

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter of)

STREAMLINING LICENSING PROCEDURES)
FOR SMALL SATELLITES)

IB Docket No. 18-86

COMMENTS OF SPACE EXPLORATION TECHNOLOGIES CORP.

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SUMMARY

Space Exploration Technologies Corp. (“SpaceX”) recognizes the important role that a new class of small non-geostationary orbit satellites (“smallsats”) can play in developing new technologies and providing niche services, as well as the growth in prominence of such missions in the space sector. Accordingly, SpaceX supports the Commission’s efforts to lower the regulatory burden involved in licensing and reduce application processing times in order to better tailor its processes to the unique needs of and issues presented by smallsats.

However, the Commission must ensure that none of the changes proposed would jeopardize safe space operations for other systems or interfere with critical links among communications satellites. The objective of this proceeding should be to find an appropriate balance in fostering the good that smallsats can do in research, development, and innovation with safeguarding space and spectrum usage by all those who seek to provide services to the public. As a leading provider of launch services, licensee of a low-Earth orbit satellite system, and operator of spacecraft (soon to be manned) – all of which involve operations in the areas of space used by smallsats – SpaceX offers its unique set of perspectives in its comments on this proceeding.

As the Commission recognizes, in order to place appropriate limits on streamlined processing rules, it must identify a distinct group of applicants for whom applying certain standard satellite-related procedures in Part 25 of the Commission’s rules would not serve the public interest. The Commission’s proposals to limit streamlined processing based on license term, trackability, system size, deployment orbit and maneuverability, and frequencies are a good start, but require a few enhancements to ensure that they adequately define an appropriate class for streamlined consideration. In addition, SpaceX suggests an additional criterion that the Commission should add to its identifier list: spectral efficiency. Smallsat applicants that satisfy

all of these requirements would thereby demonstrate that streamlined processing would be more appropriate than standard processing under existing Part 25 rules.

SpaceX also urges the Commission to take this opportunity to remind smallsat operators and their agents that they bear the responsibility to ensure that appropriate licensing has been granted prior to launch and to provide accurate information to launch providers. Third parties often broker launch arrangements on behalf of multiple smallsat customers, providing an efficient and cost-effective way for those customers to gain access to space. Launch providers must be able to rely upon the representations of aggregators as to the licensing status of their customers, as it would be logistically impractical to independently verify that status for tens or hundreds of smallsats that can be launched at the same time. By reiterating the lines of responsibility, the Commission will provide clarity and thereby support continued use of efficient third-party launch arrangements.

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COMMENTS OF SPACE EXPLORATION TECHNOLOGIES CORP.

Space Exploration Technologies Corp. (“SpaceX”) hereby comments on the Notice of Proposed Rulemaking (“*NPRM*”)¹ in which the Commission has proposed revisions to its rules to facilitate deployment of a new class of small non-geostationary orbit satellites (“smallsats”). SpaceX recognizes the important role that smallsats can play in developing new technologies and providing niche services, as well as the growth in prominence of such missions in the space sector. Accordingly, SpaceX supports the Commission’s conclusion that it should lower the regulatory burden involved in licensing and reduce application processing times in order to better tailor its processes to the unique needs of and issues presented by smallsats.

However, the Commission must also ensure that none of the changes proposed would jeopardize safe space operations for other systems or interfere with critical links with communications satellites. The objective of this proceeding should be to find an appropriate balance in fostering the good that smallsats can do in research, development, and innovation with safeguarding space and spectrum usage by all those who seek to provide services to the public. The Commission should take this opportunity to put rules in place that incentivize smallsat

¹ *Streamlining Licensing Procedures for Small Satellites*, FCC 18-44 (rel. Apr. 17, 2018) (“*NPRM*”).

operators to be efficient in their spectrum use and to apply advanced technologies that enable spectrum sharing. Doing so will have the salutary effect of ensuring that smallsat operators make intensive use of valuable public orbital and spectrum resources for the benefit of the American public.

