

(3) CUR/powered air-purifying mode performance requirements:

NFPA 1987 performance requirements	NFPA 1987 section
(i) PAPR Airflow Performance	7.3.1
(ii) PAPR Silica Dust Loading Performance	7.3.2
(iii) Airflow Resistance Performance in Breath-Responsive, Powered Air-Purifying Respirators	7.3.3
(iv) PAPR Performance with the Blower Off	7.3.4

(4) CUR/air-purifying mode performance requirements:

NFPA 1987 performance requirements	NFPA 1987 section
(i) Breathing Resistance	7.4.1
(ii) Hydration Leakage	7.4.2
(iii) Canister Test Challenge and Test Breakthrough Concentrations	7.4.3
(iv) Particulate/Aerosol Canister	7.4.4
(v) Low-Temperature/Fogging	7.4.5
(vi) ESLI Drop Test for Canisters	7.4.6
(vii) ESLI Test for Canisters	7.4.7

(b) To the extent there is a conflict between the terms or provisions of NFPA 1987 and this part, the provisions of this part control.

§ 84.402 General construction and approval requirements.

(a) Each CUR must meet the minimum construction requirements set forth in subpart G of this part.

(b) Applications for NFPA 1987 certification must be submitted to a conformity assessment body accredited to ISO/IEC 17065, *Conformity Assessment—Requirements for Bodies Certifying Products, Processes and Services*, at the same time the CUR approval application is submitted to NIOSH. NIOSH approval is contingent upon and will be issued in conjunction with NFPA 1987 certification.

Xavier Becerra,

Secretary, Department of Health and Human Services.

[FR Doc. 2024-03849 Filed 3-14-24; 8:45 am]

BILLING CODE 4163-18-P

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 25

[IB Docket Nos. 22-271, 22-272; FCC 24-21; FR ID 207048]

Space Innovation; Facilitating Capabilities for In-Space Servicing, Assembly, and Manufacturing

AGENCY: Federal Communications Commission.

ACTION: Proposed rule.

SUMMARY: In this document, the Federal Communications Commission (FCC or Commission) adopted a Notice of Proposed Rulemaking that seeks comment on a proposed new framework for licensing space stations engaged in in-space servicing, assembly, and manufacturing (ISAM).

DATES: Comments are due on or before April 29, 2024. Reply comments are due on or before May 29, 2024.

ADDRESSES: You may submit comments, identified by IB Docket Nos. 22-271 and 22-272, by any of the following methods:

- *Electronic Filers.* Comments may be filed electronically using the internet by accessing the ECFs, <http://apps.fcc.gov/ecfs>.

- *Paper Filers.* Parties who choose to file by paper must file an original and one copy of each filing.

- Filings can be sent by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission’s Secretary, Office of the Secretary, Federal Communications Commission.

- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701.

- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 45 L Street NE, Washington, DC 20554.

- Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health

and safety of individuals, and to mitigate the transmission of COVID-19. See FCC Announces Closure of FCC Headquarters Open Window and Change in Hand-Delivery Policy, Public Notice, DA 20-304 (March 19, 2020). <https://www.fcc.gov/document/fcc-closes-headquarters-open-window-and-changes-hand-delivery-policy>.

Persons with Disabilities. To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an email to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice) or 202-418-0432 (TTY).

FOR FURTHER INFORMATION CONTACT: Jameyenne Fuller, Space Bureau, Satellite Programs and Policy Division, 202-418-0945, jameyenne.fuller@fcc.gov.

SUPPLEMENTARY INFORMATION: This is a summary of the Commission’s Notice of Proposed Rulemaking (NPRM), in IB Docket Nos. 22-271 and 22-272; FCC 24-21, adopted February 15, 2024, and released February 16, 2024. The full text of this document is available at <https://docs.fcc.gov/public/attachments/FCC-24-21A1.pdf>.

Ex Parte Presentations

The Commission will treat this proceeding as a “permit-but-disclose” proceeding in accordance with the Commission’s *ex parte* rules. Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different

deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

Paperwork Reduction Act

The Notice of Proposed Rulemaking contains proposed new or modified information collection requirements. The Commission, as part of its continuing effort to reduce paperwork burdens, invites the general public and the Office of Management and Budget (OMB) to comment on the information collection requirements contained in this document, as required by the Paperwork Reduction Act of 1995 (PRA), Public Law 104–13. In addition, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107–198, see 44 U.S.C. 3506(c)(4)), the Commission seeks specific comment on how it might further reduce the information collection burden for small business concerns with fewer than 25 employees.

Providing Accountability Through Transparency Act

The Providing Accountability Through Transparency Act, Public Law

118–9, requires each agency, in providing notice of a rulemaking, to post online a brief plain-language summary of the proposed rule. The required summary of the Notice of Proposed Rulemaking is available at <https://www.fcc.gov/proposed-rulemakings>.

Initial Regulatory Flexibility Analysis

The Regulatory Flexibility Act of 1980, as amended (RFA), requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that “the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.” The Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) concerning the potential impact of the proposed rule and policy changes contained in the Notice of Proposed Rulemaking. The IRFA is set forth in Appendix B of the NPRM and a summary is included in the Procedural Matters section below. Written public comments are requested on the IRFA. Comments must be filed by the deadlines for comments on the Notice of Proposed Rulemaking indicated on the **DATES** section of this document and must have a separate and distinct heading designating them as responses to the IRFA.

Synopsis

1. In the Notice of Proposed Rulemaking (NPRM), the Commission seeks comment on several proposed changes to part 25 of the Commission's rules to create a new framework to license in-space servicing, assembly, and manufacturing, or “ISAM” space stations, thereby supporting the development of these novel space activities. Specifically, the NPRM proposes to include a new definition of “ISAM space station” in § 25.103 of the Commission's rules drawn from the definition in the ISAM National Strategy and proposes a new § 25.126 to the Commission's rules to aggregate requirements that all applicants for an ISAM space station license or market access grant must fulfill and to enumerate the exemptions from other portions of part 25 to which applicants would be entitled. It also seeks comments on whether other rule changes might be necessary to support the development of the ISAM industry. Additionally, it proposes to retain the same orbital debris mitigation requirements for ISAM operators as for other space station operators and proposes to review ISAM operators'

requests for frequency use on a case-by-case basis.

I. Introduction

2. The Commission continues its efforts to promote United States leadership in space by adopting the NPRM to propose a new framework for licensing space stations engaged in ISAM. Space capabilities are expanding, opening novel economic and scientific opportunities, and providing new tools for sustainable use of space. Effective and efficient use of radiofrequency communications will enable these new capabilities and the rules proposed are designed to facilitate and support their growth. The NPRM reflects the input of commenters from the Commission's Notice of Inquiry (NOI) on ISAM, 87 FR 56365 (September 14, 2022), which sought comment regarding where the industry is today, how the Commission can best support its sustainable development, and what tangible economic and societal benefits may result from these capabilities. Taking these comments into account, the Commission proposes to create a new framework to license ISAM space stations, thereby supporting the development of these novel space activities. As the ISAM industry continues to develop, the Commission envisions taking additional steps as needed to foster innovation and growth in this field.

II. Background

3. 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 transformation of raw or recycled

materials into components, products, or infrastructure in space.

