

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Swarm Technologies, Inc.)	
)	
Application to Modify the Authorization of Swarm NGSO Satellite System)	IBFS File No. SAT-AMD-20200501-00040
)	
)	
Amendment to Application to Modify the Authorization of Swarm NGSO Satellite System)	IBFS File No. SAT-AMD-20200504-00041
)	

COMMENTS OF SPACE EXPLORATION HOLDINGS, LLC

Pursuant to Section 25.154 of the rules of the Federal Communications Commission, Space Explorations Holdings, LLC (“SpaceX”) files these comments in response to the application of Swarm Technologies, Inc. (“Swarm”) to its pending application to modify its license for a non-voice, non-geostationary (“NVNG”) satellite system in the mobile satellite service (“Application”).¹ In its Application, Swarm proposes, *inter alia*, to implement onboard propulsion and make a corresponding increase in mass of its satellites to support the new propulsion system. As discussed herein, SpaceX supports Swarm’s use of active propulsion to enhance the safety profile of its proposed NVNG system.²

¹ See 47 C.F.R. § 25.154(a)(2) (establishing 30 day comment period); Application of Swarm Technologies, Inc., IBFS File No. SAT-AMD-20200504-00041, Call Sign S3041 (filed May 1, 2020) and Amendment to Application of Swarm Technologies, Inc., IBFS File No. SAT-AMD-20200504-00041, Call Sign S3041 (filed May 4, 2020). See also Satellite Policy Branch Information, Space Station Applications Accepted for Filing, Public Notice, Report No. SAT-01482 (rel. July 17, 2020).

² These comments are limited to Swarm’s use of active propulsion, and SpaceX takes no position otherwise on the merits of Swarm’s application.

As an initial matter, Space X appreciates Swarm’s efforts to develop and implement an active propulsion system to facilitate maneuverability and help remedy orbital operation conflicts among Swarm’s system and other operators.³ Given the proximity of, and potentially overlapping operational altitudes between, Swarm’s proposed operations (i.e., deployment altitudes between 300 and 585 km) and SpaceX’s system (i.e., deployment altitudes between 540 and 570 km), the propulsion system proposed in the Application indicates that Swarm is following best practices to ensure the success of its planned deployment and mitigate the risk of a collision in the orbits in which SpaceX’s spacecraft operate.

Maneuverability is an important component of space debris mitigation, both by enabling space stations to engage in collision avoidance and by facilitating spacecraft disposal.⁴ The means to achieve such maneuverability is important, particularly with respect to small satellites like the cubesat satellites proposed by Swarm. As SpaceX has advocated previously, the concern regarding potential collisions between de-orbiting smallsats and other operators can be mitigated through the use of propulsion systems designed to perform collision avoidance maneuvers, such as that proposed by Swarm here.⁵ To this end, SpaceX is committed to designing and operating its system in a manner that exceeds all regulatory requirements to mitigate orbital debris and

³ Application at 3-4.

⁴ See *In the Matter of Mitigation of Orbital Debris in the New Space Age*, IB Docket No. 18-313, Report and Order and Further Notice of Proposed Rulemaking, FCC 20-54, at para. 51 (rel. Apr. 24, 2020) (“*Orbital Debris NPRM*”).

⁵ See *In the Matter of Streamlining Licensing Procedures for Small Satellites*, IB Docket No. 18-86, Comments of Space Exploration Technologies Corp., at 10 (filed Aug. 7, 2018).

avoid collisions in space, and expects that other systems will take reasonable steps to avoid collision as well.⁶

Based upon its review of Swarm’s Application and the commitments contained therein, it appears that Swarm is planning appropriate steps to minimize the risk of conflicts to SpaceX’s orbital operations arising from Swarm’s proposed system. For example, Swarm states that it plans to use its propulsion system for collision avoidance maneuvers, and commits to working cooperatively with other operators to determine whether maneuvers are necessary to avoid collisions, and if so, to coordinate with the affected operator.⁷ To facilitate this process, SpaceX encourages Swarm—as it has all operators—to provide ephemeris data and other appropriate operational data to other operators via spacetrack.org to allow SpaceX and other operators to predict the trajectories of Swarm’s satellites. This will enable all potentially affected operators to make detailed assessments of the potential for collision, and work collaboratively to eliminate collision risk.

In sum, SpaceX supports Swarm’s application to the extent it proposes to use an active propulsion system, commits to conducting active maneuvers to avoid collisions with both debris

⁶ See Application of Space Exploration Holdings, LLC for Modification of Authorization for the SpaceX NGSO Satellite System, IBFS File No. SAT-MOD-20200417-00037, Call Signs S2983 and S3018, at iii (filed Apr. 17, 2020); Notice of Ex Parte Communication, RM-11768, IB Docket No. 18-313, IBFS File Nos. SAT-MOD-20190830-00087 and SAT-LOA-20190704-00057 (filed Dec. 4, 2019).

⁷ See, e.g., Application, Narrative Statement at 9 (committing, like SpaceX, to “conduct active maneuvers to avoid collisions with both debris and other spacecraft throughout the life” of its satellites); Letter from Shiva Goel, Counsel to Swarm Technologies, Inc. to Mr. Jose Albuquerque, Chief, Satellite Division, International Bureau, Federal Communications Commission, IBFS File Nos. SAT-MOD-20200501-00040 & SAT-AMD-20200504-00041, Call Sign S3041, at 2 (Aug. 4, 2020) (“in scenarios where the secondary object is also a maneuverable spacecraft, Swarm will coordinate with the other operator to mutually determine if a maneuver is necessary and to ensure any potential maneuvers are planned cooperatively.”)

and other spacecraft throughout the life of its satellites, and pledges to work with other system operators to coordinate and facilitate maneuvers. SpaceX urges the Commission to condition Swarm’s application upon its compliance with the commitments made in its application, including its commitments in Section II.C governing orbital debris mitigation and the commitment to comply with any rules governing active propulsion, collision avoidance, and orbital debris mitigation that adopted by the Commission in its open rulemaking.⁸

Respectfully submitted,

SPACE EXPLORATIONS HOLDINGS, LLC

By: /s/ David Goldman
David Goldman
Director of Satellite Policy
Space Explorations Holdings, LLC
1155 F Street, NW
Suite 475
Washington, DC 20004
(202) 649-2700

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⁸ See Amendment to Application of Swarm Technologies, Inc., IBFS File No. SAT-AMD-20200504-00041, Call Sign S3041, at 17-24. See also Orbital Debris NPRM at para. 53 (seeking to expand the record on whether to “require all NGSO satellites planning to operate above a particular altitude to have propulsion capabilities reserved for station-keeping and to enable collision avoidance maneuvers, regardless of whether propulsion is necessary to de-orbit within 25 years, and if so, what altitude should be adopted.”).

CERTIFICATE OF SERVICE

I, David Goldman, certify that a copy of the foregoing Comments to the application of Swarm Technologies, Inc. to modify its license for a non-voice, non-geostationary (“NVNG”) satellite system in the mobile satellite service, was served via first-class mail on this 17th day of August 2020, upon the following:

Scott Blake Harris
Shiva Goel
Harris, Wiltshire & Grannis, LLP
1919 M Street, N.W.
Suite 800
Washington, D.C. 20036

Sara Spangelo, Ph.D.
Kyle Wesson, Ph.D.
Swarm Technologies, Inc.
435 N. Whisman Rd.
Suite 100
Mountain View, CA 94043

Attorneys for Swarm Technologies, Inc.

/s/ David Goldman
David Goldman