris or to perform end-of-life maneuvers; inspect satellites for damage; maintain, refuel, and upgrade existing satellites; and build and operate larger, more complex systems in space that do not need to be designed to withstand the severe launch environment. The implementation plan includes the identification of high-priority future government missions and architectures enabled or enhanced by ISAM, prioritization of basic and applied ISAM research, to identify gaps in space & ground test facilities and facilitate commercial and academic access. The ISAM implementation plan also asks [the Department of Defense] to work on ISAM related autonomy and AI, as well as energy storage for high-power, high-energy or pulsed power.⁴⁶

This demonstrates that ISAM is much more than a four-letter acronym. Indeed, there may even need to be a hyphen between “IS” and “AM” (“IS-AM”) because while there appears to be some similarity between “in-space servicing” capabilities and between “assembly and manufacturing” capabilities, those two capability groupings may not share many common attributes.⁴⁷ All this is to say that it may be difficult, if not impossible, to create a one-size-fits-all regulatory system for ISAM operations. In crafting any ISAM rules, the Commission should be careful not to assume that all ISAM operations are the same, or that they need or would benefit from a similar regulatory licensing structure. For example, should an applicant wishing to communicate the results of manufacturing experiments on the ISS use the same

⁴⁶ J. Olson et al., *State of Space Industrial Base 2023* at 18 (Dec. 2023), https://assets.ctfassets.net/3nanhbfr0pc/5qTI9wqmgHP1GBK-FEeReMN/2c007046f6c5cbc1ed0ffaf06e91d780/State_of_the_Space_Industrial_Base_2023_Report_-_FINAL__1_.pdf (“DOD State of Space Industrial Base 2023”).

⁴⁷ Several commenters noted the potential need for differing approaches to different aspects of ISAM. *See* ISAM NPRM ¶ 11, n. 50 (“CONFERS Comments at 9, 11 (encouraging the Commission to move forward with rulemaking under part 25 for servicing but suggesting that assembly and manufacturing are not yet developed enough for concrete requirements)”); *id.* ¶ 11, n. 51.

form, and be subject to the same regulatory review, as someone seeking to de-orbit a large derelict upper stage? Forcing variously shaped pegs into a single square hole will introduce confusion and uncertainty into the regulatory system.

B. There's a Difference Between Flexibility and Being Rudderless

The ISAM NPRM touts a flexible approach to licensing ISAM activities.⁴⁸ It also concludes that the Commission should evaluate applications for frequencies for ISAM operations on a case-by-case basis.⁴⁹ Flexible licensing approaches have strong merit, and

⁴⁸ *See, e.g., id.* ¶ 14 (“We believe this proposed approach will provide the industry with flexibility while ISAM capabilities develop.”); ¶ 17 (“We tentatively conclude that this licensing framework will allow greater flexibility for ISAM operators looking to operate as a GSO or NGSO space station while protecting future and incumbent satellite operators from interference.”); ¶ 24 (“We believe this approach will maximize operator flexibility and therefore allow ISAM technologies and capabilities to develop while allowing the Commission to ensure continued orbital safety for all operators.”); ¶ 35 (“Here, we tentatively propose to maintain as much flexibility as possible for ISAM operators to gain authorization for their operations so long as this does not interfere with other radio-communications and justifiably fits within service allocation definitions. We seek comment on this proposal. We also note that current satellite services offer some flexibility of use and operation.”); ¶ 38 (“we do not wish to prematurely limit creativity and innovation for ISAM operators, and tentatively conclude that a case-by-case review will allow flexibility at this time as we and other regulating bodies continue to evaluate the spectrum ecosystem holistically.” (footnote omitted)).

⁴⁹ *See, e.g., id.* ¶ 10 (“We also propose to apply our existing orbital debris mitigation requirements to ISAM space stations and to address the spectrum needs of ISAM operators on a case-by-case basis.”); ¶ 14 (“We believe licensing ISAM space stations under our current rules, including rules for applications for grants of market access and rules for modifications to operations, and reviewing ISAM applications on a case-by-case basis, will allow us to address the particular needs of ISAM space station operations of different durations and in different orbits.”); ¶ 19 (“As ISAM capabilities are still developing, we tentatively conclude it is in the public interest to assess whether a client space station operator should obtain a license modification on a case-by-case basis, rather than attempt to lay out all possible scenarios that would require modification.”); ¶ 32 (“We tentatively conclude that various communication activities in support of ISAM can potentially operate within several existing service allocations, and we propose to review ISAM operators’ requests for frequency use on a case-by-case basis, consistent with our process for reviewing requests for frequency use for small satellites and small spacecraft.”).

TechFreedom has supported such efforts in the past.⁵⁰ But there is a difference between rules that provide flexibility—and rules that are so devoid of substance that they engender nothing but confusion for applicants, delay in processing of legitimate applications, and are open to regulatory abuse and mischief.