4. On August 5, 2022, the Commission adopted the ISAM NOI. It sought comment on spectrum needs and allocations; licensing processes in general and specifically for satellite servicing operations, assembly, manufacturing, and other activities; and international licensing considerations. Twenty-four comments were filed by ISAM operators, satellite operators, industry groups, and government agencies, ten parties filed reply comments, and a number of parties also submitted *ex parte* filings on the record.

5. *Prior Actions Involving ISAM Activities.* While many commercial ISAM activities are still at an early stage, the Commission, in coordination with NTIA where operations were in frequency bands shared with the federal government, has issued licenses for space stations conducting several types of ISAM activities, including the following: licensing of SpaceLogistics, LLC's (SpaceLogistics) Mission Extension Vehicle-1 (MEV-1) and Mission Extension Vehicle-2 (MEV-2); granting an experimental license to Spacelce to investigate freeze-casting, a processing technique used to create a wide range of materials like ceramics, metals, polymers, and composites, among others, in the microgravity environment; authorizing U.S. earth station communications to support Astroscale Ltd.'s ELSA-d testing of spacecraft capabilities for orbital debris removal; and granting an experimental license to NanoRacks LLC for communications to demonstrate metal-cutting in space.

6. Topics related to ISAM capabilities have also been raised in other Commission rulemaking proceedings. In the ongoing rulemaking to update the orbital debris rules, Mitigation of Orbital Debris in the New Space Age, the Commission sought comment on a variety of rule changes, including, for example, whether it should update rules specifically to address RPO. The Commission ultimately adopted a requirement that space station applicants disclose whether a space station is capable of, or will be, performing proximity operations, noting that this disclosure would identify situations where such operations are planned and provide a vehicle for further review of those operations. At the time, the Commission noted the evolving and developing nature of RPO and accordingly found that adoption of more specific technical or operational requirements would be premature. The Commission also sought comment on the role of spacecraft retrieval, also

referred to as active debris removal (ADR), as a debris mitigation strategy in certain circumstances and concluded that this was also an area where it would be premature to establish more detailed regulations.

7. *State of the ISAM Industry.* 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. While Aerospace Corporation (Aerospace) sees a "chicken and egg" problem regarding a lack of serviceable satellites and a lack of servicers, it notes that SpaceLogistics' MEVs that operate on vehicles not designed for servicing have significantly reduced this barrier and finds the mix of old and new satellites will expand ISAM servicing opportunities and draw in more satellite and ISAM providers. NTIA highlights two previous successful ISAM-related demonstrations by the Defense Advanced Research Projects Agency (DARPA) and NASA's Double Asteroid Redirection Test (DART) to support planetary protection.

III. Discussion

A. Scope of FCC Regulations

8. The NOI queried how the FCC could support ISAM activities, noting that the ISAM National Strategy calls for the U.S. domestic regulatory regime to be updated to facilitate ISAM activities. The Commission issues the 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.

9. The Commission's authority under the Communications Act allows the licensing of ISAM space stations under its existing rules, including rules that consider public interest factors. The Commission expects to continue to rely on the expertise of its fellow agencies as appropriate and note that its regulations on these issues are evolving in tandem with other government efforts. The Commission also recognizes that the United States' regulatory regime for

achieving compliance with its obligations under Article VI of the Outer Space Treaty contemplates multiple agencies authorizing and supervising the activities of non-governmental entities in space.

10. *Planetary Protection.* The NOI discussed the issue of planetary protection, given that some recent ISAM-related license applications are focused on lunar activities and beyond. Several commenters suggest the Commission consider working with other agencies on planetary protection issues instead of separately considering or taking action in this proceeding. The Commission plans to continue to support other agencies' efforts to develop and implement planetary protection policies. The Commission tentatively concludes that its proposed licensing framework for ISAM space stations should not include independent review and action from the Commission on applicants' planetary protection plans. The Commission seeks comment on how to ensure that applicants work with NASA and other relevant agencies to address planetary protection guidance and policy considerations. The Commission expects that various applications might require planetary protection considerations, such as small spacecraft applications. The Commission has previously ensured that applicants work with other federal agencies to consider planetary protection.

B. Licensing Framework for ISAM Space Stations

11. The NOI sought information on the best approaches to licensing ISAM activities. As discussed in greater detail below, the Commission proposes to modify its rules to create a licensing framework specific to ISAM space stations within its part 25 rules for licensing commercial space stations. The Commission also proposes to apply its existing orbital debris mitigation requirements to ISAM space stations and to address the spectrum needs of ISAM operators on a case-by-case basis. At the same time, the Commission proposes to maintain its part 5 experimental licensing rules as an option for licensing ISAM space stations not providing commercial service.

C. Licensing Rules for ISAM Space Stations

12. *Commercial Readiness of ISAM activities.* The NOI sought comment on possible approaches for licensing different types of ISAM operations, including servicing, assembly, manufacturing, and ADR. The record demonstrates that various ISAM

operations are developing at different rates. Some commenters recommend that the Commission develop rules specific to categories of ISAM activities that are at a high level of technological readiness, like servicing, while adopting broad performance-based regulations that could apply to categories of ISAM activities that are still developing and could become more common in the future, like assembly and manufacturing. The Commission agrees with commenters that communications operations of certain ISAM activities may need to be regulated differently, but do not propose separate rules for different types of ISAM activities at this time. Instead, the Commission proposes to move forward by creating a new framework for applications for U.S. authorizations or grants of market access that applies broadly to space stations associated with all activities that fit within the proposed definition of ISAM. Unless indicated otherwise, when the Commission refers to the term license or licensee in this summary and in the Notice of Proposed Rulemaking, the Commission also includes market access grants or grantees. This proposed approach will allow applicants for any type of ISAM activity to apply for a U.S. license or market access grant pursuant to these new rules and will provide a framework to support future regulations for specific ISAM activities that may be necessary as the industry develops. The Commission seeks comment on whether there are different factors of servicing, assembly, or manufacturing activities that necessitate specific rules or a specific framework at this time.

13. *Licensing ISAM Space Stations Through Part 5 and Part 25.*

Commenters note that ISAM remains nascent, and it may be five to ten years before the industry generally shifts toward requiring part 25 licensing for commercial space stations (rather than part 5 licensing for experimental space stations, which remains an important licensing avenue for operators as ISAM technology develops). Some commenters suggest updating the part 5 rules “to more readily enable ISAM operations.” Others caution against rule updates to part 5, explaining that “[c]hanging the Part 5 rules would pose an unnecessary drain on FCC resources and take years to complete.” The Commission notes that several ISAM space stations have successfully received experimental licenses through the part 5 process, and therefore, it does not propose to modify the part 5 experimental license rules at this time. The Commission proposes to continue to utilize both part 5 and part 25

licensing in appropriate circumstances to provide radiofrequency licensing to support ISAM development. and seek comment on this proposal.