SpaceX offers a unique set of perspectives on this proceeding. First, as a leading provider of launch services, SpaceX rockets launch satellites for a wide variety of customers, including commercial, government, and smallsat operators. SpaceX launch vehicles frequently carry smallsat payloads to the low-Earth orbit (“LEO”) altitudes at which many smallsats operate. Second, SpaceX currently operates the Dragon spacecraft that regularly transports cargo and supplies to the International Space Station (“ISS”) under NASA’s Commercial Resupply Services program. SpaceX will soon conduct manned spaceflight to the ISS and beyond. Finally, as a licensee of a constellation of non-geostationary orbit (“NGSO”) satellites operating at LEO and an NGSO applicant at even lower “very LEO” altitudes, SpaceX is acutely aware of the obligations of LEO operators to avoid collisions and otherwise minimize creation of orbital debris to safeguard this critical swath of space. These comments reflect all facets of SpaceX’s space-based businesses and its desire to find an appropriate balance between regulatory flexibility, experimentation and innovation, and operational safety.

I. THE COMMISSION MUST CAREFULLY DEFINE THE CHARACTERISTICS OF A SATELLITE OR SYSTEM QUALIFYING FOR STREAMLINED PROCESSING

In this proceeding, the Commission proposes to create a streamlined processing regime tailored specifically to small NGSO satellites and systems. SpaceX agrees that, in order to place appropriate limits on such processing rules, the Commission must identify a distinct group of applicants where applying to their operations certain standard satellite-related procedures in Part 25 of the Commission’s rules would not be in the public interest. Unfortunately, at present, there

is no widely accepted definition of smallsats upon which to rely.² Accordingly, the Commission has proposed certain characteristics that an applicant's system would have to meet in order to qualify for such processing. As discussed below, the Commission's proposals are a good start, but require a few enhancements to ensure that they adequately define an appropriate class for streamlined consideration.

More specificity about what constitutes a smallsat can provide several benefits. First, detailed requirements can help guide smallsat applicants, who frequently are less experienced with regulatory processes. Ambiguity may make it harder for those applicants to innovate. Second, more precise technical requirements can help other operators better identify and negotiate the growing number of smallsats which are unable to maneuver on their own.

In some respects, the Commission does suggest applying the proposed streamlined processing based on specific characteristics of a satellite system. For example, such processing would be available only for satellites with a mass of no more than 180 kg.³ However, in other respects, the Commission's criteria are significantly less rigorous. For example, while the Commission "anticipates" that the amount of spectrum used by any particular smallsat will be small (generally no more than a few megahertz and in some cases only a few tens-of-kilohertz) and that radiofrequency output power will be low,⁴ it has not proposed to codify those expectations into its new rules. In order to ensure that these expectations are met, the Commission should consider specifying bandwidth and power limits for systems seeking streamlined consideration to correspond with those expectations.

² See *id.* ¶ 2 (discussing various definitions).

³ See *id.* ¶ 28.

⁴ See *id.* ¶ 58.

Below we discuss the Commission's proposals to limit streamlined processing based on license term, trackability, system size, deployment orbit and maneuverability, and frequencies. In addition, SpaceX suggests an additional criterion that the Commission should add to its identifier list: spectral efficiency. Smallsat applicants that satisfy all of these requirements would thereby demonstrate that streamlined processing would be more appropriate than standard processing under existing Part 25 rules.

A. License Term

The Commission proposes to limit streamlined processing to satellites and systems with a total planned on-orbit lifetime of five years or less (including the time it takes for the satellite(s) to de-orbit).⁵ Relatedly, it also proposes to issue smallsat licenses with five-year terms and no expectation for satellite replacement or possibility of license extension.⁶ Generally speaking, SpaceX supports the Commission's conclusion that a five-year license term should be more than sufficient to cover the typical duration of a smallsat mission, including de-orbit. However, it may not be appropriate in all cases. There should be some correlation between mission length and the period required to complete de-orbit. For example, it would be appropriate to allow a smallsat with a mission life of four years to complete atmospheric reentry within a year after completing that mission, for a total license term of five years. However, there is no reason why a smallsat with a six month mission life should be allowed to continue in a decaying orbit for up to another

⁵ See *id.* ¶ 32.

⁶ See *id.* ¶¶ 29-30.

four and a half years. The added collision and orbital debris risk created during that extended post-mission period would likely outweigh the benefit of a shorter-term mission period.