In adopting rules in this proceeding, therefore, the Commission must do more than what is contemplated in the NPRM—a plan that uses existing frequencies and existing processing approaches but leaves issues unique to these activities without any actual engineering standards and subject to “flexible,” “case-by-case” analysis. Merely stating that applicants must “submit a comprehensive proposal for Commission evaluation”⁵¹ will mean nothing if applicants don’t know exactly what to submit or the criteria on which their applications will be evaluated. Similarly, any new rules that require new and different orbital debris showings must make clear the evaluation criteria.⁵²

One example bears this out. In addressing how it would approach an application for an ISAM operator to conduct Active Debris Removal (ADR), the NPRM says this:

We note that the ODMSP stresses the importance of ensuring that orbital debris remediation activities do not risk creating debris greater than the debris the operation seeks to remediate, and we therefore propose that plans to use ADR for post mission disposal will continue to be reviewed on a case-

⁵⁰ See Reply Comments of TechFreedom in Establishing a More Flexible Framework to Facilitate Satellite Operations, IB Docket No. 15-256 (Feb. 26, 2016), <https://www.fcc.gov/ecfs/document/60001489267/1>.

⁵¹ ISAM NPRM ¶ 16.

⁵² *Id.* ¶ 25 (“We note that commenters suggest that some ISAM activities, such as refueling, life extension, and orbital transfer activities, along with assembly and manufacturing activities, might pose additional risks for creating orbital debris by way of increased risk of accidental explosions, increased risk of release of debris during normal operations, increased risk of collisions, or decreased post-mission disposal reliability, and therefore these space stations must not be held to lesser standards than other operators and must be examined closely by the Commission.” (footnote omitted)).

by-case basis, including review of the risk of generating debris greater than the debris the operation seeks to remediate and human casualty risk for remediated debris disposed of through atmospheric reentry, along with compliance with our other orbital debris mitigation rules. We believe our proposal to review use of ADR for post-mission disposal on a case-by-case basis is in line with our proposal to review all ISAM space stations, including ISAM space stations conducting ADR activities, on a case-by-case basis and will allow maximum flexibility for operators, thereby fulfilling our goal of promoting growth in the industry.⁵³

But the ODMSP itself provides no additional standards or benchmarks as to how to determine whether a proposed ADR activity will generate more debris than it will remove, and the ISAM NPRM fails to provide any further guidance as to how the FCC would approach an application for ADR. Take for example Envisat, an 8,000 kilogram, 26 meter x 10 meter x 5 meter satellite launched in 2002 by ESA, and operated well beyond its intended life until its station keeping fuel ran dry.⁵⁴ It's now a monument to the "big sky" approach to orbital debris, in which everyone assumes that space is so big that the likelihood of collisions is remote.⁵⁵ Now, say an applicant seeks frequencies to attempt a deorbit of Envisat, but concludes that there was a small chance that a few small pieces, weighing a few grams, might break off in the process and remain in orbit. Would the Commission deny the application because three pieces remaining is more than the one gigantic derelict piece of space debris

⁵³ ISAM NPRM ¶ 28 (footnote omitted).

⁵⁴ See Dunstan, *Space Trash*, *supra* note 3, at 60-61.

⁵⁵ *Id.* "Although being operated well beyond its expected operational life, no efforts were made to deorbit the satellite, move it to a safer orbit, or [save] the fuels and batteries onboard. It is estimated that the satellite will remain in orbit, and a danger to space navigation, for between 100 and 150 years. ESA's response to why nothing was done to prepare Envisat for its inevitable end of life? According to one report, 'ESA officials insist that the international guidelines on disposal of debris were not in force when Envisat was designed.' So apparently, the international community will have to wait decades or more to even begin to slow the increase of orbital debris if spacefaring nations take the position that the orbital debris mitigation guidelines only apply to satellites designed after 2007."

currently in orbit? These are the types of rules and processing standards that the ISAM industry needs to determine whether to undertake an activity.⁵⁶ Regulatory uncertainties such as this have the potential to squelch a U.S.-based ISAM industry, or, as discussed below, drive it offshore to a regulatory environment with fewer uncertainties and lower regulatory costs.

Worse, because the FCC lacks deep expertise on orbital debris, it will need to coordinate its assessment of ISAM activities with other agencies, such as NASA, the Department of Commerce, the State Department, and the Department of Defense. Without clear standards and processing guidelines, the result may well be the same “black box” regulatory approach that nearly ruined the U.S. launch and satellite industries for decades under the International Trading in Arms Regulations (ITAR). Under ITAR, American dominance in launch vehicles was nearly lost to several decades of ill-founded, self-inflicted regulation.⁵⁷ The result was a retreat by the U.S. launch industry, and the introduction of foreign competition, unburdened by similar regulations.

What proved most frustrating to U.S. companies under the ITAR regime was the total lack of transparency. It was a true “black box” system. If the FCC is required to consult with multiple agencies, some of which might have the ability to veto an application based on

⁵⁶ One such approach might state, for example, that if the post-mission mass of debris is more likely than not to be less than pre-mission, the ADR application would be granted.