14. *Definition of ISAM Space Station.* As an initial matter, the Commission proposes to include a definition of “ISAM space station” in § 25.103 of the Commission’s rules. The Commission proposes that operators wishing to apply using its proposed framework for ISAM space stations must plan to operate space stations that fit this definition, although space stations that fall within the definition would not be precluded from applying through its regular part 25 rules or through its existing processes for small satellites or small spacecraft. The Commission proposes to define “ISAM space station” as follows: “A space station that has the primary purpose of conducting in-space servicing, assembly, and/or manufacturing activities used on-orbit, on the surface of celestial bodies, and/or in transit between these regimes. Servicing activities include but are not limited to in-space inspection, life-extension, repair, refueling, alteration, and orbital transfer of a client space object, including collection and removal of debris on orbit. Assembly activities involve the construction of space systems in space using pre-manufactured components. Manufacturing activities involve the transformation of raw or recycled materials into components, products, or infrastructure in space.” The Commission notes that this definition is drawn from the definition of ISAM in the ISAM National Strategy. The Commission seeks comment on this proposed definition. Specifically, should the Commission 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?

15. *Proposed § 25.126.* In general, the Commission proposes to require applicants for authorization for ISAM space stations to comply with the rules of either its regular part 25 licensing process or its streamlined processes for small satellites and small spacecraft, with some exemptions. The Commission notes that ISAM technologies are still nascent, and it views its proposed approach to regulating ISAM space stations as iterative, developing with the capabilities and needs of the industry. The Commission believes licensing ISAM space stations under its 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. The Commission believes this proposed approach will provide the industry with flexibility while ISAM capabilities develop. The Commission also believes this approach will allow the Commission to continue to develop a record on ISAM while gaining more experience licensing radiofrequency 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. The Commission seeks comment on this approach.

16. The Commission proposes to create a new § 25.126—Applications for ISAM Space Stations—to aggregate the requirements applicants for ISAM space stations must fulfill and enumerate the exemptions from the Commission’s typical processes they are entitled to. The Commission believes 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 details the application process and clearly indicates the other rule sections with which applicants must comply. The Commission proposes that applicants that fit within its proposed definition of “ISAM space station,” detailed above, would be able to use the proposed framework in § 25.126. The Commission proposes 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. The Commission seeks comment on this general approach.

17. Specifically, the proposed new § 25.126 would require applicants to submit a comprehensive proposal for Commission evaluation on Form 312, Main Form, and Schedule S, as described in § 25.114(a) through (c), consistent with the Commission’s regular part 25 licensing and small satellite and small spacecraft licensing requirements. The Commission proposes to allow ISAM space station operators to continue to apply under the small satellite and small spacecraft streamlined processes, provided they satisfy all the requirements of each respective process. The Commission proposes that ISAM space stations that do not meet the criteria for the small satellite or small spacecraft processes

would continue to be subject to the remaining licensing requirements for GSO or NGSO operators under the Commission's regular part 25 application process and therefore would be required to provide the information required by its rules with their application.

18. The Commission recognizes that radiofrequency operations for ISAM space stations seem more capable of spectrum sharing than other commercial space stations it has authorized under its part 25 rules and generally require shorter durations of intensive communications operations. The Commission therefore proposes to exempt all applications for licenses for space stations that fit its proposed definition of ISAM space stations from processing round requirements for NGSO-like operations under § 25.157 and from first-come-first-served requirements for GSO-like operations under § 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). These proposals and exemption criteria would be located in new § 25.126 and the corresponding §§ 25.157 and 25.158 would be updated to reflect these exemptions. The Commission tentatively concludes 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. The Commission also proposes to include a requirement in 25.126 for ISAM operators to provide ICFS file numbers or call signs for any FCC-related applications or grants or a list of International Telecommunications Union (ITU) filings and United Nations (UN) Registration information for any related space stations not licensed or granted market access by the United States, which the Commission explains in more detail below. The Commission notes that its proposal to exempt ISAM operators from its processing round and first-come-first-served queue, given relevant showings, does not modify its obligations to coordinate authorizations with federal operators when spectrum shared by federal and nonfederal users is requested. The Commission seeks comment on these proposals. It also seeks comment regarding whether other

rule changes are necessary to effectuate the proposed approaches discussed above. Commenters should specify which rules and explain the basis for recommending additional revisions.

19. *Surety bonds.* In addition to the exemptions that it proposes in 25.126, the Commission also proposes to defer the posting of surety bonds by one year after the grant of a license for ISAM operators. This proposal is consistent with the Commission's treatment of small satellites and small spacecraft. 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. Spaceflight notes that ISAM space stations are not likely to have exclusive use of spectrum and are likely to be licensed relatively close to launch, and a surety bond would be excessive for many ISAM operators and disproportionate to the cost of developing the space stations. Spaceflight says these considerations match the considerations the Commission relied on when it decided to implement a one-year grace period for filing of a bond for satellites authorized under the streamlined process for small satellites and recommends the Commission adopt a rule allowing ISAM operators to demonstrate they meet the policy objectives of the surety bond requirement in lieu of filing a surety bond. For operators that cannot make such a showing, Spaceflight suggests that the Commission allow ISAM operators one year to file a bond or meet milestone requirements, in line with the rules for streamlined small satellites and small spacecraft. Intelsat also notes that the Commission waived bond and milestone requirements for SpaceLogistics's MEV-1 servicer vehicle because MEV-1 and Intelsat's satellite were treated as one for purposes of the specific operation. While the Commission tentatively concludes that a one-year grace period for surety bonds for ISAM space stations is appropriate, it does not propose to follow Spaceflight's suggestion of allowing operators to demonstrate compliance with policy objectives of the bond requirement. The Commission believes this type of individualized showing can be handled through a waiver request, as the Commission may waive any rule for good cause shown according to 47 CFR 1.3. Specifically, the Commission proposes 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. The Commission seeks comment on these proposals.

20. *U.S.-Licensed Servicing and Client Operations.* 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, the Commission tentatively agrees with Starfish that cases are limited where client operators should be required to modify authorizations, but it does 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, the Commission tentatively concludes 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. The Commission seeks comment on this approach.

21. To facilitate review of whether a client space station must seek a modification, the Commission proposes to include a requirement in its new proposed § 25.126 for ISAM space station applicants to provide a list of FCC file numbers or call signs for all related space stations, including experimental applications and grants and other applications and grants under part 25. This requirement is similar to the requirement in the Commission's streamlined process for small satellites and small spacecraft, but the Commission proposes to expand what it considers to be "related" applications and grants in the context of ISAM applications. It proposes that related applications and grants would include not only space stations operated by the

same operator, but could also include client space stations, space stations that have become debris the applicant seeks to remediate, and other space stations the applicant plans to interact with or collaborate with as part of its operations. The Commission proposes to require this information from all applicants that fit within its proposed definition of ISAM space stations, whether the operator is applying under the Commission's regular part 25 process or its streamlined processes under §§ 25.122 and 25.123. The Commission seeks comment on this proposal.

