



Federal Communications Commission  
Washington, D.C. 20554

March 21, 2017

William M. Wiltshire  
Paul Caritj  
Harris, Wiltshire & Grannis LLP  
1919 M Street, N.W.  
Suite 800  
Washington, DC 20036

Re: Space Exploration Holdings, LLC, IBFS File No. SAT-LOA-20161115-00118  
(Call Sign S2983)

Dear Messrs. Wiltshire and Caritj:

On November 15, 2016, Space Exploration Holdings, LLC (SpaceX) filed the above-captioned application for authority to construct, deploy, and operate a non-geostationary orbit (NGSO) fixed-satellite service system. To aid in the Commission's evaluation of SpaceX's application,<sup>1</sup> please provide the following:

1. A statement from SpaceX disclosing the accuracy with which the parameters of satellite orbits will be maintained, including apogee, perigee, inclination, and the right ascension of the ascending node(s).<sup>2</sup> Although SpaceX indicates that it will maintain the accuracy of its orbital parameters at a level that will allow operations with sufficient spacing to minimize the risk of conjunction with adjacent satellites in the constellation and other constellations,<sup>3</sup> SpaceX must still disclose the information specified above concerning the accuracy of the orbital parameters of its satellite system.
2. Please provide an analysis of collision risk for satellites during the passive disposal phase, i.e., after all propellant is consumed, for a 4,425 satellite deployment, assuming 100% reliability, and using representative scenarios for altitude at the end of the active phase. As part of that analysis, please provide an assessment of how many conjunctions and/or collision avoidance maneuvers might be required of the International Space Station (ISS), assuming it is in operation throughout the period in which SpaceX satellites would transit the ISS orbit.
3. Please provide an analysis of collision risk, assuming rates of satellite failure resulting in the inability to perform collision avoidance procedures of 10, 5 and 1 percent. This analysis should include a study performed assuming all failures occur at the mission altitude, but may also include additional studies specifying alternative assumptions concerning the orbital locations (such as injection altitude) at which failures might occur.
4. Please state whether, during all stages of satellite operations prior to the passive disposal phase, SpaceX will perform collision avoidance procedures, including conjunction

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<sup>1</sup> 47 CFR § 25.111(a).

<sup>2</sup> 47 CFR § 25.114(d)(14)(iii).


<sup>3</sup> Technical Supplement to Application at 52.

assessment, execution of avoidance maneuvers, trajectory planning and conjunction assessment for any planned alteration of satellite trajectory, and notification to other potentially affected operators of any planned alteration of a satellite's trajectory.

5. Any additional information you may wish to provide concerning human casualty risk resulting from satellite disposal, such as outcomes based on higher fidelity analysis, or any risk or loss mitigation strategies under development.<sup>4</sup>
6. Any information or analysis you may wish to provide with respect to treatment of this application under the Commission's environmental processing rules.<sup>5</sup>
7. For optical inter-satellite links, please provide the wavelength, power, duty cycle, beam diameter at emitter, and beam divergence. In addition, please provide the power margin at the receiver at maximum operating distance.
8. Please indicate whether optical inter-satellite links will be coordinated with other systems proposed in FCC applications and with the DoD's laser clearing house, and, if such coordination has commenced, please address the status of coordination.

SpaceX must file a letter providing this information by **April 20, 2017**. Failure to do so may result in the dismissal of SpaceX's application pursuant to Section 25.112(c) of the Commission's rules, 47 CFR § 25.112(c).

Sincerely,

  
Jose P. Albuquerque  
Chief, Satellite Division  
International Bureau

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<sup>4</sup> Based upon the generally worst case Debris Assessment Software analysis provided in your application, at pp. 61-66, we calculate the aggregate casualty risk from components that survive atmospheric re-entry as roughly 1 in 5 for the 4,425 satellite deployment described in the application, assuming no satellite replenishment.

<sup>5</sup> 47 C.F.R. §§ 1.1301-1.1309. *Cf.* Space Data Corporation, 16 FCC Rcd 16421, ¶¶ 24-27 (WTB 2001). Based upon information provided in your application, as many as 200,000 separate objects can be expected to reach the Earth's surface as a result of disposal of the 4,425 (plus spares) satellite deployment described in the application, assuming no satellite replenishment.