

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

REPLY COMMENTS OF WORLDVU SATELLITES LIMITED

WorldVu Satellites Limited (“OneWeb”) respectfully submits this reply to the comments filed in response to the Federal Communications Commission’s (the “Commission”) Notice of Proposed Rulemaking (“NPRM”) in the above-captioned proceeding.¹

I. THE RECORD DEMONSTRATES THE COMMISSION SHOULD MAINTAIN ITS CURRENT TREATMENT OF MARKET ACCESS GRANTEES WITH RESPECT TO ORBITAL DEBRIS OBLIGATIONS

OneWeb agrees with a number of commenters who support the Commission’s proposal to maintain its current policy of allowing non-U.S. licensed satellite operators seeking U.S. market access to satisfy orbital debris mitigation requirements by demonstrating that their orbital debris mitigation efforts are subject to direct and effective regulatory oversight by another national licensing authority.² These comments demonstrate that the proposed continuation of this long-standing policy provides benefits to both the Commission and to satellite operators. As ViaSat notes, the current policy allows the Commission to avoid “expend[ing] additional administrative resources” in an “unnecessary” and duplicative review of orbital debris mitigation plans that have

¹ *Mitigation of Orbital Debris in the New Space Age, et al.*, Notice of Proposed Rulemaking and Order on Reconsideration, IB Dkt. No. 18-313, FCC 18-159 (rel. Nov. 19, 2018) (“NPRM”).

² See Comments of ViaSat, Inc., IB Dkt. No. 18-313 at 2 (filed Apr. 5, 2019) (“ViaSat Comments”); Comments of Eutelsat S.A., IB Dkt. No. 18-313 at 12-13 (filed Apr. 5, 2019) (“Eutelsat Comments”);

been analyzed and approved by other administrations.³ Continuation of the Commission’s current policy obviates the need for duplicative and burdensome demonstrations when any grant of U.S. market access to non-U.S. licensed operators will be conditioned on satisfying the debris mitigation requirements of their national licensing authority.

Eutelsat also correctly points out that applying the Commission’s orbital debris mitigation requirements directly to non-U.S. licensees could lead to conflicting orbital debris mitigation requirements, which could unnecessarily complicate compliance efforts.⁴ While SpaceX argues for the Commission to directly regulate both U.S.-licensed systems and foreign-licensed systems granted U.S. market access, it fails to note that doing so would unfairly disadvantage market access grantees.⁵ Requiring non-U.S. licensees to comply with two different orbital debris mitigation regimes could result in inefficient allocations of resources for satellite operators, which is fundamentally at odds with the open market commitments made by the United States in the World Trade Organization (“WTO”) Agreement on Basic Telecommunications Services and first implemented in the DISCO II Order.⁶ The current policy of allowing a direct and effective regulatory showing to satisfy applicable orbital debris mitigation requirements has directly contributed to the United States maintaining its unique position as a competitive marketplace that encourages innovation in space while also being at the forefront of issues involving orbital

³ ViaSat Comments at 3.

⁴ Eutelsat Comments at 13.

⁵ See Comments of Space Exploration Technologies Corp., IB Dkt. No. 18-313 at 8 (filed Apr. 5, 2019) (“SpaceX Comments”).

⁶ See *Amendment of the Commission’s Regulatory Policies to Allow Non-U.S.-Licensed Space Stations to Provide Domestic and International Satellite Service in the United States*, Report and Order, 12 FCC Rcd 24094 (1997).

stewardship. Nothing in the record justifies changing course from this long-standing and effective policy, which has resulted in non-U.S. operators providing U.S. customers with innovative services and injecting significant capital into the U.S. market.

II. ADEQUATE ORBITAL SPACING BETWEEN LARGE CONSTELLATIONS SHOULD BE A COMPONENT OF ANY ORBITAL DEBRIS MITIGATION REGIME

OneWeb has consistently advocated for adequate orbital separation as a method of ensuring orbital safety.⁷ Adequate orbital separation is recommended by the IADC and would provide significant orbital debris mitigation benefits to the orbital environment. Other commenters share OneWeb's common sense view. For example, OneWeb agrees with Iridium's assessment that the United States "should authorize only one NGSO satellite system to operate at a particular altitude" to "ensure that finite orbital resources are used efficiently while limiting the risk of collision with operators in other orbital planes."⁸ In addition, OneWeb notes ORBCOMM's suggestion that orbital debris mitigation policies "clearly should address issues such as how much physical separation is necessary, and how to assign orbits if there is contention" for the same altitudes.⁹ The record in this proceeding reflects support for the principle that avoiding orbital overlaps simplifies operations and makes space demonstrably safer by reducing collision risk between NGSO satellites.