22. International Servicing and Client Operations. The NOI asked a number of questions regarding how to license ISAM space stations that may plan to interact with a non-U.S.-licensed space station. When considering U.S.-licensed space stations interacting with non-U.S. client space stations, Blue Origin asserts that the Commission should only seek the name of the client space station, its licensing administration, and associated ITU filings because the client is not seeking U.S. market access and so there should be no spectrum management concerns to address. Despite this suggestion, the Commission tentatively concludes that spectrum management may be implicated in certain cases when U.S.-licensed space stations interact with or service non-U.S. licensed space stations, given that there may be a wide range of factual scenarios, including servicing for the purpose of altering the location at which a client spacecraft operates or altering other technical characteristics of operations. The Commission also believes sufficient information concerning the proposed operations must be available to ensure that an authorization is in the public interest. For example, a servicing mission that contemplates facilitating client space station operations fundamentally inconsistent with U.S. interests, such as operations that might interfere with other U.S. satellites, should be identified in the authorization process. Likewise, the Commission does not propose to presume that client space station operators are in possession of a license, as Starfish suggests. That approach might, for example, result in the servicing mission facilitating an activity by the client satellite that has not been authorized by the administration to which it is subject. Therefore, for client space stations licensed outside of the United States, both with or without U.S. market access grants, the Commission proposes to require that the license applicant provide the client's ITU filings and UN

registration information, as well as a discussion of regulatory requirements to which the client satellite and its operators are subject, and the status of any regulatory approvals required for the client satellite's participation in the servicing activity. This baseline information may also facilitate any necessary coordination with other U.S. government agencies, such as the State Department. The Commission proposes to require this information in its proposed new rules for applications for ISAM space stations to be located in § 25.126. The Commission seeks comment on these proposals.

23. International Coordination. Aerospace argues that it would be impractical and unreasonable to require an operator to undergo the ITU's seven-year coordination process for frequencies it will use to service a single satellite and will not use once it moves away from that satellite. Aerospace suggests that notifying the Radiocommunications Bureau at the ITU of a commercial ISAM mission would be a prudent alternative and coordination could be accomplished for TT&C operations used throughout the life of an ISAM space station. The Commission recognizes the current ITU process poses challenges to ISAM operators, but the ITU Radio Regulations are a treaty by which the United States is bound, and the Commission cannot unilaterally modify what activities and frequencies need to be coordinated with the ITU through a rulemaking process. The Commission therefore proposes not to accept Aerospace's suggestion that it simply notify the Radiocommunications Bureau at the ITU of a commercial ISAM mission instead of coordinating in accordance with ITU Radio Regulations. But the Commission does propose, as part of ongoing work on ISAM activities, to continue to coordinate with other federal agencies, including the State Department, to support international servicer-client arrangements. The Commission seeks comment on these proposals.

D. Orbital Debris Mitigation and ISAM Space Stations

24. The NOI sought comment on orbital debris mitigation concerns specific to ISAM activities in general. Specifically, the Commission sought comment on how ISAM activities might not fit into its current orbital debris mitigation requirements, for example by storing fuel on-orbit rather than using or depleting fuel (refueling depots), or by creating debris as byproducts of servicing or manufacturing activities, and how the Commission might modify

its current orbital debris mitigation requirements to account for the additional risks that ISAM operations may pose.

25. At this time, the Commission tentatively concludes to retain the same orbital debris mitigation requirements for ISAM operators as for other space station operators. As stated in the NOI, the Commission's orbital debris mitigation requirements apply to all space station operators, including operators of ISAM space stations. The Commission notes that its current orbital debris mitigation rules are performance based, in that they require demonstration of results rather than dictating specific methods operators must use to meet those results, and so the Commission proposes that it does not need to modify its rules for ISAM communications to accommodate requests in the record for performance-based orbital debris mitigation requirements for ISAM space stations. The Commission's orbital debris mitigation requirements are also based on the United States government's Orbital Debris Mitigation Standard Practices (ODMSP) developed by NASA. The Commission therefore does not propose to modify its orbital debris rules at this time or to require additional orbital debris mitigation showings for ISAM space stations in general. Rather the Commission proposes that ISAM operators will either comply with orbital debris requirements under the regular part 25 licensing process, or under the small satellite or small spacecraft processes, if they apply under those streamlined licensing processes. The Commission proposes to include a requirement that applicants for ISAM space stations submit the orbital debris mitigation information under the rules of their chosen application process in the proposed new § 25.126, as part of the proposal to clearly lay out the application process for ISAM operators in that section. The Commission also proposes to review any applications for ISAM space stations on a case-by-case basis, just as it does with other license applications, to ensure compliance with its orbital debris mitigation requirements. The Commission believes 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. The Commission seeks comment on this proposed approach.

26. ISAM Activities that May Pose Additional Risks. The Commission notes 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. It seeks comment on whether its current orbital debris mitigation rules are sufficient to protect the orbital environment from these additional risks. Are there additional specific orbital debris showings the Commission should consider for these activities?

E. Orbital Debris Remediation Activities

27. The NOI asked a series of questions to gain information on the state of orbital debris remediation technologies and industry development, including whether and how the Commission should consider ADR as part of an applicant's orbital debris mitigation plan and what actions the Commission could take to promote growth and innovation for ADR. The Commission agrees with commenters that ISAM activities can play a role in orbital debris remediation and space sustainability. 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.

28. The Commission proposes that operators engaging in ADR and similar orbital debris remediation activities could seek authorization through the same process for ISAM space stations outlined in the NPRM, including requiring space stations conducting ADR to demonstrate compliance with the Commission's orbital debris rules. The Commission seeks comment on this proposal. In particular, the Commission seeks comment on whether it should impose additional requirements on applicants for ISAM space stations conducting debris remediation activities to mitigate potential additional risks from these activities.

29. In response to the NOI's queries on whether ADR should be factored into post-mission disposal requirements or otherwise be fostered by Commission action, commenters suggest the Commission make clear that ADR is permitted as a means to demonstrate compliance with the Commission's

orbital debris rules and recommend that the Commission encourage all space station operators to include navigational aids and grappling fixtures to assist with potential ADR. The Commission agrees that acknowledging third-party services as an option for post-mission disposal will likely further its goals of promoting innovation and growth of ADR and will also likely provide additional flexibility to applicants when considering their end-of-life disposal options. To date, the Commission's rules do not prescribe any particular method of end-of-life disposal of NGSO space stations, and instead the Commission reviews an applicant's orbital debris mitigation plans for such disposals on a case-by-case basis. The Commission has previously stated that it did not intend to dismiss or foreclose direct retrieval as a method of end-of-life disposal and that disposal plans involving direct retrieval would be evaluated if direct retrieval were implemented in the future. As such, the Commission does not propose to modify its rules to list ADR explicitly as a post-mission disposal method. The Commission notes 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 the Commission therefore proposes that plans to use ADR for post-mission disposal will continue to be reviewed on a case-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 the Commission's other orbital debris mitigation rules. The Commission believes its proposal to review use of ADR for post-mission disposal on a case-by-case basis is in line with its 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 the Commission's goal of promoting growth in the industry. The Commission seeks comment on this approach.

30. Additionally, the Commission believes that Aerospace's suggestion that the Commission require ADR plans as a back-up for large constellations' post-mission disposal plans has merit for consideration. In cases of large constellations, as Aerospace points out, numerous defunct satellites could be left in orbit even while meeting the Commission's current post-mission disposal requirements. Given that the technology for ADR is still nascent and

developing, however, the Commission does not propose to adopt rules on this issue at this time, but it expects to consider this possibility in the future.

31. The NOI asked specifically whether an operator bond associated with removal would be an appropriate mechanism for ensuring ADR. Commenters responding to the NOI present a range of views regarding potential bonds associated with post-mission disposal reliability, from support for the proposal, to requests for further study, to concerns that a bond would chill innovation and be less effective than strong orbital debris mitigation requirements. The Commission agrees that further consideration of this issue is warranted, but as it is also continuing to consider post-mission disposal bonds in general in its orbital debris proceeding, it defers this issue as related to ISAM and debris remediation to a later time when it can consider it more fully.