⁵⁷ See American Institute of Aeronautics and Astronautics, *The Impact of Export Controls on the Domestic Aerospace Industry: An AIAA Information Paper*, https://www.aiaa.org/docs/default-source/uploadedfiles/issues-and-advocacy/aeronautics/exportcontrolitarwhitepaper031309v03.pdf?sfvrsn=f6319b39_0 (“ITAR has created an undue trade barrier for US manufacturers, who have lost significant market share and their innovative edge. This toll on economic opportunity has been justified in the past as the cost of sound national security. However, recent studies have shed a new light on this issue, and it has become apparent that US export control policies have actually reduced national security.”).

undisclosed “national security interests,” ISAM may become the new four-letter word for the U.S. commercial space industry, the way ITAR was for so many years. During the period where virtually all space hardware sat on the “munitions list” under the ITAR, many commercial space companies complained about not being able to receive export licenses because of objections raised by DoD.⁵⁸ Others have complained that the FCC’s ability to allocate additional frequencies for space usage has been stymied by DoD efforts to maintain control of its legacy communications systems.⁵⁹ Is that the future for ISAM under the FCC? It would seem so based on how the ISAM NPRM is written.

⁵⁸ See, e.g., Michael Gold, *The Wrong Stuff: America’s Aerospace Export Control Crisis*, 87 NEB. L. REV. 521, 524 (2008), <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1025&context=nlr> (“[O]ne must begin by filing a Technical Assistance Agreement (‘TAA’). The TAA is a broad general document describing what kind of collaboration will take place, the type of information that will be shared, and who the foreign parties are. Drafting a TAA can take anywhere from a month to half a year (depending upon the complexity of the project) and is submitted to the Department of State’s Directorate of Defense Trade Controls (‘DDTC’). Depending on their backlog and the nature of the TAA, it usually takes anywhere from three to six months for the DDTC to respond. More often than not, TAAs with Russian entities are approved, but gaining approval is only the beginning of a lengthy and difficult process. When a TAA involving space hardware and Russia is approved, it inevitably will include numerous pages of “provisos.” These provisos are requirements that companies must abide by, such as 24-hour monitoring of all hardware, including the mandatory presence of U.S. Government officers during any “technical” conversations, etc.”). See also U.S. DEPT. OF DEFENSE, PGI 225.79 (2023), https://www.acq.osd.mil/dpap/dars/pgi/pgi_htm/PGI225_79.htm (“PGI 225.7901-2 (1) DoD Focal Point on Export Controls. (i) Within DoD, the focal point on export controls is the Defense Technology Security Administration (DTSA). Official authorities and responsibilities of DTSA are established in DoD Directive 5105.72.”).

⁵⁹ See, e.g., Dawn S. Onley, *DOD Continues to Dog FCC on Spectrum Use*, GCN (Feb. 3, 2002), <https://gcn.com/2002/02/dod-continues-to-dog-fcc-on-spectrum-use/285536/> (“On the eve of a Federal Communications Commission vote on whether to approve the use of ultra-wideband technology across all radio frequency bands, the Defense Department continued to push FCC to protect military-only bands.”); Sandra Erwin, *Pentagon Presses on with Campaign to Overturn FCC’s Ligado Order*, SPACENEWS (May 25, 2020), <https://spacenews.com/pentagon-presses-on-with-campaign-to-overturn-fccs-ligado-order/> (“DoD has been leading an all-out campaign to kill Ligado’s 5G network plans on grounds that the FCC is allowing the company to use L-band spectrum that is adjacent to the Global Positioning System. DoD says a terrestrial broadband network in that spectrum

We generally support the use of “shot clocks” wherever possible.⁶⁰ The NPRM, however, fails to even mention their use for ISAM activities, and indeed, the mechanics of application processing are largely ignored. This regulatory uncertainty at best will delay the development of a robust U.S.-based ISAM industry. At worst, as discussed below, ISAM operators will instead go offshore to seek authorization from administrations better able to move with alacrity. Finally, mechanisms must exist to allow an applicant to appeal denial of an application to the full Commission. This must also include a path whereby an applicant can seek relief in the event that Commission staff merely sits on an application and fails either grant or deny the application.

C. Get the Regulatory Approach Wrong, and the ISAM Industry Simply Moves Offshore

Space is inherently international, and if we do not provide a practical regulatory system that can quickly and economically authorize and supervise the activities of U.S. nationals in space (a “frictionless regulatory system”),⁶¹ two things will happen: First, and

band will interfere with GPS signals.”); Peter Rysavy, *No Magic Spectrum Sharing Solutions*, FIERCE WIRELESS (Apr. 6, 2021), <https://www.fiercewireless.com/regulatory/no-magic-spectrum-sharing-solutions-rysavy> (“Together, the FCC plan and the DoD responses demonstrate that dynamic spectrum sharing (as envisioned by DoD) [in the 3100–3550 MHz band] is not a realistic option for widespread 5G commercial networks.”).

⁶⁰ See Comments of TechFreedom in Expediting Initial Processing of Satellite and Earth Station Applications & Space Innovation, IB Docket Nos. 22-2411 & 22-271 (Mar. 3, 2023), <https://techfreedom.org/wp-content/uploads/2023/03/TechFreedom-Comments-Satellite-Streamlining-3-3-23.pdf> (“TechFreedom supports the NPRM’s proposal to implement shot clocks for applications. Nothing adds more friction to a regulatory system than agency delay in acting upon applications. The Commission should commit to timely reviewing applications. These shot clocks should apply to all applications, not just those that the Commission deems ‘straightforward’ or ‘routine.’ Applying shot clocks only to ‘easy’ applications will stifle the cycle of innovation which has characterized the last decade of NGSO deployment and leave the United States vulnerable to foreign entities seeking to dominate the cis-lunar system.” (footnotes omitted)).

