

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

In the Matter of)	
)	
Mitigation of Orbital Debris in the New Space Age)	IB Docket No. 18-313
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)	

REPLY COMMENTS OF ORBCOMM INC.

ORBCOMM Inc. (“ORBCOMM”) hereby replies to some of the comments on the Commission’s proposals to update its regulations with regard to orbital debris.¹ In its initial comments, ORBCOMM supported several of the Commission’s proposals. ORBCOMM anticipated that there would be consensus on many of these issues, including the proper regulations. In addition, for some of the proposals in the *Orbital Debris NPRM*, ORBCOMM anticipated that there would be a consensus on the goals, but ORBCOMM believed that the satellite system proponents should have greater flexibility in how those goals are achieved and/or that other measures should be taken to ensure that any resulting new regulation is practical, reasonable, and effective. For some of the other proposals in the *Orbital Debris NPRM*, ORBCOMM believed that additional analyses would be necessary. In some cases, the proposals will need to be revised, and as a result, a further notice of proposed rulemaking would be appropriate. And finally, there were some proposals in the *Orbital Debris NPRM* that ORBCOMM urged the Commission not to adopt. The comments filed by the other parties are

¹ *Mitigation of Orbital Debris in the New Space Age*, FCC 18-159, released November 19, 2018, 84 Fed Reg 4742 (February 19, 2019) (hereafter cited as “*Orbital Debris NPRM*”).

largely consistent with ORBCOMM's positions, although ORBCOMM does take issue with some of the other commenters' arguments as explained below.

As an initial matter, ORBCOMM observes that there was a great deal of consensus in the comments with regard to the importance of addressing orbital debris and the need for the Commission to harmonize its orbital debris policies with other Federal agencies and Administrations elsewhere in the world that oversee orbital debris mitigation and space traffic management. The "New Space Age" of cubesats and mega-constellations enhances the criticality of orbital debris mitigation, while at the same time greatly complicating the ability to mitigate orbital debris. The comments in this proceeding confirm a broad consensus view that the space industry must continue to employ a 'best practices' approach with regard to orbital debris mitigation, and that the Commission, other Federal agencies, and Administrations elsewhere in the world have an essential role to play in managing and preserving the orbital resource.

Several of the other commenters shared ORBCOMM's position with regard to specific proposals in the *Orbital Debris NPRM*. In order to effectuate space traffic management, ORBCOMM supported the obligation of licensees to track their spacecraft and report on their locations, and to respond to conjunction warnings to mitigate against collisions. Other commenters agreed.²

With regard to some of the other proposals in the *Orbital Debris NPRM*, ORBCOMM agreed with the goal of the specific proposal, but thought that satellite system operators should have somewhat greater flexibility in achieving that goal. Other commenters concurred with ORBCOMM. For example, Boeing also agreed that it was important to keep malign actors from

² E.g., OneWeb Comments at pp. 11-12; Boeing Comments at pp. 21-22; Lockheed Martin Comments at p. 11; Secure World Foundation Comments at p. 4.

taking control of satellites, but that the Commission should not mandate encryption of the TT&C signals.³ Similarly, Boeing and OneWeb also supported ORBCOMM's stated position that the Commission should require "maneuverability" of satellites, without specifically mandating propulsion.⁴

There were also some proposals in the *Orbital Debris NPRM* that ORBCOMM took exception to, and several of the other commenting parties took similar positions. ORBCOMM urged the Commission not to adopt its proposal to mandate a two-stage deployment for satellite systems that will operate at an altitude above 650 km, with an initial deployment at a lower altitude and then an orbit-raising maneuver to the operational altitude after a prolonged testing period. Other commenters shared ORBCOMM's concerns that such a two-stage deployment was inefficient and unnecessary.⁵ Likewise, other commenting parties agreed with ORBCOMM that the Commission should not adopt its proposal to require automatic de-orbiting upon a satellite failure.⁶

In its initial comments, ORBCOMM also questioned the need for the Commission's proposal to require insurance, indemnification agreements and an obligation to post a performance bond. ORBCOMM explained that the costs of such requirements would far exceed any benefits, and would not be effective in mitigating orbital debris. Secure World Foundation similarly contends that performance

³ Boeing Comments at pp. 36-37.

⁴ Boeing Comments at p. 19; OneWeb Comments at p. 15.

⁵ Lockheed Martin Comments at p. 13, OneWeb Comments at pp. 24-26; Boeing Comments at pp. 27-28.