SpaceX submits that the Commission should take a more nuanced approach in determining the appropriate term for a smallsat license. It should, for example, establish five years as an upper bound rather than a default license term, adopting a formula that would relate the duration of a smallsat's mission to the length of time it is authorized to operate through complete de-orbit. The Commission could adopt a policy of granting a license term that is three times the period proposed for operations or five years, whichever is smaller – *e.g.*, a smallsat with a six-month mission would have a total of eighteen months in which to complete that mission and complete atmospheric re-entry and demise. Such an approach would ensure that the developmental, research, and scientific benefits achieved through smallsat operations better correlate with the orbital debris burdens they create for other operators in space and provide an incentive for smallsat operators to invest in efficient de-orbit capabilities.

No matter how the Commission ultimately decides to set the term of smallsat licenses, it must also ensure that the licensee is capable of exerting operational control during the entire duration of that license. For example, oversight cannot cease just because the particular university class that sponsored the smallsat concludes at the end of a given semester. The Commission should make clear that a smallsat licensee remains responsible for its spacecraft through atmospheric demise, and therefore must make appropriate arrangements for ongoing controls and monitoring throughout the entire period covered by its authorization.

B. Trackability

The Commission has long recognized that mitigating orbital debris is a critical public interest objective.

Because orbital debris could affect the cost, reliability, continuity, and safety of satellite operations, orbital debris issues have a bearing upon the “larger and more effective use of radio in the public interest.” In addition, orbital debris can negatively affect the availability, integrity, and capability of new satellite systems and valuable services to the public. Thus, orbital debris and related mitigation issues are relevant in determining whether the public interest would be served by authorization of any particular satellite system, or by any particular practice or operating procedure of satellite systems.⁷

Smallsats that lack maneuvering capability pose many of the same operational concerns as simple debris in orbit, since other satellite operators must bear the burden of avoiding potential collisions with these objects in space. Moreover, such smallsats effectively become orbital debris after their brief operational lifetime has expired if they continue in uncontrolled orbits with no communications. Accordingly, the Commission has, for example, denied authorization for smallsats that are smaller than 10 cm in one of their three dimensions, which fall below the minimum size that the Space Surveillance Network can reliably track.⁸ Without such tracking, other operators lack the information they need to determine when a conjunction is likely to occur and to take appropriate action to avoid it.

In light of these facts, SpaceX supports the Commission’s proposal to limit streamlined processing to smallsats that are at least 10 cm x 10 cm x 10 cm and include a unique telemetry marker that allows the object to be readily distinguished from other satellites or space objects.⁹

⁷ *Mitigation of Orbital Debris*, 19 FCC Rcd. 11567, ¶ 14 (2004).

⁸ *See, e.g.*, Letter from Anthony Serafini to Sara Spangelo, ELS File No. 0305-EX-CN-2017 (Dec. 12, 2017) (declining to grant experimental authorization). *See also* Space-track.org, Documentation – Frequently Asked Questions (“10 centimeter diameter or ‘softball size’ is the typical minimum size object that current sensors can track”), available at <https://www.spacetrack.org/documentation#faq>.

⁹ *See NPRM* ¶ 38.

The Commission should also require that this telemetry marker utilize one or more frequency bands that are commonly in use by international tracking networks. Such measures will ensure that only smallsats with sufficient trackability in space will qualify for expedited consideration. These requirements will serve the public interest by enhancing the safety of space for all operators.

C. System Size

The Commission proposes to license no more than ten satellites under a single smallsat authorization – a number consistent with the Commission’s experience to date with smallsat systems.¹⁰ SpaceX agrees that this would be an appropriate way to identify a group of applicants whose operations are limited enough in scope that it would not serve the public interest to apply certain of the more complex standard Part 25 procedures. In order to ensure that no party is able to circumvent this limitation, the Commission should adopt limits on the number of applications that can be filed under the proposed streamlined process by an individual smallsat operator or its affiliates.¹¹

Fortunately, there is an existing rule that serves just this purpose. Section 25.159(b) of the Commission’s rules prohibits a party from applying for an NGSO satellite system authorization if that party has a pending application for or an authorized-but-unbuilt NGSO system involving the same frequency band.¹² When the Commission adopted this rule, it also adopted rules that would extend the prohibition to cover those parties that hold an attributable interest in another entity to ensure that no one “could evade the limit simply through corporate restructuring.”¹³ Applying this

¹⁰ See *id.* ¶ 27.