⁶¹ See 2023 Testimony, *supra* note 5.

we're already seeing this, U.S. domestic companies will simply move offshore and find a country that will quickly and cheaply grant them authorization for their outer space activities in exchange for license fees or taxes—fees and taxes that are thus pulled out of the U.S. economy. Second, the existing regulatory scheme, and any future regulatory scheme which is characterized by high degrees of friction, slows down the U.S. space economy, and thus advances the interests of our adversaries, including China, who do not share our democratic principles, and who wish to export their ideals into space, to our direct detriment. Yes, the stakes in this proceeding are that high.

IV. Issues on Which the ISAM NPRM Gets It Right

Thus far in these comments, we've been highly critical of the ISAM NPRM. But there are areas where the NPRM proposes reasonable approaches to regulating the frequencies used in ISAM activities. We highlight those below, again with the caveat that we don't believe the FCC has the statutory authority to promulgate rules for ISAM that go beyond regulating frequency interference.

A. The FCC Properly Will Avoid “Planetary Protection” Rules

In an exercise in regulatory humility (somewhat rare in the ISAM NPRM), the Commission tentatively concludes that its review of ISAM frequency license applications should not include a review of the applicant's plans for “planetary protection.”⁶² Here, the Commission appears to heed the warnings of commenters (including TechFreedom), that

⁶² ISAM NPRM ¶ 9 (“We tentatively conclude that our proposed licensing framework for ISAM space stations should not include independent review and action from the Commission on applicants’ planetary protection plans. We seek comment on how to ensure that applicants work with NASA and other relevant agencies to address planetary protection guidance and policy considerations.”).

the FCC shouldn't stray into regulatory waters where it has no statutory authority and no experience or expertise.⁶³ The term "planetary protection" itself demonstrates how far removed it is from the traditional role of the FCC in managing radiofrequency interference. "Planetary protection typically encompasses the policies and practices designed to protect celestial bodies from contamination by Earth life and protect the Earth's biosphere from potential contamination from returning spacecraft."⁶⁴ The ISAM NPRM notes that the main regulatory expertise in this area remains at NASA.⁶⁵ The FCC should continue to participate in interagency working groups,⁶⁶ but in no way should it become the point of the regulatory spear on planetary protection. TechFreedom encourages the FCC to apply this reasoning to virtually all other aspects of ISAM beyond frequency licensing: the FCC is out of its regulatory depth in the majority of its proposals in this NPRM.

B. The Commission Should Use Its Part 5 Experimental Licensing Rules to the Maximum Extent Possible in the Early Years of ISAM Development

The FCC has a powerful tool in promoting the introduction of new and innovative communications services, its Part 5 experimental licensing rules. "[W]e propose to maintain our part 5 experimental licensing rules as an option for licensing ISAM space stations not providing commercial service."⁶⁷ TechFreedom supports this proposal. But we also support

⁶³ *Id.* ¶ 8, n. 39 ("Several commenters raise concerns regarding any extension of FCC regulations beyond activities related to radiofrequency communication, for example regulation of manufacturing activities, or to planetary protection. See CSF Comments at 1; Relativity Space Comments at 2; CONFERS Comments at 10; TechFreedom Comments at 3-4, 5-6, 8-9; SpaceX Comments at 2-4; Blue Origin Comments at 7.").

⁶⁴ *Id.* ¶ 9, n. 43.

⁶⁵ *Id.* ¶ 9, n. 46 (referencing NASA's planetary protection program).

⁶⁶ *Id.* ¶ 9, n. 44.

⁶⁷ *Id.* ¶ 10.

the call from commenters who suggest that the Commission should expand the use of Part 5 licensing to the maximum degree possible.⁶⁸ Especially given the intermittent or short duration of frequency use during many ISAM activities,⁶⁹ ISAM activities fit well within the structure of Part 5 rules and procedures. Moreover, TechFreedom urges the FCC to consider whether Part 5 might be suitable for commercial ISAM uses, since the “commercial service” being offered is not a communications service—i.e. the use of spectrum to deliver communications services for hire—but rather just the control of space vehicles that are providing a service wholly distinct from communications.

Finally, the Commission should explore ways to eliminate the cliff effect of transitioning from Part 5 to Part 25 licensing. Whereas Part 5 is an efficient and relatively frictionless regulatory approach, some operators have found it difficult, if not impossible, to transition from a Part 5 experimental license to a Part 25 commercial license. As discussed above, make that transition too difficult, and the FCC may find itself in the situation of being the go-to jurisdiction for experimental licenses, but not the jurisdiction of choice for full commercial ISAM licenses.

⁶⁸ *Id.* ¶ 12, n. 55.