⁶ Lockheed Martin Comments at p. 14; Boeing Comments at pp. 28-29; OneWeb Comments at p. 26.

bonds or insurance are unlikely to address the orbital debris problems.⁷ And Boeing sees no need for indemnification or insurance to cover on-orbit collisions or re-entry.⁸

ORBCOMM agrees with the views of many of the other comments. However, there are a few issues where ORBCOMM finds it necessary to respond to some of the other parties. In its initial comments, ORBCOMM addressed the Commission's questions with regard to multi-satellite deployments using launch service consolidators and multi-spacecraft deployment devices. ORBCOMM shared the Commission's concerns based on its review of an earlier mission where the consolidator – Spaceflight -- disclaimed any responsibility for assessing the collision risk of the mission as a whole, and as we understood it, was planning on deploying the individual satellites randomly. In its comments in this proceeding, Spaceflight indicates that in its recent SSO-A mission, it

[U]sed a six degree of freedom orbital trajectory analysis tool to measure the relative distance between every customer spacecraft and its two free flying deployers. This tool enabled Spaceflight to model the probability of recontact between the customer spacecraft during the mission in order to quantify the recontact risk and allowed Spaceflight to reduce the recontact risk by optimizing the mission deployment sequence.⁹

ORBCOMM welcomes Spaceflight's use of well-planned deployments, rather than random deployments of satellites on these consolidated missions.

The Commission, however, should not simply assume that multi-satellite launch mission aggregators will utilize such "best practices" without proper regulatory oversight. Thus, ORBCOMM continues to believe the Commission should require consolidators to provide an assessment of the collision risk of the entire mission, and disputes the claim of the Commercial Smallsat Spectrum Management Association ("CSSMA") that such a requirement is

⁷ Secure World Foundation Comments at pp. 8-9.

⁸ Boeing Comments at pp. 38-39.

⁹ Spaceflight Comments at pp. 2-3.

unnecessary.¹⁰ Likewise, ORBCOMM disagrees with Boeing that a disclosure requirement for the consolidated mission as a whole is not necessary because “the *NPRM* does not identify any unfavorable trend with respect to collision events involving the ejection of multiple satellites from a shared launch vehicle.”¹¹ Thankfully, in the short time since these multi-satellite launches have occurred, there have been no reported associated collisions, but that is not a reason to avoid conducting a robust analysis of the risks posed by such missions.

ORBCOMM in its comments also supported the Commission’s proposals to assess collision risk and re-entry risk on a system-wide basis.¹² In contrast, Boeing and SpaceX contend that the Commission should evaluate the risk on a per-satellite basis.¹³ ORBCOMM disagrees. The risks are affected by numerous factors that are within the control of the satellite system operator, including the mass and size of the satellites, the selected altitude, and the number of satellites in the constellation. And NGSO applicants are licensed to launch and operate satellite constellations, not individual satellites. Thus, in assessing the risk, ORBCOMM believes that the Commission should examine the entire constellation. On the other hand, given the disagreements with regard to the particular values that should be used as a level of acceptable risk,¹⁴ a further notice of proposed rulemaking would be warranted to address this issue.

¹⁰ CSSMA Comments at p. 5.

¹¹ Boeing Comments at p. 24.

¹² Other commenting parties likewise supported the Commission’s proposals to conduct such analyses on a system-wide basis. *E.g.*, OneWeb Comments at pp. 15-18.

¹³ Boeing Comments at pp. 10-11 and 13; SpaceX Comments at pp. 15-16.

¹⁴ *E.g.*, Boeing Comments at pp. 26-27; CSSMA Comments at p. 16; OneWeb Comments at pp. 27-29.

AS ORBCOMM explained in its initial comments, we welcome the Commission's efforts to update its orbital debris mitigation Rules and policies in light of the significant changes in the satellite industry that have occurred since these Rules and policies were last revised. The Commission must continue to ensure that it harmonizes its actions with those of the other Federal agencies and Administrations elsewhere in the world that oversee orbital debris mitigation and space traffic management. And as explained in these Reply Comments, other parties agreed with the positions espoused by ORBCOMM in its comments. Where other commenters disagreed, however, ORBCOMM believes that its positions will best serve the public interest.

Respectfully submitted,



Walter H. Sonnenfeldt, Esq.
Vice President, Regulatory Affairs
ORBCOMM Inc.
395 West Passaic Street
Suite 325
Rochelle Park, New Jersey 07662
Direct Tel: (585) 461-3018
E-Mail: sonnenfeldt.walter@orbcomm.com

Stephen L. Goodman
Stephen L. Goodman PLLC
532 North Pitt Street
Alexandria, Virginia 22314
(202) 607-6756
E-Mail: stephenlgoodman@aol.com

Counsel for ORBCOMM Inc.

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