

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

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In the Matter of)	
)	
Streamlining Licensing Procedures)	IB Docket No. 18-86
for Small Satellites)	
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COMMENTS OF THE COMMERCIAL SPACEFLIGHT FEDERATION

The Commercial Spaceflight Federation (“CSF”) comments in response to the Commission's Notice of Proposed Rulemaking (“Small Sat NPRM”) in the above referenced proceeding. CSF supports the Commission’s allowance of a Part 25 streamlined licensing process for non-geostationary orbit satellite or “small satellite” (small sat) market access applicants. We also support the conclusion that the existing part 25 licensing process is an excessive burden to many small satellites and that application processing times should be reduced to facilitate small satellite’s unique requirements while ensuring a safe space environment. While this proposed procedure will help to initiate licensing processes, CSF recommends a few additional criteria to augment the Commission’s proposal and encourages the Commission to consider in the proposed license regime a path to accommodate commercial companies potential growth.¹

¹ See *Small Sat NPRM*, ¶ 23-24.

Increased Clarity

Throughout the NPRM, the terminology “small satellites” is utilized. If size is the only criteria considered than this designation is good. If there will be additional criteria, that should be reflected in the name. Even though this increases the length of the title, it increases clarity and will lead to greater ease and understanding.

CSF is supportive of the efforts to streamline the licensing process overall and applaud the current efforts of the FCC. There are areas that can be changed and updated within the licensing process that will result in increased efficiency on both the side of the government and industry. As currently written, it seems that all commercial satellites may be pushed through the updated Part 25 (where some are currently addressed in Part 5). In this area, clarity should be increased to make it apparent to commercial entities where they will now fall. We are also concerned that all commercial satellites will be prevented from utilizing Part 5 when appropriate and that will be addressed at a later point.

Ensuring a Steady Environment for Experimental Spacecraft

While streamlining processes can often make licensing simpler, the vast array of science and technology within the industry shows that one size does not fit all. Paragraph 17 begins as follows:

“To date, the majority of non-governmental small satellite operations in the United States have been authorized through the experimental process under Part 5 of the Commission’s rules on a non-interference, unprotected basis and with limited license terms.”²

The next sentence then goes on to state that in many cases, interference protection is in fact needed. Although the previous statement says that operations have been authorized successfully without this, it offers no backup on why these increased requirements are necessary. In the interest of commercial endeavors in relation to small sats, rhetoric alluding to or stating the need for “interference protection” should be eliminated from the NPRM.

² See *Small Sat NPRM*, ¶17

In paragraph 21, the objective of the NPRM is stated as follows:

“to develop an alternative arrangement for authorizing small satellites that is more efficient for both applicants and the Commission and that better reflects the unique nature of small satellite deployment than the existing authorization regimes ”³

Although many of the suggested updates will work towards this objective, some commercial satellites, especially experimental or demo missions, will be better served to operate under Part 5. Pushing all commercial entities into part 25 in an attempt to streamline could hamper technological growth and innovation throughout the industry.

Applications Per Organization

We see no reason that is in the public interest for limiting the number of applications per organization. To do so might harm innovative companies with multiple satellite systems in development by excluding them concurrently. To address the concern of ‘gaming’ the proposed process; without a hard cap, there will be a natural barrier that would serve as a deterrent to splitting an application which might otherwise go through a regular Part 25 process under the proposed streamlined process. These deterrents include compounding fees and the burden of managing multiple applications. Commercial satellite programs will be looking to replenish decaying small satellites in order to continue their operations. The Commission should account for a transition process from an initial deployment of commercial small satellites to an ongoing and replenished full constellation. It is important to note that the majority of companies seeking their first launch typically only demonstrate 1-2 satellites, however, many have broader plans to launch batches of small satellites to constitute a constellation beginning within a few years of their first launch. Following initial deployment, commercial companies are still in a high-risk position until their constellation is deployed. These companies would benefit from the proposed new streamlined license regime. Companies would most likely not be able to switch to a regular Part 25 license for a long-term system authorization until their second or third phase of launch.⁴ We encourage the Commission to consider including a simple transition path from this new

³ See *Small Sat NPRM*, ¶21

⁴ See *Small Sat NPRM*, ¶ 27.

license regime to a regular Part 25 license when the operator is ready for long term operations, which may include a full constellation deployment and satellite replenishments.

Proposed Orbital Lifetime

We support the Commission's proposed 5-year on-orbit lifetime, however there should be provisions addressing potential orbit maintenance schemes and propulsion methods. We believe that the limit should remain at five years for the operational phase of the satellite and allow for an additional period thereafter for continued collision-avoidance and disposal methods other than the use of propulsion above a human-inhabited stations, as proposed in the NPRM. Therefore, the small sat may have five years of operation and up to five or more years of deorbit procedures. If the applicant chooses to use a design whereby the satellite will have a lifetime beyond five years, this streamlining process should allow for a transition to a regular part 25 license for a long-term authorization. The license term of a small sat should also depend on the operational capabilities of said small sat. The term should begin at the time of the satellite launch and deployment. If the term starts at the grant date of the license, applicants will be discouraged from filing as early as possible, shortening the available processing time. If this is not possible, there should be an extension process for the license term put in place to account for launch delays, failures, and any other event that would result in the need for an extension of license, especially for those events that are due to no fault of the operator such as launch delays. This should also include an extension process in the event of failure and need for replacement once entering the license term. The license term needs to be consistent with the operational lifespan of the satellite, allowing an additional period after decommissioning through a limited remaining orbital lifetime, such as 5 years either naturally or by some other form of de-orbit capability (i.e. propulsion, de-orbit service, or drag enhancement).⁵

⁵ See *Small Sat NPRM*, ¶ 28-29.