32. Finally, despite the suggestions of some commenters, the Commission defers proposals to modify regulatory and application fees to appropriate regulatory or application fee proceedings in the future. The Commission is required by the Communications Act to collect application fees and regulatory fees. The Communications Act provides specific exemptions from application fees and regulatory fees. Moreover, the Commission's authority to waive application fees or regulatory fees is limited to specific instances and the Commission has consistently rejected consideration of waiving such fees for classes of applicants or regulatees. As this proceeding progresses, the Commission will propose any relevant regulatory fee or application fee updates for ISAM space stations as part of future Commission's regulatory and application fee proceedings.

F. Radiofrequency Spectrum To Support ISAM

33. The Commission tentatively concludes that various communication activities in support of ISAM can potentially operate within several existing service allocations, and it proposes to review ISAM operators' requests for frequency use on a case-by-case basis, consistent with its process for reviewing requests for frequency use for small satellites and small spacecraft. The Commission seeks comment on these proposals.

34. *Communication Operations and Service Allocations.* ISAM space station operations will require the use of telemetry, tracking, and command (telecommand) (TT&C), as several

commenters note. 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. 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. Commenters indicate that ISAM frequency use will need to be agile, changing to communicate with client satellites or to avoid interfering with GSO satellites as an ISAM space station transits close to the GSO arc. NTIA and Aerospace also note that ISAM space stations could utilize relay satellites or satellite networks for data downlink and other communications.

35. Numerous commenters suggest that the space operation service (defined in 47 CFR 2.1(c)), fits well with some aspects of ISAM operations, particularly TT&C needs, but several also note that the space operation bands are already encumbered by federal users and others assert that some communications needs for ISAM space stations may not fit in this service. Some suggest that space research service, fixed-satellite service (FSS), mobile-satellite service (MSS), inter-satellite service, or even Earth-exploration satellite service (EESS) allocations (all defined in § 2.1(c) of the Commission's rules), as well as experimental licensing and other flexible options could be construed to allow for certain ISAM operations. The Commission's rules define service allocations according to the ITU definitions, and the Commission relies on these definitions as it considers requests for frequency authorization as part of its licensing process. The Commission tentatively concludes that various ISAM operations could fit within numerous service allocation definitions. For example, the Commission 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 scientific or technological research operations. Additionally, the Commission proposes 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. For example, CONFERS states that the space operation service "is not meant for downlinking ISAM payload data." However, the Commission tentatively concludes that at least some ISAM operations could fall within the scope of the space operation definition, especially if the data in question is related to "the operation of spacecraft." At the same time, the Commission notes that certain service allocations, such as EESS which is focused on "[i]nformation relating to the characteristics of the Earth and its natural phenomena, including data relating to the state of the environment," appear to be dedicated to operations that are not typically consistent with ISAM operations.

36. The Commission proposes 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, the Commission proposes to continue its 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 the Commission's considerations for small satellites, where the Commission recognized small satellite operators may engage in a variety of operations. Here, the Commission tentatively proposes 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. The Commission seeks comment on this proposal. The Commission also notes that current satellite services offer some flexibility of use and operation. For example, in certain cases, FSS operators are permitted to provide service to earth stations in motion (ESIM). Similarly, a single satellite constellation can be licensed to provide both FSS and MSS. Given the current state of ISAM development, and the variety of communications needs that ISAM operators may have, the Commission believes that continuing to work within available service allocations, with the modifications to the licensing process

proposed in the NPRM, can address many of the frequency demands for ISAM in the near term. The Commission seeks comment on this approach.

37. *Proposed Exemptions Consistent with Spectrum Sharing Capabilities.* In keeping with its proposal to provide flexibility in considering frequency authorization, the Commission proposes to exempt applicants for ISAM space station authorizations from NGSO-like processing rounds and from the GSO-like first-come-first-served queue, which they could otherwise be subject to under the current regular part 25 satellite licensing regime. This proposal is largely consistent with the Commission's approach for NGSO small satellites and small spacecraft, which are exempt from processing rounds where spectrum sharing (that is, not materially constraining other operations in the requested frequency band(s)) is shown to be possible. Commenters have indicated that spectrum sharing is likely possible for many aspects of ISAM operations as well. However, here the Commission expands its proposal to include an exemption for GSO-like space station processes as well as NGSO because the Commission recognizes that ISAM space stations could seek to be authorized as a GSO-like space station, whereas the Commission's small satellite process focused on NGSO-only. The Commission tentatively concludes 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 and not materially constrain future use of the band. Specific showings would be laid out in the proposed § 25.126, as described above. The Commission seeks comment on this proposal and on any alternate approaches it should consider.

38. *Authorizing Frequency Consistent with Client Space Station Allocations.* The Commission recognizes commenters' interest in the possibility of ISAM space stations receiving frequency authorization consistent with a client's authorization, also known as frequency "piggybacking." Under the Commission's current rules the MEV-1 and MEV-2 licenses allowed for frequency "piggybacking" with the client satellite for certain frequencies. 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. 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. The Commission recognizes that such an approach may only be an option for a small portion of ISAM space stations, because the space stations would need to be designed with specific communications capabilities to match operational frequencies of client or partner satellites and may likely only fit with those providing servicing missions, like life-extension and repair. CONFERS also highlights that the option of relying on client frequencies will not work for operators engaged in debris removal. Given the identified limitations on this model, the Commission does not propose “piggybacking” as an overall solution for ISAM-related frequency authorization; rather it notes that this option has been authorized under its existing rules in the past, without requiring a change to the Commission’s rules.

39. *Specific Frequency Bands.* The Commission views its regulation of radiofrequency in support of ISAM as an iterative process, and the Commission proposes to continue case-by-case review of frequency authorization, as opposed to proposing specific frequency bands for ISAM-related communications’ use. In doing so, the Commission recognizes the benefit of expanding its experience with authorizing communications operations in support of ISAM missions. The Commission believes that creating a process for operators to identify as ISAM space stations will allow the Commission to gather important data and understanding regarding the future spectrum needs of ISAM operators. Additionally, the Commission recognizes that operators are already thinking creatively about various frequencies and service allocations that may be able to accommodate ISAM communication needs, as discussed above. Many commenters responding to the NOI are in favor of identifying spectrum to support ISAM operations on a protected basis (*e.g.*, exclusive or co-primary). The Commission also notes that it deferred consideration of specific frequency bands that could be used for certain ISAM-related operations, such as RPO, from the Commission’s space launch spectrum proceeding. Yet it does 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 the Commission and other regulating bodies continue to evaluate the spectrum ecosystem holistically. The

Commission’s proposal to require frequency use authorization on a case-by-case basis is also consistent with its treatment of small satellite and small spacecraft, with the understanding that these operations would be carried out on a non-exclusive, shared basis, and would not cause interference to incumbent operators. The Commission therefore does not propose specific bands at this time and seeks comment on this proposal.