¹¹ See *id.*

¹² See 47 C.F.R. § 25.159(b). Section 25.137(d)(5) applies a similar limitation upon those applying for authority to access the U.S. market. Because the *NPRM* focuses on licensing of Commission-authorized satellites, we refer only to the former rule – though the latter would be relevant to a smallsat seeking market access.

¹³ See *Amendment of the Commission’s Space Station Licensing Rules and Policies*, 18 FCC Rcd. 10760, ¶ 236 (2003) (“2003 Licensing Reform Order”).

rule to smallsat applicants would ensure that no party could file a series of applications to create a substantial NGSO constellation in ten-satellite increments, and thereby extend the streamlined processing rules well beyond their intended scope.

The Commission's proposal would exempt smallsats from the limitation in Section 25.159, however.¹⁴ It is based on the tentative conclusion that smallsats would not preclude other NGSO systems from operating in a given frequency band.¹⁵ Even if this were the case, that conclusion does not consider the orbital debris implications of a large NGSO system cobbled together from a string of smallsat authorizations. More importantly, it does not address the imperative for a limiting principle to ensure that the streamlined processing rules will be available only to smallsat applicants who propose operations on a scale intended by the Commission.

Rather than attempt to craft an entirely new rule, the Commission should continue to rely upon Section 25.159 to limit smallsat applications to an appropriate scope and prevent abuse of the streamlined processing rules. This rule has served the Commission and the satellite industry well for fifteen years in preventing misuse in processing rounds and similar proceedings, and that familiarity – including the association of attribution rules – should help avoid any uncertainty that could arise from an entirely new rule.

D. Deployment Orbit and Maneuverability

Smallsats deployed in large numbers have the potential to impact the operations of other systems operating in LEO space, including the ISS. In order to address these risks, the Commission has proposed three options with respect to operational altitude for authorizing small satellites under the streamlined process: (1) any smallsat may be deployed at altitudes below the

¹⁴ See *NPRM* ¶ 46.

¹⁵ *Id.*

ISS; (2) any smallsat may be deployed from the ISS, or from a vehicle docked at the ISS;¹⁶ and (3) a smallsat may deploy at altitudes above the ISS if the operator certifies that the satellite(s) have sufficient propulsion capabilities to perform collision avoidance maneuvers and de-orbit within the designated license term.¹⁷ This last requirement is based on the tentative conclusion that satellites with more limited maneuvering capabilities, such as those relying primarily on atmospheric drag, would likely require closer Commission review to ensure a safe operating environment for the ISS. In addition, in the event that any other manned spacecraft are located at altitudes below where an applicant intends to operate a smallsat, the applicant would have to describe in narrative form the design and operational strategies it will use to avoid collision with such manned spacecraft.¹⁸

SpaceX shares the Commission's concern that smallsats lacking the ability to maneuver to avoid collisions present a potential danger to other satellite systems and orbiting platforms. Limiting access to streamlined license processing to those smallsats that are launched at or below the altitude of the ISS (or any other manned spacecraft) will go a long way toward safeguarding such platforms and NGSO satellite systems that operate at higher altitudes. However, there are other space operations that must also be considered.

For example, two operators have previously launched and operated NGSO systems at altitudes below the ISS.¹⁹ In addition, as the Commission knows, SpaceX intends to operate an NGSO satellite constellation that includes a very-low-Earth orbit ("VLEO") component,

¹⁶ See *id.* ¶ 33.

¹⁷ See *id.* ¶ 34.

¹⁸ *Id.* ¶ 33.

¹⁹ See, e.g., Letter from Jonathan Rosenblatt to Marlene H. Dortch, IBFS File No. SAT-LOA-20151123-00078 (Mar. 7, 2017) (confirming launch of 28 satellites as part of several cargo supply missions to the ISS); Stamp Grant, IBFS File No. SAT-LOA-20130626-00087 (Dec. 3, 2013) (authorizing operation of NGSO satellites at altitudes between 200 and 410 km).

consisting of more than 7,500 satellites operating at altitudes below the ISS (from 335 km to 346 km).²⁰ For these systems, many non-propulsive smallsats in decaying orbits could present a significant space safety concern. From a launch perspective, a large number of such non-maneuverable smallsats complicate the deployment of any spacecraft that transits through the sub-ISS altitudes. This includes not only payloads destined for mid-Earth orbit or geostationary orbit, but also scientific, military, and governmental satellites that undertake orbit-raising during a LEO mission. This would also include manned missions transiting through this area of space, such as SpaceX's next-generation Crew Dragon capsule that will carry astronauts to the ISS and human passengers to other destinations.²¹ Moreover, there is growing interest in and development toward space tourism activities that will include other operators building spacecraft that will carry passengers into orbit, and even beyond.²²