License Term

The current language assumes satellite constellations can be launched in a short, known period of time and doesn't consider the uncertainty around missions such as launch schedules. This is especially true in the world of small sats where larger payloads often drive mission schedules. There should be an option for extension to account for such scenarios and other delays.⁶

Size

Size, as measured by mass, is likely not the right metric. If the concern is about debris risk then cross-section surface area is what matters rather than mass.

Trackability

We disagree with the NPRM's requirement of the minimum dimension size of 10 cm x 10 cm x 10 cm for a small satellite. Previous satellites have been approved and shown to be trackable at smaller dimensions. We propose that the requirement should rather be adjusted so that it is required that companies indicate and prove that satellites are in fact trackable without dictating how they would meet that requirement.⁷

Casualty Risk

Regarding the NPRM's request for comment on this topic, with reference to their suggestion that all satellites must undergo a casualty risk assessment and that said assessment must result in a human casualty risk of zero.⁸ Given the reality of spacecrafts in general, the requirement of a casualty risk to be absolute and true zero is unfeasible and unattainable. Instead of true zero, risk assessments are normally just below a certain level where it is functionally equivalent or can be rounded to zero. We thus suggest that the NPRM's casualty risk assessment regulation should be specific (e. g. <0.0001) because true zero, as implied in the NPRM, is not realistic.

⁶ See *Small Sat NPRM*, ¶ 29-30.

⁷ See *Small Sat NPRM*, ¶38

⁸ See *Small Sat NPRM*, ¶39

Further, we do not see a reason for having this standard be different for small satellites than for other satellites. We recommend small satellites retain the same orbital debris standards as other satellites and that if those standards need to be updated, they are handled in a separate rulemaking that is applicable to all satellites.

Deployment Orbit and Maneuverability

We do not agree with the NPRM on their proposal stating that “Deployment of satellites lacking maneuvering capabilities above the ISS, to orbits from which they will eventually transit through the ISS altitude band, increase the likelihood that the ISS will need to conduct avoidance maneuvers, potentially disrupting ISS operations. For that reason, deployment of satellites without propulsion capabilities above the ISS may not be appropriate for streamlined consideration.”⁹ The propulsion requirement seems to be contrary to existing ISS and NASA approval of missions. Additionally, this will discourage commercial companies from launching from the United States and will push them to apply in other countries that do not have a propulsion requirement, taking away business from the U.S. commercial space economy.

Proposal on Bond Requirements

The NPRM specifically calls out special request for comment on the bond proposal found in paragraph 50 (“most NGSO licensees or recipients of market access must have on file a surety bond.”)¹⁰. We do not see a purpose in the requirements for a bond for small satellites given that spectrum rights are not established under the proposed licensing process and that the length of license is quite short. A bond is typically needed to insure long term satellites and protect their spectrum rights, therefore the suggestion from The Commission to include bond rights in this NPRM seems unnecessary.

In addition, we feel that due to the unnecessary nature of bonds to small satellites, that there is also no need to surrender licenses due to excessive launch delays.

⁹ See *Small Sat NPRM*, ¶ 33-34

¹⁰ See *Small Sat NPRM*, ¶50,53

Scope of Frequency Use

In response to The Commission's request for comment regarding specific frequency allotments, we believe that frequencies should not be specified ahead of time. CSF suggests that it would be better to outline frequency allotments beforehand and provide a guidance document rather than have it be a codified regulatory rule, as suggested in the NPRM.¹¹ This will aid the commercial sector by allowing for innovation and adoption of technology throughout the time in which the frequencies are being used.

Optical Communication and Bandwidth Requirements

We do not believe that optical links should be covered in this rule-making. It is tangential to the primary purpose of the rule and its complexity does not lend itself to being analyzed as a tack-on issue.¹² The context in which it is mentioned in the NPRM is in reference to optical links providing a means of small satellites having high data throughput without utilizing RF spectrum. While optical has many potential benefits, the technology is still young and its limitations, including high levels of atmospheric absorption and strict pointing requirements, means that many satellites will still be best served by RF. Therefore the potential availability of optical links should not restrict the RF spectrum afforded to small satellite missions.