40. *Less Traditional Spectrum Use.* Finally, the Commission notes that innovation in spectrum use may open new pathways for ISAM-related frequency use in the future. Commenters provide a range of examples and suggestions of less traditional spectrum use, such as increased use of inter-satellite links, 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. These creative suggestions are evidence of the innovative nature of ISAM operations, but the Commission tentatively concludes that these suggestions will require further study or changes at an international level, and it does not propose any changes to its current rules in relation to these novel suggestions.

G. Digital Equity and Inclusion

41. The NOI sought comment on “any equity-related considerations and benefits (if any) that may be associated with the topics discussed” in the NOI. Aerospace provided several comments addressing digital equity and inclusion in the ISAM industry. Aerospace states, “[m]aintaining satellite connectivity that is both consistent and affordable is becoming more essential to remote regions that include tribal lands and rural areas, as well as urban centers of typically underserved populations disadvantaged by socioeconomic factors.” The Commission agrees that promoting growth of the ISAM industry could create a safer and more sustainable space environment, which will allow for more options for broadband service for unserved and underserved areas.

42. Aerospace suggests that to promote digital equity and inclusion in the ISAM industry, the Commission should encourage inclusive business practices through incentive programs, such as reduced or waived regulatory fees and application filing fees for federally recognized small disadvantaged ISAM businesses and reduced or waived fees for debris-mitigating ISAM activities. Aerospace

notes that loss of satellite connectivity caused by debris or interference could mean a complete internet blackout for rural and other unserved and underserved areas which lack ground connectivity infrastructure, and therefore the Commission should work to incentivize ISAM activities which mitigate debris. Aerospace is correct to note the importance of satellite connectivity, particularly in unserved and underserved regions, and ISAM activities, particularly servicing capabilities and debris remediation, have the potential to strengthen these networks to better serve these populations. As discussed above, however, the Commission does not propose to reduce or eliminate fees for space stations that adopt ISAM-compatible technology because the Commission is required to collect application filing and regulatory fees by Congress, and the Commission lacks authority to waive fees for whole categories of payors or to assess fees on factors other than cost of processing filings or regulatory burden.

43. Aerospace also proposes specific regulations for the FCC to consider regarding spectrum which it states would benefit unserved and underrepresented populations. Specifically, Aerospace suggests that the “FCC could propose spectrum sharing schemes that pool spectrum for Small Disadvantaged Businesses developing or supporting ISAM technology dedicated to public interest efforts specific to underserved customers or for use by academia with underrepresented student populations.” The Commission seeks additional comment regarding this proposal. It recognizes the Small Business Administration has regulations and programs for small disadvantaged businesses in the federal contracting space. Specifically, how might the Commission categorize “small disadvantaged businesses” in this context? Are there other categories of businesses, organizations, or academic institutions that such a program would be appropriate for? More broadly, how would such a program work? What would the benefits and drawbacks be?

44. Finally, Aerospace suggests that the Commission consider regulatory changes to protect educational spectrum as a public good by requiring that educational spectrum licenses only be sold to other educational entities. Aerospace also recommends the Commission limit the number of leasing agreements for spectrum to prevent hoarding of spectrum that could be used for ISAM operations which will benefit unserved and underserved populations, as well as regulations preventing

harmful interference to spectrum users from vulnerable groups, such as farmers, coastal fishers, and gulf states during hurricane season, relying on accurate weather data. The Commission views these suggestions to be beyond the scope of this rulemaking, which is focused on developing rules to most effectively license ISAM space stations to nurture growth in the industry and ultimately benefit the public interest, and therefore it does not propose to incorporate Aerospace's suggestions into the proposed rule changes in this proceeding.

45. ISAM is a nascent industry, and as such, the Commission is seeking additional comments on ways the Commission can continue to incentivize the growth of the ISAM industry through the proposals in the NPRM and beyond. Furthermore, as part of the Commission's continuing effort to advance digital equity for all, including people of color, people with disabilities, persons who live in rural or tribal areas, and others who are or have been historically underserved, marginalized, or adversely affected by persistent poverty or inequality, it continues to invite comment on any equity-related considerations raised by the proposals made in the NPRM. Specifically, the Commission continues to seek comment on how the topics discussed and any related proposals may promote or inhibit advances in diversity, equity, inclusion, and accessibility, as well as the scope of the Commission's relevant legal authority.

IV. Initial Regulatory Flexibility Analysis

46. As required by the Regulatory Flexibility Act (RFA), the Commission has prepared this Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in the Notice of Proposed Rulemaking (NPRM). The Commission requests written public comments on the IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines provided on the first page of the NPRM. The Commission will send a copy of the NPRM, including the IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).

A. Need for, and Objectives of, the Proposed Rules

47. The Commission advances the leadership role of the United States in space with a new framework for licensing space stations engaged in in-space servicing, assembly, and

manufacturing, known as (ISAM), proposed in the NPRM. The NPRM reflects comments the Commission received in response to a Notice of Inquiry on ISAM (ISAM NOI), which requested comment on the current state of the industry, how the Commission can best support the sustainable development of the industry, and what tangible economic and societal benefits can result from the expansion of capabilities facilitating the sustainable use of space. The Commission seeks comment on several proposals relating to changes to the Commission's rules and policies for radiofrequency communication to foster the advancement of in-space servicing, assembly, and manufacturing (ISAM) operations. The Commission believes effective radiofrequency communications will enable expansion of capabilities for space use and has proposed rules designed to facilitate and support growth.

48. The licensing framework rules the Commission proposed in the NPRM would accommodate authorization under part 25 of the Commission's rules for commercial space stations engaged in ISAM operations. Adoption of the proposed changes would modify 47 CFR part 25 of the Commission's rules to make communication authorization for ISAM missions more accessible while promoting efficient use of spectrum. The ability of ISAM space station operators to apply under the existing small satellite and small spacecraft streamlined processes would be available to ISAM space station operators that meet the requisite requirements for the applicable process. Licensing under part 5 of the Commission's experimental licensing will also continue to be an option for licensing ISAM space stations that do not provide commercial service. 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 radiofrequency use for ISAM space stations.

B. Legal Basis

49. The proposed action is authorized under sections 4(i), 301, 302(a), 303(e), 303(f), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 301, 302(a), 303(e), 303(f), and 303(r).

C. Description and Estimate of the Number of Small Entities to Which the Proposed Rules Will Apply

50. The RFA directs agencies to provide a description of, and where feasible, an estimate of the number of small entities that may be affected by the proposed rules and policies, if adopted. The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction." In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act. A "small business concern" is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.

51. *Satellite Telecommunications.* This industry comprises firms "primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications." Satellite telecommunications service providers include satellite and earth station operators. The SBA small business size standard for this industry classifies a business with \$38.5 million or less in annual receipts as small. U.S. Census Bureau data for 2017 show that 275 firms in this industry operated for the entire year. Of this number, 242 firms had revenue of less than \$25 million. Additionally, based on Commission data in the 2022 Universal Service Monitoring Report, as of December 31, 2021, there were 65 providers that reported they were engaged in the provision of satellite telecommunications services. Of these providers, the Commission estimates that approximately 42 providers have 1,500 or fewer employees. Consequently, using the SBA's small business size standard, a little more than half of these providers can be considered small entities.