⁶⁹ *See, e.g., id.* ¶ 17 (“We recognize that radiofrequency operations for ISAM space stations seem more capable of spectrum sharing than other commercial space stations we have authorized under our part 25 rules and generally require shorter durations of intensive communications operations.” Footnote omitted); ¶ 33 (“Numerous commenters also explain that ISAM space stations may, at times, require other communications for limited duration, such as video, imaging, location sensing information, other status information, and other data downlink and suggest that TT&C allocations alone will not cover all stages of most ISAM operations.” (footnote omitted)).

C. The Definition of “ISAM Space Station” Is Correct, with Minor Modifications Needed

The ISAM NPRM proposes to align its definition of an “ISAM space station” with that contained in the ISAM National Strategy.⁷⁰ But the NPRM also seeks further comment on this issue.⁷¹ TechFreedom suggests one such “tightening,” which aligns with the FCC’s core regulatory mission of regulating communications services. We urge the Commission to include the following language at the end of its definition:

ISAM space stations shall not include any space station that provides commercial communication services not related to ISAM activities.

Such a caveat can go far in dissuading applicants from attempting to game the system to utilize ISAM authority to provide commercial communications services to Earth or in space.

D. New Section 25.126 Must Be Flexible Enough to Cover All the Proposed ISAM Activities and More

In a similar vein, proposed Section 25.126 must be broad enough to encompass previously identified ISAM activities as well as new innovative space activities that would benefit from the ISAM rules.

We propose to create a new section 25.126—Applications for ISAM Space Stations—to aggregate the requirements applicants for ISAM space stations must fulfill and enumerate the exemptions from our typical processes they are entitled to. We believe creating a new rule section specific to ISAM space stations will make the process transparent for the industry, providing applicants for authorization for ISAM space stations one rule section that

⁷⁰ *Id.* ¶ 13 (citing NATIONAL SCIENCE AND TECHNOLOGY COUNCIL, IN-SPACE SERVICING, ASSEMBLY, AND MANUFACTURING INTERAGENCY WORKING GROUP, IN-SPACE SERVICING, ASSEMBLY, AND MANUFACTURING NATIONAL STRATEGY at 6 (Apr. 2022), <https://www.whitehouse.gov/wp-content/uploads/2022/04/04-2022-ISAM-National-Strategy-Final.pdf> (“ISAM National Strategy”)).

⁷¹ *Id.* (“We seek comment on this proposed definition. Specifically, should we further define ‘primary purpose’ and, if so, how? Are there ISAM activities that would not be included in this definition? Conversely, is this definition so broad that it risks creating confusion as to whether more traditional space stations are included and, if so, how should it be tightened?”).

details the application process and clearly indicates the other rule sections with which applicants must comply. We propose that applicants that fit within our proposed definition of “ISAM space station,” detailed above, would be able to use the proposed framework in section 25.126. We propose that operators of ISAM space stations could apply for both U.S. authorizations and grants of U.S. market access using the proposed framework in this section. We seek comment on this general approach.⁷²

What the Commission should avoid is a situation where it is unable to act quickly when presented with an application that doesn’t fit nicely into this rule definition.⁷³ No ISAM applicant should be denied simply because the activity doesn’t describe a previously approved application. As noted above, other government agencies include a broader range of activities than those listed in the ISAM NPRM.

Similarly, the Commission should avoid a regulatory system where ISAM activities not requiring an FCC license at all are somehow brought under the regulatory thumb of the FCC. In short, the FCC cannot morph itself into the Federal Space Commission by promulgating rules that demand FCC approval of space activities unrelated to frequency licensing.⁷⁴

E. Processing Rounds Make No Sense for the ISAM Service

The single most important thing the FCC can accomplish in this rulemaking process is to ensure that it does not create the chaos of a processing round approach to ISAM.

⁷² *Id.* ¶ 15.

⁷³ There was a running joke in the early years of the FAA’s licensing of commercial launch vehicles that to get your license if it was for an orbital launch, you had to make your vehicle look as much like a Boeing Delta rocket as possible, since the vast majority of commercial orbital launch licenses issued by the FAA were for Delta rockets.

⁷⁴ See Press Release, TechFreedom, The FCC Can’t Morph Itself Into the Federal Space Commission (Oct. 31, 2022), <https://techfreedom.org/the-fcc-cant-morph-itself-into-the-federal-space-commission/>.

We recognize that radiofrequency operations for ISAM space stations seem more capable of spectrum sharing than other commercial space stations we have authorized under our part 25 rules and generally require shorter durations of intensive communications operations. We therefore propose to exempt all applications for licenses for space stations that fit our proposed definition of ISAM space stations from processing round requirements for NGSO-like operations under section 25.157 and from first-come-first-served requirements for GSO-like operations under section 25.158, provided they certify that operations of the space station(s) will be compatible with existing operations in the authorized frequency bands and submit a narrative description to demonstrate spectrum sharing capabilities are technically possible, and that the operations will not materially constrain future space station entrants from using the authorized frequency band(s).⁷⁵

Processing rounds and first-come-first-served licensing regimes work (somewhat) when the FCC faces multiple applications for similar types of services, or that present fundamentally mutually exclusive requests for spectrum use. ISAM is completely different, and the myriad of activities identified as ISAM demonstrate that these are not similar services. Especially given that many ISAM activities will require frequency use for short periods of time,⁷⁶ or will involve localized communications utilizing very low power transmissions,⁷⁷ pitting ISAM operators against each other for licensing is wholly unnecessary. TechFreedom supports the NPRM's conclusion that ISAM applicants should not be subject to processing rounds or first-come-first-served processing rules.⁷⁸

⁷⁵ ISAM NPRM ¶ 17 (footnotes omitted).