A steady rain of uncontrolled de-orbiting smallsats would also present a significant collision concern for all of these spacecraft during operations below the altitude of the ISS. Accordingly, the Commission cannot overlook the potential danger presented by smallsats operating at such altitudes with limited maneuvering capabilities. To address this issue, the Commission could require that in order to qualify for streamlined consideration, a smallsat applicant must certify that its satellite(s) have sufficient propulsion capabilities to perform collision avoidance maneuvers – regardless of their deployment altitude. Applicants who cannot make such a certification would be free to pursue licensing under existing rules and procedures.

²⁰ See Application, IBFS File No. SAT-LOA-20170301-00027 (Mar. 1, 2017).

²¹ Information on the Crew Dragon can be found at <http://www.spacex.com/crew-dragon>.

²² See, e.g., Space Policy Directive – 3, National Space Traffic Management Policy (June 18, 2018) (noting significance of “[e]merging commercial ventures such as satellite servicing, debris removal, in-space manufacturing, and tourism, as well as new technologies enabling small satellites and very large constellations of satellites”), available at <https://www.whitehouse.gov/presidential-actions/space-policy-directive-3-national-space-traffic-management-policy/>.

E. Frequencies

The Commission proposes to consider qualifying smallsat applications without using the processing round procedures applicable to other NGSO systems.²³ This exemption would be made possible by the requirement that smallsat applicants certify that their systems will not interfere with existing operations or unreasonably preclude future operators from using the same frequency band. By contrast, as the Commission recognizes, the complexities of typical NGSO FSS, MSS, or other operations requiring full-time uninterrupted availability of assigned spectrum yield limited or nonexistent ability to share spectrum with all existing and future operations. For example, the ongoing Ku/Ka-band NGSO processing round involved a dozen applicants, all of whom propose to provide full-time broadband services.²⁴ Systems authorized in this round will have to either reach coordination agreements or resort to a default band segmentation mechanism – a significant challenge given the number of systems and their collective desire to use scarce spectrum resources.²⁵ Accordingly, SpaceX supports the Commission’s conclusion that the required indicia of sharing would not be present in bands used by larger NGSO satellites and satellite systems, which are more appropriately addressed for authorization under existing Part 25 procedures – including processing rounds.²⁶

In this regard, the Commission also seeks comment on whether the proposed streamlined process should be limited to specific frequency bands, should be presumptively available in certain bands, or should be available in any band on a case-by-case basis.²⁷ In order to give smallsat

²³ See *NPRM* ¶ 43.

²⁴ See Applications Accepted for Filing, 32 FCC Rcd. 4180 (IB 2017).

²⁵ See 47 C.F.R. § 25.261.

²⁶ See *NPRM* ¶ 45.

²⁷ See *id.* ¶ 57.

applicants both guidance and flexibility, the Commission should publish a non-exclusive list of frequencies available for smallsat use in Section 25.202. Applicants would then know that certain bands – such as the MSS bands discussed in the *NPRM*²⁸ – could be included in a streamlined smallsat application, but would also be able to seek access to other bands if they could make an appropriate showing. However, recognizing the complex spectrum sharing issues raised by smallsat operations in certain bands, the Commission should also maintain a list on its website of frequencies that have been or are currently the subject of an NGSO processing round involving systems that require full-time uninterrupted availability of assigned spectrum and are therefore not suitable for streamlined processing of smallsat applications. Thus, for example, the Ku-, Ka-, and V-band frequencies at issue in the three currently ongoing NGSO processing rounds²⁹ would be listed as unavailable for use by smallsats under the proposed streamlined procedure.

The Commission has also tentatively concluded that it should develop an allocation for MSS space-to-space operations in the frequency bands that have been used for communications with the Globalstar and Iridium systems, which would allow smallsats to relay signals to MSS operators for transmission to and from Earth, reducing frequency congestion and obviating the need for building out terrestrial infrastructure.³⁰ SpaceX takes no position on that conclusion, but does *not* support the use of FSS frequency bands for similar inter-satellite communications. FSS spectrum is already heavily subscribed, both by established GSO systems and by the emerging generation of NGSO constellations that promise to bring an even higher level of broadband services to all Americans. Authorizing an ever-changing assortment of smallsats to operate inter-

²⁸ See *id.* ¶¶ 63-69.