52. *All Other Telecommunications.* This industry is comprised of establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable

of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Providers of internet services (e.g., dial-up ISPs) or Voice over internet Protocol (VoIP) services, via client-supplied telecommunications connections are also included in this industry. The SBA small business size standard for this industry classifies firms with annual receipts of \$35 million or less as small. U.S. Census Bureau data for 2017 show that there were 1,079 firms in this industry that operated for the entire year. Of those firms, 1,039 had revenue of less than \$25 million. Based on this data, the Commission estimates that the majority of “All Other Telecommunications” firms can be considered small.

D. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

53. The NPRM seeks public comment on proposed revisions to the Commission’s rules governing satellite and earth station applications under 47 CFR part 25. Specifically, the NPRM proposes and seeks comment on several rule changes that will affect ISAM communications authorization procedures, reporting, recordkeeping, and other compliance requirements for space station operators. The Commission believes the proposed changes would decrease the burden in various regards for small entities that plan to launch and operate ISAM space stations.

54. The NPRM proposes to add a new section to the Commission’s rules, § 25.126 Application for ISAM Space Stations, which clarifies application requirements for ISAM space stations in a single section. These proposals include documentation requirements largely consistent with those already established for an applicant under part 25 of the Commission’s rules. In proposed § 25.126(a), applicants that meet the proposed definition of “ISAM space station” are directed to seek authorization and submit the requisite application information and materials either through the Commission’s regular part 25 process or through the streamlined processes for small satellites and small spacecraft. As such, ISAM space station license applicants, including small entities, that also meet the requirements to seek authorization under the Commission’s current streamlined processes for small satellites or small spacecraft will be able to submit the information and certification required in § 25.122 or § 25.123 rather than the regular part 25 authorization process.

55. In the new § 25.126(b), the Commission proposes to exempt small entities and other operators that meet the definition of ISAM space stations from non-geostationary orbit (NGSO) processing rounds and/or the first-come-first-served queue for geostationary orbit (GSO) operators, provided the applicant certifies that the operations of the space station(s) will be compatible with existing operations in the authorized frequency band(s), and submits a narrative 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). While the exemption contains a certification and narrative submission requirement, the proposal is designed to provide more flexibility to small and other operators who may want to operate as a GSO or NGSO space station, while simultaneously providing interference protection for incumbent and future satellite operators. The proposed rule would also reduce the procedural requirements for small entities and other applicants.

56. Pursuant to proposed § 25.126(c), ISAM space station license applicants, including small entities, would need to provide the International Communications Filing System (ICFS) file number for any applications or Commission grants related to proposed operations (e.g., experimental license grants, other space station or earth station applications or grants), including but not limited to client space stations, space stations that have become debris the applicant seeks to remediate, and other space stations the applicant plans to interact with or collaborate with as part of its operations. Additionally, ISAM applicants working with space stations not licensed or granted market access by the United States would need to provide relevant information related to those operations, including ITU file numbers and a narrative description. However, since the international-related filing requirements would only pertain to operators working with space stations that are not licensed or granted market access by the United States, the requirement for applicants who do not have such working relationships is largely to provide the appropriate file numbers. Therefore, the Commission does not believe the inclusion of the proposed filing requirements in § 25.126(c) will increase the procedural compliance burdens for small entities.

57. As a mechanism for fostering the growth of the burgeoning ISAM industry the licensing framework proposal includes a one-year grace period for

surety bonds for small and other ISM applicants, just as the Commission has done for operators applying through the small satellite and small spacecraft rules. The Commission seeks comment on whether any of the burdens associated with complying with the filing, recordkeeping, and reporting requirements in its proposed licensing framework can be further minimized for small entities. Due to the proposed approach to license ISAM space stations under the Commission’s current rules including allowing applicants to seek authorization under the Commission’s current streamlined processes for small satellites or small spacecraft, the Commission does not expect that small entities will need to hire professionals to comply with any of the requirements for ISAM space station authorization. With regard to the compliance costs for small entities, at this time the Commission cannot quantify the compliance costs for small entities. The Commission therefore expects the information it received in comments to include cost and benefit analysis data which should help the Commission assess compliance costs. Industry input should also allow the Commission to identify and evaluate additional matters, and burdens relevant to small entities that may result from the proposals and inquiries it makes in this proceeding.

E. Steps Taken To Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

58. The RFA requires an agency to describe any significant, specifically small business, alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): “(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rules for such small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small entities.”

59. The Commission’s consideration of rule revisions to reflect changes and advances in the commercial space industry includes proposals in the licensing framework that would assist in reducing the economic impact for small entities such as exempting ISAM applicants from the surety bond requirement for one year after an ISAM license is granted, and not subjecting applications for ISAM space stations to

NGSO processing round procedures or the GSO operator queue. These proposals are designed to lower the regulatory burden involved in licensing ISAM operations and reduce application processing times, thereby lessening the burden of compliance on small entities with more limited resources than larger entities. The Commission considered not providing these exemptions, which would require ISAM operators, including small entities, applying under the Commission's regular part 25 process to engage in a more lengthy and complex procedural process. ISAM applicants for example, could be placed in a processing round or required to submit requests for waiver, which the Commission believes may have a greater impact on small entities than the NPRM's proposal to exempt ISAM operators from these processes so long as they provide the requisite demonstrations for spectrum sharing. In the formulation of its surety bond requirement proposal, the Commission considered a recommendation that ISAM operators be allowed to demonstrate compliance with the policy objectives of the surety bond requirements in place of filing an actual surety bond. Implementation of this recommendation would introduce additional review into the licensing process on a larger scale than allowing individual applications to demonstrate such showings through a waiver request, which is currently an available avenue for applicants under the Commission's general waiver rules, therefore the Commission did not include this in the proposal.

60. Small entities and other operators meeting the proposed definition of an ISAM space station would be required to include some additional information with their application by providing the ICFS file numbers for related applications or grants of authority, if this proposed rule is adopted. This requirement may ultimately lower the impact on small entities and other operators however, since providing the file numbers up front could lower the need for, and costs associated with additional follow-up and review at a later stage of the application process. Similarly, the Commission believes that the proposed requirement for ISAM applicants to provide relevant international filings for related space stations not licensed or granted market access by the United States while creating some additional steps on the front end, will ultimately lead to a smoother review process for small entities and other applicants who may be servicing or partnering with foreign-

licensed space stations as part of their operations.

61. Although the Commission ultimately proposed to continue the use of part 5 and 25 rules for the ISAM space station operation licensing framework, it considered various alternatives for the framework proposal. The Commission assessed for example the use of different licensing requirements for different types of ISAM activities. Rather than proposing to adopt different regulatory requirements, the Commission chose to propose a broad licensing framework for space stations that could be applicable to all activities that fall within the proposed definition of ISAM. The proposed licensing framework provides small entities and other ISAM space station applicants with several options to use to apply for authorization. The option available for small entities meeting the process requirements to utilize the Commission's existing streamlined processes for small satellites and small spacecraft as described in the NPRM should reduce the impact for these applicants because of the reduced burden of the streamlined processes. Small entities seeking Commission authorization as ISAM space station operators may already have experience, and familiarity with the existing processes, and have cost-effective and efficient internal procedures in place to execute the streamlined processes. To the extent a small entity does not meet the requirements for the streamlined processes for small satellites and small spacecraft and seeks authorization through the regular part 25 process, the proposed exemptions and reduced regulatory burdens discussed above will result in a less arduous and costly approach than would be available in the absence of the new section and other proposed rule changes. Small entities may also benefit from the continuation of the part 5 process as a means of authorization since several ISAM space stations have secured experimental licenses using this process. Similarly, the part 5 process may be of assistance to small entity ISAM applicants with an interest in market trials.