⁷⁶ *See supra* note 69 and associated text.

⁷⁷ ISAM NPRM ¶ 33 (“Commenters also raise the need for communications between space stations, such as between a servicing space station and a client or between multiple space stations supporting a common and complex assembly or manufacturing mission, and note that these communications may likely occur at low power given the proximity of the space stations involved.” (footnotes omitted)).

⁷⁸ *Id.* ¶ 36 (“We tentatively conclude that ISAM-related communications licensing would not require processing rounds for NGSO operators or a first-come-first-served queue for GSO space stations if applicants can demonstrate that the proposed operations are technically able to share spectrum

F. Deferring the Regulatory Costs of Surety Bonds Is Critical to Future ISAM Success

The business case for ISAM remains questionable.⁷⁹ The ISAM NPRM proposes to not require the posting of a surety bond for a year after application grant.⁸⁰ TechFreedom supports this approach in principle, but requests that the Commission explore whether surety bonds are necessary at all. The Commission instituted surety bonds for satellite systems to ward off the warehousing of frequencies.⁸¹ It can be argued that it is the FCC's processing round and first-come-first-served rules that themselves have forced applicants to file before they are ready, or forever lose their access to vital frequencies. Again, because ISAM activities should allow for far more spectrum sharing than exists with satellite communication services to and from Earth, there is no reason to believe that ISAM operators will feel compelled to file a license application prior to when they can actually use the license. This, of course, presupposes that the ultimate rules will have sufficient clarity and processing

and not materially constrain future use of the band. Specific showings would be laid out in the proposed section 25.126, as described above. We seek comment on this proposal and on any alternate approaches we should consider." (footnotes omitted)).

⁷⁹ See, e.g., DOD State of Space Industrial Base 2023, *supra* note 46, at 18 ("Most importantly the strategy recognizes the lack of a consistent demand signal to the private sector on government ISAM needs."). See also The Center for Space Policy & Strategy, *The Geo-economics of ISAM*, YOUTUBE (Nov. 29, 2023), <https://www.youtube.com/watch?v=L5Fx3VvBdd0&t=36s>.

⁸⁰ ISAM NPRM ¶ 18 ("Specifically, we propose a one-year grace period, during which ISAM space station operators would not have to post a bond. The grace period would begin 30 days after the license is granted, since this is typically when a licensee would have to post the surety bond. If within the one-year grace period, the ISAM operator satisfies the Commission's milestone requirement, then no bond is required. This proposal is similar to the rules regarding surety bond requirements for small satellites and small spacecraft. We seek comment on these proposals." (footnotes omitted)).

⁸¹ See *id.* ¶ 18 ("Spaceflight suggests that the policy objective underlying the Commission's surety bond requirement is to prevent operators from warehousing spectrum for years while failing to follow through on deploying their planned system, but many ISAM operators would meet these objectives without a bond requirement." (footnotes omitted)).

timelines such that applicants will have confidence that their applications can be granted in a timely fashion, and the rules themselves will not force them to file too early by assuming a certain amount of delay and regulatory friction to their proposals. In short, the better the rules, the less the need for surety bonds.

If the Commission nonetheless fears that ISAM frequency warehousing might occur, and therefore surety bonds are needed, it should consider exceptions and extensions to the one-year deferral period. It should consider waivers, for instance, if an applicant can demonstrate external factors which will keep it from utilizing its license for an identified period beyond the one-year deferral period. For example, if an applicant can demonstrate that its ISAM payload has been manifested on a launch vehicle, but such launch will not occur until after the one-year deferral period, the Commission should consider an extension or waiver.

Similarly, if the ISAM license comes with FCC-imposed conditions that may delay use of the license, such as prior coordination, the surety bond should be deferred in the event that coordination cannot be achieved during the deferral period. The Commission should not allow incumbent operators to use the cost of obtaining a surety bond as a weapon to force concessions by new entrants in the coordination process. Space is no place for building moats.⁸²

⁸² See Comments of TechFreedom in Mitigation Methods for Launch Vehicle Upper Stages on the Creation of Orbital Debris, n. 75, Docket No. FAA-2023-1858 (Dec. 22, 2023), <https://techfreedom.org/wp-content/uploads/2023/12/TechFreedom-comments-Mitigation-Methods-for-Launch-Vehicle-Upper-Stages-on-the-Creation-of-Orbital-Debris-12-22-23.pdf> (“It’s a time-honored tradition in the American economy that when a disruptive technology comes along,

G. Servicing Clients Should Not Be Required to Seek a License Modification Unless the Servicing Will Result in a New Orbital Location or Use of Different Frequencies