²⁹ The relevant bands are 10.7-12.7 GHz, 12.75-13.25 GHz, 13.85-14.0 GHz, 14.0-14.5 GHz, 17.8-18.6 GHz, 18.6-18.8 GHz, 18.8-19.3 GHz, 19.3-20.2 GHz, 27.5-28.35 GHz, 28.35-29.1 GHz, 29.1-29.5, 29.5-30.0 GHz, 37.5-40.0 GHz, 40.0-42.0 GHz, 47.2-50.2 GHz, and 50.4-51.4 GHz.

³⁰ See *NPRM* ¶ 72.

satellite links using FSS spectrum would further complicate the already challenging coordination environment for NGSO operators with GSO and other NGSO systems.

F. Spectral Efficiency

SpaceX recommends that the Commission consider an additional criterion for smallsat applicants seeking streamlined licensing treatment: efficiency of spectrum use.³¹ The Commission has long recognized the general principle that “[m]echanisms to ensure spectrum efficiency are a high regulatory priority.”³² It has found that, “[b]ecause the radio spectrum is a limited resource, as a general principle, all Commission licensees should use spectrum in the most efficient manner possible. This is particularly true where different services share the same radio spectrum resource and inefficient use by one service could foreclose or severely limit use by another service.”³³ Applying this policy, the Commission consistently pays special attention to spectral efficiency when considering new rules, license applications, and other regulatory decisions. For example, in 2003, while noting that “new satellites are capable of generating multiple narrow-beam spot beams” and that “such space stations reuse frequencies in spatially independent beams rather than by using orthogonally polarized signals within a single beam,” the

³¹ See *id.* ¶ 26 (seeking comment on other criteria not considered in the *NPRM* that should be met by smallsats applying under the streamlined process).

³² *A Re-Examination of Tech. Regulations*, 99 F.C.C.2d 903, ¶ 27 (1984).

³³ *FWCC Request for Declaratory Ruling on Partial-Band Licensing of Earth Stations*, 15 FCC Rcd. 23127, ¶ 26 (2000). See also *Spectrum Policy Task Force Seeks Public Comment on Issues Related to Commission's Spectrum Policies*, 17 FCC Rcd. 10560, ¶ 16 (2002) (“Due to the ever increasing spectrum demand, increased spectral efficiency will be needed to accommodate future growth. To this end, it is important that spectrum policies create positive incentives to make ‘efficient’ use of the spectrum resource and to continue the development of spectrally efficient technologies.”).

Commission revised its frequency reuse rules to account for such beams in order to “encourage deployment of new, technologically innovative spot-beam satellites.”³⁴

This approach is a necessary response to the finite and highly valuable nature of spectrum, but it is also compelled by the Communications Act itself. As the Commission has observed, considering an application “without regard to the efficiency of the applicant's proposed use of the spectrum, has the potential to produce anomalous results that would seem to contravene the original statutory mandate of section 307(b) ‘to provide a fair, efficient, and equitable distribution of radio service.’”³⁵ Similarly, the Commission has held that the public interest, the lodestar of all Commission decision-making, is best served “by making efficient use of finite spectrum and orbital resources.”³⁶

As seen in some of the applications submitted in the ongoing NGSO processing rounds, a new generation of satellite technology is emerging that will increase on-orbit flexibility to share spectrum among satellite systems and to adapt operations to evolving mission parameters or rapidly changing customer demands. Satellite operators continue to explore innovative approaches to operating more flexibly and using spectrum more efficiently. Phased array antennas and adaptive beam-forming strategies allow satellites to target narrow coverage areas more precisely and reuse spectrum many times over to maximize throughput. More powerful computing and software capabilities enable operators to allocate resources in real time, so that capacity can be placed where it is most needed and energy can be directed away from areas where it might cause interference to other spectrum users.

³⁴ 2003 Licensing Reform Order, ¶ 262.

³⁵ *Applications of Faye & Richard Tuck, Inc., et al.*, 3 FCC Rcd. 5374, ¶ 4 (1988).