62. In response to the ISAM NOI, comments were filed involving spectrum regulation impacting small disadvantaged businesses. The Commission considered these comments which suggest the Commission propose spectrum sharing arrangements to pool spectrum impacting small disadvantaged businesses that develop, or support ISAM technology targeting underserved customers, or academic institutions with underrepresented student

populations, and in the NPRM the Commission requested additional comment on this proposal, including how such arrangements would work, and the benefits and drawbacks of such arrangements. The Commission expects to consider this, and other issues discussed herein, as well as the economic impact on, and alternatives for small entities, based on its review of any comments filed in response to the NPRM and the IRFA.

F. Federal Rules That May Duplicate, Overlap, or Conflict With the Proposed Rules

63. None.

V. Ordering Clauses

64. Accordingly, *it is ordered* that, pursuant to sections 4(i), 301, 302(a), 303(e), 303(f), and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. 154(i), 301, 302(a), 303(e), 303(f), and 303(r), the Notice of Proposed Rulemaking *is adopted*.

65. *It is further ordered* that, the Commission's Office of the Secretary, Reference Information Center *shall send* a copy of the Notice of Proposed Rulemaking, including the Initial Regulatory Flexibility Act Analysis, to the Chief Counsel for Advocacy of the Small Business Administration, and shall cause it to be published in the **Federal Register**.

List of Subjects in 47 CFR Part 25

Administrative practice and procedure, Earth stations, Satellites
Federal Communications Commission.
Marlene Dortch,
Secretary.

Proposed Rules

For the reasons discussed in the preamble, the Federal Communications Commission proposes to amend 47 CFR part 25 as follows:

PART 25—SATELLITE COMMUNICATIONS

■ 1. The authority citation for part 25 continues to read as follows:

Authority: 47 U.S.C. 154, 301, 302, 303, 307, 309, 310, 319, 332, 605, and 721, unless otherwise noted.

■ 2. Amend § 25.103 by adding the definition of "ISAM Space station" in alphabetical order to read as follows:

§ 25.103 Definitions.

* * * * *

ISAM Space station. A space station which has the primary purpose of conducting in-space servicing, assembly, and/or manufacturing activities used on-orbit, on the surface

of celestial bodies, and/or in transit between these regimes and which are supported by radiofrequency operations. Servicing activities include but are not limited to in-space inspection, life extension, repair, refueling, alteration, and orbital transfer of a client space object, including collection and removal of debris on orbit. Assembly activities involve the construction of space systems in space using pre-manufactured components. Manufacturing activities involve the transformation of raw or recycled materials into components, products, or infrastructure in space. ISAM space stations are eligible for authorization under the application process described in § 25.126.

* * * * *

■ 3. Add § 25.126 to read as follows:

§ 25.126 Applications for ISAM Space stations.

(a) This section shall only apply to applicants for ISAM space stations as defined in § 25.103. Applicants seeking authorization for ISAM space stations must submit a comprehensive proposal for Commission evaluation on FCC Form 312, Main Form and Schedule S, as described in § 25.114(a) through (c), together with the information required in § 25.114(d)(14) or, if the applicant is seeking authorization under the streamlined processes for small satellites or small spacecraft, the information required in § 25.122(c) and (d) or § 25.123(b) and (c).

(b) Applicants for ISAM space stations will not be placed in a processing round for NGSO-like operations under § 25.157 or placed in a queue for GSO-like operations under § 25.158, provided:

(1) The applicant certifies that operations of the space station(s) will be compatible with existing operations in the authorized frequency band(s) and will not materially constrain future space station entrants from using the authorized frequency band(s); and

(2) The applicant submits a narrative description of means by which requested spectrum could be shared with both current and future operators, (e.g., how ephemeris data will be shared, antenna design, earth station geographic locations) thereby not materially constraining other operations in the requested frequency band(s).

(c) Applicants for ISAM space stations must also provide the following:

(1) A list of the FCC file numbers or call signs for any applications or Commission grants related to the proposed operations (e.g., experimental license grants, other space station or earth station applications or grants), including but not limited to client space stations, space stations that have become debris the applicant seeks to remediate, and other space stations the applicant plans to interact with or collaborate with as part of its operations.

(2) A list of the International Telecommunications Union filings and United Nations Registration information for any space stations not licensed or granted market access by the United States that are related to the proposed operations, including but not limited to client space stations, space stations that have become debris the applicant seeks to remediate, and other space stations the applicant plans to interact with or collaborate with as part of its operations.

(3) For all related space stations included under paragraph (c)(2) of this section, a narrative description of the regulatory requirements to which these related space stations are subject and the status of licenses of these related space stations.

* * * * *

■ 4. Amend § 25.137 by revising paragraph (b) to read as follows:

§ 25.137 Requests for U.S. market access through non-U.S.-licensed space stations.

* * * * *

(b) Any request pursuant to paragraph (a) of this section must be filed electronically through the International Communications Filing System and must include an exhibit providing legal and technical information for the non-U.S.-licensed space station of the kind that §§ 25.114, 25.122, 25.123 or § 25.126 would require in a license application for that space station, including but not limited to, information required to complete Schedule S. An applicant may satisfy this requirement by cross-referencing a pending application containing the requisite information or by citing a prior grant of authority to communicate via the space station in question in the same frequency bands to provide the same type of service.

* * * * *

■ 5. Amend § 25.157 by revising paragraph (i) to read as follows:

§ 25.157 Consideration of applications for NGSO-like satellite operation.

* * * * *

(i) For consideration of license applications filed pursuant to the procedures described in §§ 25.122, 25.123, or § 25.126 the application will be processed and granted in accordance with §§ 25.150 through 25.156, taking into consideration the information provided by the applicant under §§ 25.122(d), 25.123(c), or § 25.126(b) but without a processing round as described in this section and without a queue as described in § 25.158.

■ 6. Amend § 25.158, by revising paragraph (a)(2) to read as follows:

§ 25.158 Consideration of applications for GSO-like satellite operation.

(a) * * *

(2) The procedures prescribed in this section do not apply to an application for authority to launch and operate an ISAM space station that meets the relevant criteria in § 25.126(b). The procedures prescribed in this section also do not apply to an application for authority to launch and operate a replacement space station that meets the relevant criteria in § 25.165(e)(1) and (e)(2) and that will be launched before the space station to be replaced is retired from service or reasonable time after the loss of a space station during launch or due to premature failure in orbit.

* * * * *

■ 7. Amend § 25.165 by revising the introductory text of paragraph (a) to read as follows:

§ 25.165 Surety bonds.

(a) For all space station licenses issued after September 20, 2004, other than licenses for SDARS space stations, space stations licensed in accordance with §§ 25.122, 25.123, or § 25.126, and replacement space stations as defined in paragraph (e) of this section, the licensee must post a bond within 30 days of the grant of its license. Space stations licensed in accordance with §§ 25.122, 25.123, or § 25.126 must post a bond within one year plus 30 days of the grant of the license. Failure to post a bond will render the license null and void automatically.

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