One of the great benefits of ISAM is the possibility of extending the life of existing satellites.⁸³ Reprovisioning, refueling, and even bolt-on station keeping modules could allow satellites to operate well beyond their original design lives.⁸⁴ Finding ways to encourage such space recycling should be a top priority nationally, and finding ways to extend the life of communications satellites will lessen the Commission's workload in approving replacement satellites. TechFreedom therefore supports a licensing regime in which no

entrenched users attempt to spin the levers of the regulatory system to slow down or stop the new entrant in order to protect their lines of business. *See generally* George J. Stigler, *The theory of economic regulation*, 3 BELL J. OF ECON. & MGMT. SCI. 3 (1971), <https://publics22.classes.ryansafner.com/readings/Stigler-1971.pdf>. In doing so, a business attempts to build a 'moat' (a term popularized by Warren Buffet in 1999) around its business to keep its market advantage. *See, e.g.*, Talmon Joseph Smith, *What Is a 'Moat'?*, N.Y. TIMES (Sept. 29, 2023), <https://www.nytimes.com/2023/09/29/business/what-is-a-moat.html>”).

⁸³ Jeff Foust, *The Satellite Servicing Industry Prepares to Take Flight*, SPACENEWS (Nov. 15, 2022), <https://spacenews.com/the-satellite-servicing-industry-prepares-to-take-flight/> (“The industry is shifting from whether satellites can be serviced to how it can be done safely and profitably. That brings a new set of challenges for the industry, from developing standards to identifying customers and grappling with an uncertain regulatory environment.”); *see also* ISAM NPRM ¶ 26, n. 97 (“Astroscale Comments at 6-7 (asserting that initial ISAM market growth will be driven by the servicing elements of ISAM, including active debris removal, as well as life extension services, and end-of-life services).”).

⁸⁴ *But see* J. 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/> (“Last year, in the space of a few months, four geostationary satellites failed in orbit. Each had reached, or exceeded, its design life. Each incident created, or posed a high risk of creating, debris that could endanger other satellites; debris that could linger for thousands of years.”). In any renewal application for such satellites, the Commission should require a showing that such an extension, if beyond the design life of the statute, does not pose a threat of the creation of orbital debris.

modifications to the client satellite license are required if none of the operating parameters of the license will change post-servicing.⁸⁵

Further, TechFreedom fully supports the concept of allowing the ISAM servicing operator to “piggyback” on the frequencies of the client satellite if it can show that use of these frequencies does not present interference concerns.⁸⁶ The ISAM NPRM notes that it has granted such piggyback authority in the past,⁸⁷ and NTIA has endorsed the concept.⁸⁸ Yet the NPRM falls short of fully endorsing this practice.⁸⁹ Given that servicing large GSO satellites might be an early and commercially lucrative ISAM activity, TechFreedom urges the Commission to look more deeply at this issue, and if possible, adopt rules that allow such ISAM piggybacking as a low friction model for regulating this aspect of ISAM.

⁸⁵ See ISAM NPRM ¶ 19 (“Starfish Space recommends that client space stations being serviced should not need to obtain a license modification unless the client space station will need to use new or unlicensed frequencies during or following the servicing. For U.S. licensed client space stations, we tentatively agree with Starfish that cases are limited where client operators should be required to modify authorizations, but we do not propose to set forth specific scenarios in which a client need not obtain a modification. While some ISAM activities, such as inspection or repair, might not result in changes that necessitate a modification, other activities, including orbital transfer or mission extension, could change the client’s orbital location, which could alter the parameters of frequency operations and orbital debris mitigation information that was reviewed and authorized by the Commission. As ISAM capabilities are still developing, we tentatively conclude it is in the public interest to assess whether a client space station operator should obtain a license modification on a case-by-case basis, rather than attempt to lay out all possible scenarios that would require modification. We seek comment on this approach.” (footnotes omitted)).

⁸⁶ *Id.* ¶ 37.

⁸⁷ *Id.* (“For example, MEV-1, which is attached to and provides life extension services to the Intelsat 901 satellite, is authorized to provide TT&C consistent with Intelsat 901’s licensed frequencies and parameters.”).

⁸⁸ *Id.* (“NTIA notes that ‘[o]ne of the more straightforward opportunities for ISAM spectrum access is for ISAM missions servicing [FSS and MSS]’ and asserts that those missions could use ‘the same spectrum used by the “client” satellite’ as was done for the MEV-1.”).

⁸⁹ *Id.* (“Given the identified limitations on this model, we do not propose ‘piggybacking’ as an overall solution for ISAM-related frequency authorization; rather we note that this option has been authorized under our existing rules in the past, without requiring a change to our rules.”).

H. While the Commission Searches for More Frequencies to Make Available for ISAM, All Space Frequencies Should Be Made Available

As stated above, the ISAM NPRM's approach to frequency use is anemic.⁹⁰ We've documented in the past the fact that there is a grave scarcity of space frequencies.⁹¹ If ISAM activities develop as so many hope, the real challenge the FCC will face is not figuring out how to process such applications, but rather finding the necessary frequencies to support the revolution of ISAM operations. Nothing should be off the table, and as we discussed in our comments to the ISAM NOI, many ISAM activities will require internal communications within the ISAM station, with little to no possibility of interfering with other ISAM operators, let alone any communications activity on Earth.⁹² The Commission especially should study the availability of unlicensed spectrum for ISAM operations.⁹³

In the interim, TechFreedom supports use of all currently allocated space spectrum for ISAM use, regardless of the current service designation.⁹⁴ This is the key area where the FCC should remain flexible, as articulated in the ISAM NPRM:

⁹⁰ See *supra* Section II.A.