⁷ See, *et. al.*, Timothy Maclay, Walt Everetts and Doug Engelhardt, *Responsible satellite operations in the era of large constellations*, SPACENEWS (Jan. 23, 2019); Comments of WorldVu Satellites Limited, IB Dkt. No. 18-313 at 3 (filed Apr. 5, 2019) ("OneWeb Comments").

⁸ Comments of Iridium Communications Inc., IB Dkt. No. 18-313 at 4 (filed Apr. 5, 2019) ("Iridium Comments").

⁹ Comments of ORBCOMM Inc., IB Dkt. No. 18-313 at 17 (filed Apr. 5, 2019) ("ORBCOMM Comments").

Today there exists a reasonable number of open orbital locations for operators and therefore is no need for overlapping NGSO constellations. In the future, advances in proven satellite technology could lead to a reduction in the minimum separation necessary, as has occurred in the regulation of vertical separation minimums for aircraft.¹⁰ Avoiding orbital overlap would create regulatory certainty for satellite operators and their investors, encouraging investment of capital into the satellite sector. Rules that mandate adequate orbital spacing between large NGSO constellations should be adopted.

III. COMMENTERS SUPPORT ADOPTING A COLLISION RISK METRIC ON AN AGGREGATE BASIS

The NPRM discusses the use of a metric for assessing collision risk and seeks comment on whether to apply the metric on a per-satellite or aggregate basis. OneWeb agrees with commenters such as CSSMA and the Global NewSpace Operators that to the extent collision risk is quantified, it should be on an aggregate basis.¹¹ Reviewing collision risk on an aggregate basis would allow the full analysis of potential impacts of large NGSO constellations, which may include thousands of satellites. Commenters who argue to the contrary are misguided. For example, given the number of proposed satellites in its constellation, it is unsurprising that SpaceX strains to portray the use of aggregate metrics as “arbitrarily disparate.”¹² However, given the potential scenario in which multiple large NGSO constellations operate in nearby

¹⁰ See *Reduced Vertical Separation Minimum (RVSM)*, FAA (Aug. 29, 2017), https://www.faa.gov/air_traffic/separation_standards/rvsm/ (reducing the VSM from 2,000 to 1,000 feet as aircraft technology evolved and became proven).

¹¹ See Comments of the Commercial Smallsat Spectrum Management Association, IB Dkt. No. 18-313 at 7 (filed Apr. 5, 2019) (“CSSMA Comments”); Comments of Global NewSpace Operators, IB Dkt. No. 18-313 at 6 (filed Apr. 5, 2019) (“GNO Comments”); ORBCOMM Comments at 7.

¹² SpaceX Comments at 15.

orbits, analysis on a per-satellite basis runs the risk of failing to properly account for the full impact of the constellation on the orbital environment. Currently, the Commission reviews the public interest benefits of NGSO constellations on a system-wide basis in granting licenses and U.S. market access. An aggregate analysis of collision risk would commensurately measure the risks of such constellations on a system-wide basis. Accordingly, collision risk should be analyzed on an aggregate basis.

IV. STAKEHOLDERS AGREE THAT POST-MISSION DEMISABILITY SHOULD BE AN AREA OF EMPHASIS

In its comments, OneWeb supported the proposal to tie post-mission disposal time limits to mission lifetimes, and additionally suggested this be capped at five years.¹³ OneWeb reiterates its support for this suggestion, and notes the broad support in this proceeding to institute a demise time shorter than the current 25 years.¹⁴ Iridium, for instance, proposes that operators with satellites at altitudes below 2000 km should be required to de-orbit within five years post-mission.¹⁵ Intelsat contends that the disposal timeframe should be two times the original lifespan of the satellite, while Global NewSpace Operators support lowering the post-mission disposal time to five years in the majority of instances.¹⁶ OneWeb's suggestion to limit post-mission disposal time to the length of the mission lifetime with a maximum of five years achieves the goals of many commenters and is a solution that provides flexibility while achieving reduction of disposal time from its current 25 year limit.