³⁶ *Amendment of Part 25 of the Commission's Rules to Establish Rules & Policies Pertaining to the Second Processing Round of the Non-Voice, Non-Geostationary Mobile Satellite Serv.*, 13 FCC Rcd. 9111, ¶ 136 (1997).

The Commission proposes to require smallsat applicants to certify that they will not unreasonably preclude future operators from utilizing their assigned frequency band(s), and to provide a brief narrative description illustrating the methods by which future operators will not be unreasonably precluded.³⁷ Some of the examples of such methods listed in the *NPRM*, such as limiting smallsat operations to certain times throughout the day or to certain defined geographic locations, do not require advanced technology. However, such strategies would significantly hamper another satellite system that sought to operate at the same times or in the same locations. By contrast, deployment of satellite technologies that use spectrum efficiently and flexibly would better facilitate a wide range of sharing options with other systems. The Commission should encourage smallsat operators to incorporate such technologies by giving applicants proposing more spectrally-efficient systems more expedited consideration under the streamlined process.

II. THE COMMISSION SHOULD MAKE CLEAR THAT SMALLSAT OPERATORS AND THEIR AGENTS BEAR THE BURDEN OF ENSURING PROPER LICENSING PRIOR TO LAUNCH

The Commission has recently reminded all satellite system operators of the need to obtain authorization for space station operations prior to their launch.³⁸ The streamlined processing proposals in this proceeding should significantly facilitate and expedite the authorization process for qualifying smallsat applicants. As a result, it should be easier for smallsat operators planning to operate under U.S. authority to secure appropriate licenses well in advance of anticipated launch dates, and thereby avoid any regulatory risk of launch delay or unauthorized launch.

Yet it is increasingly the case that launch providers do not deal directly with smallsat operators. Rather, third parties – such as smallsat aggregators, rideshare coordinators, and satellite

³⁷ See *NPRM* ¶ 43.

³⁸ See FCC Enforcement Advisory, “Compliance with Satellite Communications Licensing Requirements Is Mandatory and Failure to Comply Can Result in Enforcement Action,” DA 18-368 (EB/IB/OET/WTB, Apr. 12, 2018).

integrators – often broker launch arrangements on behalf of multiple smallsat customers for a single launch. This is an efficient arrangement for smallsat operators, who may not have the funding or experience to arrange for a launch on their own. In some cases, smallsats may be attached directly to the launch vehicle or integrated into a third party’s deployment device or dispenser, which itself may require authorization.³⁹ In many scenarios, smallsats that have been aggregated into a single launch may be authorized by several different administrations, all with distinct licensing regimes and regulatory requirements, with varying degrees of transparency. Where a third party intermediary is involved, the launch provider depends upon the third party aggregator for information on the spacecraft to be launched. The Commission has properly assigned responsibility to these third party aggregators to both guide smallsat clients in seeking the appropriate regulatory approvals from the relevant regulatory authorities (whether through one of the U.S.-based agencies or overseas), and also to ensure that appropriate licensing has been granted prior to launch.

As a launch service provider, SpaceX’s launch services contracts with smallsat aggregators require that the aggregator customer flow down the requirement that all of the smallsat payloads subject to that contract have secured all relevant licenses, including for launch and operations in space. In the absence of the necessary licensing approvals for a given smallsat payload, SpaceX maintains the contractual right to remove a satellite from its launch vehicle prior to launch. SpaceX must be able to rely upon such assurances from smallsat aggregators, as it would be logistically impractical for SpaceX to independently verify the licensing status of the tens or hundreds of smallsats that can be launched at the same time, especially in cases where SpaceX does not have

³⁹ See, e.g., IBFS File No. SAT-STA-20180523-00042 (application by Spaceflight, Inc. for authority to deploy two non-propulsive, free-flying spacecraft intended to deploy auxiliary spacecraft after each spacecraft has been itself deployed by the launch vehicle).

a direct relationship with the smallsat operators. Otherwise, launch providers may have to limit the availability of rideshare opportunities and other arrangements negotiated through aggregators, which could stifle the development of smallsats by effectively denying them access to space. The Commission should make clear that smallsat operators and their agents bear the responsibility for securing all necessary licenses prior to launch, and for providing accurate information to launch providers as to the status of such licenses, so that these efficient and cost-effective relationships can continue.

Respectfully submitted,

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