

1919 M STREET NW SUITE 800 WASHINGTON DC 20036

TEL +1 202 730 1300 FAX +1 202 730 1301 HWGLAW.COM

ATTORNEYS AT LAW

December 12, 2017

BY ELECTRONIC FILING

Marlene H. Dortch Secretary Federal Communications Commission 445 Twelfth Street, S.W. Washington, DC 20554

Re: Space Exploration Holdings, LLC, IBFS File Nos. SAT-LOA-20161115-00118 and SAT-LOA-20170301-00027

Dear Ms. Dortch:

On December 8, 2017, Patricia Cooper, Mark Krebs (by phone), Mihai Albulet (by phone), and undersigned counsel on behalf of Space Exploration Holdings, LLC ("SpaceX") met with Jose Albuquerque, Karl Kensinger, Stephen Duall (by phone), and Jay Whaley (by phone) of the Commission's International Bureau to respond to the nearly identical *ex parte* letters recently filed by WorldVu Satellites Limited ("OneWeb") expressing safety-related concerns about the non-geostationary orbit ("NGSO") satellite systems proposed in the above referenced applications.¹

First, SpaceX noted to the Commission that there are least 50 km separating the SpaceX and OneWeb NGSO systems as filed,² which ensures safe operations, unless OneWeb inappropriately plans to occupy an unjustifiably large range of available altitudes. SpaceX confirmed its confidence that its own constellation would be more than capable of operating safely, consistent with the filed orbits of both OneWeb and SpaceX. SpaceX also referred to the Commission's recent rejection of OneWeb's recommendation to reserve a large "buffer zone" around its constellation,³ commenting that no justification was provided for such enormous separations that would effectively sterilize a large swath of space from further development.

See Letters from Brian D. Weimer to Marlene H. Dortch, IBFS File Nos. SAT-LOA-20161115-00118 and SAT-LOA-20170301-00027 (Nov. 17, 2017). Because these letters are nearly identical, they will be referred to herein collectively as the "OneWeb Letter."

OneWeb proposes to operate its NGSO system at an altitude of 1,200 km. SpaceX proposes to operate its NGSO system at several altitudes – specifically, 1,110 km, 1,130 km, 1,150 km, 1,275 km, and 1,325 km. Inexplicably, OneWeb repeatedly asserts that these orbits are "interwoven" or "interleave[d]" or "overlapping." *See* OneWeb Letter at 1-4. SpaceX also proposes to operate a portion of its V-band constellation at much lower altitudes (335.9-345.6 km).

³ See Telesat Canada, FCC 17-147, ¶ 12 (rel. Nov. 3, 2017) ("Telesat Order").

Marlene H. Dortch December 12, 2017 Page 2 of 6

Second, regarding the potential risk of orbital debris, SpaceX noted that it has demonstrated throughout this proceeding that its NGSO system will meet or surpass all current Commission requirements and international norms for de-orbit and risk. The company also continues to drive the expectation of de-orbit risk downward with ongoing innovations in both spacecraft design and on-orbit operational enhancements, including through its collaboration with both NASA and the Joint Space Operations Center ("JSpOC").

Furthermore, the proposed adoption of some new and unannounced standard would be antithetical to the Commission's rulemaking process, and any eventual changes in requirements clearly should then apply equally to all NGSO applicants. SpaceX is fully committed to maintaining a safe space environment for future development and exploration, and recognizes the responsibility held by all those who plan to operate in space. Orbital spacing and de-orbit procedures are just two of the many aspects of space safety, and the potential interactions among multiple large NGSO constellations are important to address properly to ensure safe operations in space. The operational concerns and recommendations for regulatory or best practice standards should be identified and addressed through a Commission rulemaking, wherein all interested parties can participate and provide expert advice. That approach will allow the Commission to adopt rules of general applicability so that the entire satellite industry meets the standards necessary to safeguard this valuable resource. Indeed, this is the approach that OneWeb itself supported earlier this year before its own authorization was granted.⁴

SpaceX agrees that the operations of its proposed NGSO constellation and any other NGSO system licensed by the Commission should be subject to any such orbital debris or space safety rules adopted in the future. Applying new and uncodified rules in the midst of a processing round to the benefit of one applicant over others, however, would be unprecedented and would undermine sound regulatory policy. Moreover, as discussed below, the specific issues OneWeb has raised should be no impediment to granting SpaceX's application.

In granting OneWeb authority to access the U.S. market, the Commission noted that OneWeb's NGSO system would operate "at an approximate altitude of 1200 kilometers."⁵ However, OneWeb now asserts that its system will operate at altitudes that vary by 75 km above and below its stated orbit at 1,200 km.⁶ This is a far larger orbital variance than any other NGSO

⁴ See Letter from Douglas A. Svor to Marlene H. Dortch, IBFS File No. SAT-LOI-20160428-00041 (June 16, 2017) (OneWeb "expressed its view that the NGSO FSS rulemaking process is the proper forum for resolution of all items related to the ongoing NGSO FSS proceeding" and that "no decisions on such items should be made in connection with OneWeb's pending Petition for Declaratory Ruling"). Indeed, it appears that OneWeb raised many of these same concerns about space safety in the context of the recent NGSO FSS rulemaking. See Letter from Samuel L. Feder to Marlene H. Dortch, IB Docket No. 16-408, Attachment at 15-25 (Nov. 3, 2017).