Inter-Satellite Links

We believe that while the authorization of The Commission of space-to-space in select MSS bands is a good step, the benefits, as mentioned in the NPRM, could be further enhanced. They could do so if such links were also allowed in the typical bands of high-data applications, such as earth observation, in addition to The Commission's encouragement to relay operations using Iridium, Globalstar, and other systems to alleviate some of the difficulties faced by small satellite operators in identifying frequencies for Earth-to-space and space-to-Earth links, as well as their creation or search for ground station infrastructure.¹³ We propose that in order to enhance the links discussed above, the earth-exploration service allocation in X-band (8025-8400 MHz)

¹¹ See *Small Sat NPRM*, ¶57

¹² See *Small Sat NPRM*, ¶58

¹³ See *Small Sat NPRM*, ¶72

should match the EESS allocation in S-band (2200-2290 MHz) that allows for space-to-space, assuming that any potential for interference to X-band ground stations can be demonstrated.

Proposed Fee

We believe \$30,000 to be an appropriate application fee, as it is similar to the cost of a Part 25 ‘modification’ application. This low fee will most likely not be a barrier to aspiring commercial operators, however it is high enough to avoid frivolous applications. The Commission should stipulate whether or not demo satellites will continue to be able to use the less costly fee structure of the Part 5 experimental license rules. If this process is expected to replace the use of the experimental process by commercial satellite operators, then the \$30,000 fee would be too high and would most likely prohibit these operators from continuing to produce innovative programs. This new fee structure raises concern for the scientific and research community, therefore, it is important that further clarification is made for satellite operators who apply under Part 5 so that they may be fully aware of their advantage of being able to utilize this new streamlining procedure yet remain at their appropriate fee structure.¹⁴ This consideration is important to ensure the minimum fee does not halt production and innovation for both the industry and academic communities.

Applicability to Non-Traditional Missions, Including Beyond LEO

Commercial lunar missions or other non-Earth orbiting missions may face similar financial challenges and could greatly benefit from a streamlined licensing process. CSF strongly supports the idea of allowing companies planning missions to the Moon and beyond to take advantage of the proposed new streamlined licensing process for small satellites. Rules should account for cases when atmospheric re-entry is not an option. As such, missions typically have short lifespans and fairly low-power communications compared to traditional communications satellites and could benefit from a streamlined application process. For example, some lunar orbit missions may require more than five years to reach and complete its mission, therefore the lifespan limit has no bearing as fellow small sats will not be affected in such an orbit. If the non-

¹⁴ See *Small Sat NPRM*, ¶ 76-77.

Earth orbiting satellite meets the appropriate licensing criteria, we agree that the term should be related to the expected operational lifetime of the satellite.

The Commission may want to consider relaxing its proposed maximum mass requirement of 180 kg for missions and instead set limits based on orbit lifetime and orbital debris risk, thereby allowing the industry to innovate towards those limits at whatever mass meets their mission requirements. If the concern is about debris risk, then cross-section surface area is what should serve as a judgement of maximum size rather than mass. For the case of non-Earth orbiting satellites, if mass limits are considered, we support a higher mass limit since these spacecrafts will often have more mass than a typical LEO small sat (particularly true for those designed for lunar missions going to the surface). At the very least, clarification should be added regarding how the Commission will determine the mass of a spacecraft traveling beyond Earth orbit. Counting only the “dry mass” (without fuel) of a spacecraft going beyond Earth orbit would be helpful because, unlike most LEO small satellites, many potential commercial lunar spacecraft (for example, those from Moon Express) include built-in upper-stage engines to get the vehicle from Earth orbit to the final destination. Accordingly, they need to be heavier than a typical LEO small sat to survive a more rugged space environment. Raising the maximum mass requirement to 500 kg for spacecraft going beyond Earth orbit, or for all small satellites (mentioned as an alternative in the *Maximum Spacecraft Size* section of the NPRM)¹⁵ would also be helpful. As an alternative, the Commission should consider using a standard other than mass (such as length of mission or the power/type of communications device used) to determine whether missions beyond Earth orbit can qualify for the streamlined rule.

If the Commission does extend the use of the proposed streamlined process to missions beyond Earth orbit, it should consider using the term “spacecraft”, already defined in 47 CFR 25.103, or “small spacecraft” instead of or in addition to “small satellite” in its rules as many potential missions beyond Earth will intend to land on, or travel between, celestial bodies such as the Moon and Mars rather than orbit them.¹⁶

¹⁵ See *Small Sat NPRM*, ¶ 32

¹⁶ See *Small Sat NPRM*, ¶ 31-32.

In Conclusion

We applaud The Commissions effort in the recent NPRM and are thankful for this opportunity to provide comment. As the commercial space industry grows and flourishes it becomes a significantly larger part of our everyday life, especially in the case of small sats. It is thus of great importance that we craft legislation and regulation that allows for the most optimal use, launch, and de-orbit procedures. CSF therefore greatly appreciates The Commissions conclusion acknowledging the burden of the current FCC licensing regime as well as application processing times. In addition to this we greatly appreciate their commitment to fixing these issues, while maintaining a high level of safety standards, with an evolved FCC Licensing procedure.

If any further comment or clarification is desired, we would be happy assist in any way possible.