⁹¹ Comments of TechFreedom on Revision of the Big LEO Spectrum Sharing Plan, RM-11975 (Apr. 25, 2024), <https://www.fcc.gov/ecfs/document/1042549927730/1>; see Dunstan, *Earth to Space: I Can't Hear You*, *supra* note 3.

⁹² See ISAM NOI Comments, *supra* note 9, at 18-19.

⁹³ ISAM NPRM ¶ 39 (“Commenters provide a range of examples and suggestions of less traditional spectrum use, such as increased use of inter-satellite links, 161 in-space radar systems to be used during proximity operations, and unlicensed Wi-Fi spectrum for servicer-to-client satellite communications, especially when in close proximity, e.g. during docking activities.” (footnotes omitted)).

⁹⁴ See *id.* ¶ 34 (“We tentatively conclude that various ISAM operations could fit within numerous service allocation definitions. For example, we need not read the definition of space research services, ‘a radiocommunications service in which spacecraft or other objects in space are used for scientific or technological research purposes,’ to be fundamentally at odds with commercial satellite operations given that the plain language of the definition does not exclude commercially-based

We propose not to limit service allocation designations that might be possible for ISAM operations so long as the requested operations can justifiably fit within the service allocation definition. As such, we propose to continue our current practice of assessing whether an applicant’s proposed ISAM operations fall within the applicant’s desired service allocation(s) on a case-by-case basis. This proposal is consistent with our considerations for small satellites, where we recognized small satellite operators may engage in a variety of operations. Here, we tentatively propose to maintain as much flexibility as possible for ISAM operators to gain authorization for their operations so long as this does not interfere with other radiocommunications and justifiably fits within service allocation definitions.⁹⁵

Ultimately, the FCC should work at the ITU as well as domestically to create a new flexible category for ISAM called “Space Operations” that would both utilize existing space frequencies as well as terrestrial frequencies that can be reused in space without causing interference to terrestrial operations.

V. Conclusion

The FCC is excited about the future of outer space activities.⁹⁶ So are we, and we’ve

scientific or technological research operations. Additionally, we propose that the space operation service, which is ‘concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry, and space telecommand,’ need not be as narrowly construed as some commenters seem to suggest.” (footnotes omitted)).

⁹⁵ *Id.* ¶ 35.

⁹⁶ *See, e.g.*, Press Release, Fed. Comm’ns Comm’n, Chairwoman Rosenworcel Announces Plan to Modernize the FCC by Establishing a Space Bureau and Office of International Affairs (Nov. 3, 2022), <https://docs.fcc.gov/public/attachments/DOC-388826A1.pdf> (announcement of the establishment of a Space Bureau; Separate Statement of Comm’r Geoffrey Starks in Mitigation of Orbital Debris in the New Space Age, FCC 20-54 at 137 (Apr. 24, 2020), <https://docs.fcc.gov/public/attachments/FCC-20-54A1.pdf> (“Next-gen satellite broadband technology holds tremendous promise for connecting people in the hardest-to-reach communities in rural America, and I’m excited that American companies like SpaceX and Amazon are leading this burgeoning industry.”); *Connecting America: Oversight of the FCC: Hearing Before the H. Comm. on Energy & Commerce, Subcomm. on Comm’ns & Tech.*, 27, 117 Cong. (2022) (additional questions for the record, Chairwoman Jessica Rosenworcel), <https://docs.house.gov/meetings/IF/IF16/20220331/114545/HHRG-117-IF16-Wstate-RosenworcelJ-20220331-SD001.pdf> (“I am excited about the promise of low earth orbit (LEO) satellite systems and their ability to deliver high speed connectivity to remote communities

been bullish on outer space for decades.⁹⁷ But excitement can't be equated with authority, and that's where the ISAM NPRM goes wrong. TechFreedom urges the FCC to focus on the FCC's critical role in promoting ISAM—establishing a licensing regime that will allow these new capabilities to flourish free from radiofrequency interference, under American stewardship. Attempt to regulate ISAM activities beyond frequency use, however, and the FCC is treading into dangerous and uncharted regulatory waters.

Respectfully submitted,

_____/s/_____
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in Utah. LEO satellite providers have announced plans to launch thousands and even tens of thousands of satellites, which drastically increases the need for safety rules and coordination among competing systems.”).

⁹⁷ J. Dunstan, *Funding the High Frontier: Old Lessons We Must Once Again Learn*, Proceedings of the Ninth Princeton/AIAA/Space Studies Institute on Space Manufacturing (1989); J. Dunstan, *Generating Revenues in Space: Challenging Some of the Economic Assumptions of Space Exploitation*, Proceedings of the NASA Symposium on Lunar Bases and Space Professional Activities in the 21st Century (Apr. 1988).