⁵ See WorldVu Satellites Limited, 32 FCC Rcd. 5366, ¶ 2 (2017) ("OneWeb Authorization Order").

⁶ See OneWeb Letter at 10 n.20.

Marlene H. Dortch December 12, 2017 Page 3 of 6

applicant expects to maintain.⁷ OneWeb provides no justification for its claim to such a large operational range for its system. It is this variance from its stated orbital altitude that creates the "overlap" that OneWeb now cites as problematic.

In granting market access, the Commission did not discuss (much less endorse) OneWeb's proposed \pm 75 km area of operations. The Commission did, however, impose a condition requiring OneWeb to "coordinate physical operations of spacecraft with any operator using similar orbits, for the purpose of eliminating collision risk and minimizing operational impacts," and put OneWeb on notice that "[t]he orbital parameters specified in this grant are subject to change based on such coordination."⁸ Such coordination should not be difficult. For example, if OneWeb and SpaceX agreed to maintain their orbits within a 25 km altitude tolerance – a reasonable and achievable level of variance – they could eliminate any potential for "overlap" of their NGSO systems.

Contrary to this condition of its authorization, OneWeb means to benefit from its own "loose" approach to station-keeping to somehow lay claim to vast areas of space and thereby preempt entry by competitors. To this end, OneWeb continues to argue that the Commission should impose a buffer zone of 125 km between NGSO systems, and require SpaceX to change the parameters of its NGSO system.⁹ In support of this assertion, OneWeb cites no rule nor any other requirement imposed by the Commission or the ITU – because none exist.¹⁰ Indeed, the ITU rules do not give any priority to the orbital parameters of earlier-filed NGSO systems, and the Commission's processing round regime is specifically designed to grant all applicants equal

See, e.g., Letter from Bruce A. Olcott to Jose P. Albuquerque, IBFS File No. SAT-LOA-20170301-00028, at 11 (July 25, 2017) (altitude maintained within 11 km tolerance); Letter from William M. Wiltshire to Jose P. Albuquerque, IBFS File No. SAT-LOA-20161115-00118, at 1 (Apr. 20, 2017) (altitude maintained within 30 km tolerance).

⁸ OneWeb Authorization Order, ¶ 25.d.

⁹ See OneWeb Letter at 10. Establishing such an extensive buffer zone would allow OneWeb to reserve 250 km of orbital altitude for use by its system alone, effectively warehousing valuable orbital real estate. Such an approach would unnecessarily chill the development of space by limiting the number of NGSO operators that could be accommodated. This would be especially harmful to systems from emerging nations that may not yet be ready to deploy. OneWeb fails to recognize the anticompetitive effect of its proposal, much less justify it.

¹⁰ OneWeb attempts to shore up its position by citing a recent statement released by the Iner-Agency Space Debris Coordination Committee ("IADC") recommending that NGSO systems maintain "sufficient altitude separation" in order to minimize the potential collision risk. *See* OneWeb Letter at 12. However, IADC did not endorse any specific separation distance, much less anything as large as 125 km. Moreover, the IADC statement makes clear that its recommendations "do not mean additional or expansion of IADC guidelines, but technical guidance on how to best comply with them." Inter-agency Space Debris Coordination Committee, *IADC Statement on Large Constellations of Satellites in Low Earth Orbit*, IADC-15-03, § 4.1 (Sep. 2017), *available at http://www.iadc-online.org/index.cgi?item=docs_pub*. This IADC recommendation does not support the overlarge buffer zone OneWeb proposes as a new regulatory requirement.

Marlene H. Dortch December 12, 2017 Page 4 of 6

status.¹¹ Reflecting these facts, the full Commission recently rejected OneWeb's request to impose such a buffer zone on another NGSO system applicant, Telesat Canada ("Telesat"), which proposed to operate some of its satellites at an altitude of 1,248 km (*i.e.*, 48 km above OneWeb's constellation).¹² The Commission concluded that "these concerns are best addressed in the first instance through inter-operator coordination," and thus declined to impose the requested 125 km buffer zone.¹³ In addition, the Commission imposed a standard condition requiring that Telesat coordinate its physical operations with space stations of NGSO systems operating at similar orbital altitudes – just as it had required of OneWeb.¹⁴ Thus, the Commission has already established how it will handle NGSO systems operating at proximate orbital altitudes under its existing rules, and should take the same approach here as well.