¹³ OneWeb Comments at 22.

¹⁴ *See, et. al.*, Iridium Comments at 8-9; GNO Comments at 16; Comments of Intelsat License LLC, IB Dkt. No. 18-313 at 7 (filed Apr. 5, 2019) ("Intelsat Comments").

¹⁵ Iridium Comments at 8.

¹⁶ *See* Intelsat Comments at 7; GNO Comments at 16.

With regards to post-mission disposal, OneWeb restates its position that satellites should be designed either for complete demise or to be capable of performing a controlled atmospheric reentry that directs any surviving debris to unpopulated areas on the ground, assuming the aggregate risk in the event of satellite failure is below a certain threshold. As with collision risk, OneWeb maintains that the most accurate way of measuring re-entry casualty risk is on an aggregate basis.¹⁷ OneWeb agrees with Iridium that operators should be required to calculate their “re-entry casualty risk annually on a system-wide basis.”¹⁸ OneWeb also agrees with a number of commenters that the current NASA standard for disposal reliability of .9 may not be sufficient for large NGSO constellations.¹⁹ For instance, Boeing encourages the Commission to “consider the adoption of a higher metric,” not to exceed .95, for large constellations.²⁰ To ensure that non-functional spacecraft do not unnecessarily jeopardize the orbital environment, OneWeb reiterates its position that a .95 standard for large NGSO constellations would be achievable without imposing unnecessary burdens on satellite operators.²¹

V. THE RECORD REFLECTS SUPPORT FOR REQUIRING MANEUVERABILITY FOR DEPLOYMENTS ABOVE THE ISS

In its comments, OneWeb argued that 400 km altitude is the appropriate inflection point for requiring satellites to possess propulsive or maneuverability capabilities.²² OneWeb

¹⁷ See OneWeb Comments at 19.

¹⁸ Iridium Comments at 10.

¹⁹ See *id.* at 27-28; GNO Comments at 12.

²⁰ Comments of the Boeing Company, IB Dkt. No. 18-313 at 26 (filed Apr. 5, 2019).

²¹ As OneWeb pointed out in its comments, the proposed NASA standard of .99 or higher is based on underlying studies of questionable validity and could have significant cost impacts to NGSO operators.

²² See OneWeb Comments at 14.

reiterates this position, because using 400 km as a threshold for altitude-based orbital debris mitigation requirements will more adequately protect the International Space Station (“ISS”). For satellites above the ISS, having the ability to actively control the trajectories of one’s assets is paramount to the safety of the ISS, other operators, and the orbital environment as a whole.

While having maneuvering capabilities helps significantly raise a satellite’s space safety profile, these capabilities are not a panacea for collision risk. Currently, the Commission considers satellites with propulsive capabilities to have a near-zero collision risk, under the theory that they can maneuver out of the way of any object with which they would potentially collide.²³ OneWeb agrees with other commenters, including NASA, who believe that propulsive capabilities cannot entirely eliminate the collision risk of a satellite.²⁴ While OneWeb notes that propulsion plays an important role in reducing orbital debris risk, past experience reveals that the collision risk of satellites with propulsion is not zero. As Iridium notes, Iridium-33 had propulsive capabilities when it was destroyed in a collision.²⁵ Therefore, maneuvering capabilities should be considered as one factor in the evaluation of an applicant’s collision risk with tracked objects.

²³ See Space Exploration Holdings, LLC, *Request for Modification of the Authorization for the SpaceX NGSO Satellite System*, Order and Authorization, IBFS File No. SAT-MOD-20181108-00083, DA 19-342 at 9 (Apr. 26, 2019) (“consistent with current licensing practice, the collision risk is considered to be zero, or near zero, during the time in which the satellite is maneuverable”).

²⁴ See Iridium Comments at 3; CSSMA Comments at 8; Letter from Anne E. Sweet, NASA Representative to the Commercial Space Transportation Interagency Group Human Exploration and Operations Mission Directorate, Launch Services Office, to Marlene H. Dortch, Secretary, FCC, IB Dkt. No. 18-313 at 2 (filed Apr. 4, 2019).

²⁵ See Iridium Comments at 3.

VI. CONCLUSION

OneWeb commends the Commission for initiating this proceeding. OneWeb believes that adoption of the above proposals will help ensure a safe orbital environment that will facilitate continued innovation in space.

Respectfully submitted,

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