With respect to assessing orbital debris risk, SpaceX responded to the Commission's request for information on the potential for collisions involving failed satellites and the existing catalog of space objects. OneWeb incorrectly asserts that SpaceX failed to respond fully because it did not address the risk of its NGSO satellites colliding with each other or with other NGSO constellations.¹⁵ This critique is unfounded, as the Commission specifically clarified that in response to its inquiry, it would expect applicants to "address collision risk involving failed [NGSO] satellites and the background debris population, which may be the single largest category of risk."¹⁶ In response, SpaceX discussed a simulation performed using data from JSpOC and NASA's Orbital Debris Engineering Model. These simulations concluded that a satellite failure rate of 1 percent at mission altitude would yield approximately a 1 percent chance *per decade* that

- ¹³ *Id.* ¶ 12.
- ¹⁴ *Id*.

See, e.g., Amendment of the Commission's Space Station Licensing Rules and Policies, 18 FCC Rcd. 10760, ¶ 61 (2003) (under the modified processing round regime, "operating rights in all the available spectrum in the frequency band will be assigned equally to all qualified applicants in the first processing round"), OneWeb Authorization Order, ¶ 3 ("Each of these applicants and petitioners [in the processing round] proposes an NGSO FSS system that, if approved, would have the same status as OneWeb's NGSO FSS system approved here").

¹² See Telesat Order, supra.

¹⁵ See OneWeb Letter at 5.

¹⁶ See E-mail from Karl Kensinger to Carlos Nalda, et al. (Apr. 5, 2017). This e-mail is available in IBFS File No. SAT-LOA-20161115-00121, but was copied to counsel for all applicants that received a similar request for information. The Commission went on to say that, "[w]hile we would welcome any analysis that assumes deployment of multiple constellations, and assesses risk with respect to uncontrolled satellites resulting from those constellation deployments, we recognize that this may require complex modelling, and would consider your answer complete if it simply recognized but did not further address such scenarios." *Id.*

Marlene H. Dortch December 12, 2017 Page 5 of 6

any failed SpaceX satellite would collide with a piece of tracked debris.¹⁷ Thus, SpaceX's response fully satisfied the Commission's expectations.

As SpaceX has demonstrated, its system far surpasses the U.S. and international standards for de-orbit operations.¹⁸ Nonetheless, SpaceX has stated its intention to continue to explore opportunities to reduce total risk still further.¹⁹ The Commission should encourage such efforts. For transparent reasons, OneWeb persists in arguing that the Commission should defer action on SpaceX's application until some undefined future date when these further refinements above and beyond current requirements have been achieved.²⁰ Here again, OneWeb inequitably asserts that the Commission should impose a new and higher standard upon SpaceX that is applied to no other satellite operator at any orbit – including OneWeb and other applicants in the ongoing NGSO processing rounds. If a new rule is to be imposed, it should be considered in a rulemaking proceeding and, if adopted, then made applicable to all NGSO system authorizations. It would be inappropriate to apply a novel and unannounced standard to SpaceX uniquely.

SpaceX has demonstrated that its proposed NGSO system will meet or surpass all current requirements with respect to safety of space. It understands that its system will be subject to the standard condition requiring coordination of physical operations with space stations of NGSO systems operating at similar orbital altitudes, and anticipates no difficulty in complying. While SpaceX would support a rulemaking to explore additional strategies for safeguarding this critical resource and will comply with any rules adopted in the future, it would be inappropriate to impose new and heightened requirements upon SpaceX's application alone, as OneWeb requests. Accordingly, the Commission should reject OneWeb's self-serving and anti-competitive arguments and grant SpaceX's application expeditiously so that it can proceed with development and deployment of its NGSO system.

Respectfully submitted,

William M. Wiltshie

William M. Wiltshire *Counsel to SpaceX*

¹⁷ See Letter from William M. Wiltshire to Jose P. Albuquerque, IBFS File No. SAT-LOA-20161115-00118, at 6 (Apr. 20, 2017).

¹⁸ See Consolidated Opposition to Petitions and Response to Comments of Space Exploration Holdings, LLC, IBFS File No. SAT-LOA-20161115-00118, at 13-14 (July 7, 2017).

¹⁹ See, e.g., *id.* at 14-15.

²⁰ See OneWeb Letter at 14.

Marlene H. Dortch December 12, 2017 Page 6 of 6

cc: Jose Albuquerque Karl Kensinger Stephen Duall Jay Whaley

ENGINEERING CERTIFICATION

The undersigned hereby certifies to the Federal Communications Commission as follows:

- (i) I am the technically qualified person responsible for the engineering information contained in the foregoing filing,
- (ii) I am familiar with Part 25 of the Commission's Rules, and
- (iii) I have either prepared or reviewed the engineering information contained in the foregoing filing, and it is complete and accurate to the best of my knowledge and belief.

Signed:

/s/ Mark Krebs

Mark Krebs Principal Satellite Systems Engineer SPACE EXPLORATION TECHNOLOGIES CORP.

December 12, 2017 Date