



# PUBLIC NOTICE

Federal Communications Commission  
45 L Street NE  
Washington, DC 20554

News Media Information 202-418-0500  
Internet: [www.fcc.gov](http://www.fcc.gov)  
TTY: 888-835-5322

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## SPACE BUREAU SEEKS TO REFRESH THE RECORD ON PROPOSED RULES PERTAINING TO ORBITAL DEBRIS MITIGATION

IB Docket Nos. 18-313 and 22-271

**Comments Due: [30 days after publication in the Federal Register]**  
**Reply Comments Due: [45 days after publication in the Federal Register]**

With this Public Notice, the Space Bureau seeks to refresh the record on rule changes pertaining to orbital debris mitigation previously proposed by the Commission. The Commission continues to seek to improve and clarify its rules taking into account the Commission's experience gained in the satellite licensing process, improvements in mitigation guidelines and practices, and in light of various market developments. The Commission sought comment in 2020 on various proposals for amending the Commission's orbital debris mitigation rules.<sup>1</sup> The comment period closed over three years ago.<sup>2</sup> To ensure that the Commission has the benefit of current information, including any developments relating to these issues since the release of the underlying *Further Notice of Proposed Rulemaking (FNPRM)*, we invite interested parties to update the record as discussed below.

*Background.* In 2020, the Commission adopted a *Report and Order* comprehensively updating its rules on orbital debris mitigation. At the same time, the Commission adopted an *FNPRM* which sought comment on additional rule amendments and proposals related to the probability of accidental explosions, collision risk for multi-satellite systems, maneuverability requirements, and casualty risk, among other issues.<sup>3</sup> In the *2020 Order*, the Commission discussed the pace at which the industry is growing, noting that it expected that the regulation of orbital debris would be an iterative process as new research becomes available and new policies are developed based on experience and the evolving commercial space landscape.<sup>4</sup>

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<sup>1</sup> *Orbital Debris in the New Space Age*, IB Docket No. 18-313, Report and Order and Further Notice of Proposed Rulemaking, 35 FCC Rcd 4156 (2020) (*2020 Order* or *2020 FNPRM*); see also *Mitigation of Orbital Debris in the New Space Age*, IB Docket No. 18-313, Order on Reconsideration, FCC-24-6 (Jan. 26, 2024) (affirming the *2020 Order*).

<sup>2</sup> See *2020 FNPRM*; see also Federal Communications Commission, *Mitigation of Orbital Debris in the New Space Age*, 85 Fed. Reg. 52455 (August 25, 2020) (announcing the comment period ending on October 9, 2020, and the reply comment period ending on November 9, 2020).

<sup>3</sup> See, generally, *2020 FNPRM*, 35 FCC Rcd at 4226-49. On September 29, 2022, the Commission adopted a Second Report and Order addressing the post-mission disposal lifetime issues raised in the *FNPRM*, resulting in the adoption of a rule requiring satellite operators ending their mission in, or passing through low Earth orbit (LEO), to dispose of their satellites as soon as practicable, but no more than 5 years after the end of the mission. See *Space Innovation; Orbital Debris in the New Space Age*, IB Docket Nos. 18-313 and 22-271, Second Report and Order, 37 FCC Rcd 11818 (2022).

<sup>4</sup> *2020 Order*, 35 FCC Rcd at 4166-67, para. 21.

Since the Commission last sought comment on its orbital debris mitigation rules, NASA and other standards-setting bodies have made a number of technical and policy updates to their orbital debris mitigation standards and guidance documents,<sup>5</sup> and industry has gained substantial experience in this area, potentially leading to the development or refinement of new industry standards and practices in the future. In addition, in order to maintain U.S. leadership in the space economy, the Commission has opened a new docket for Space Innovation, IB Docket 22-271, recognizing that the new space age needs new rules, including for orbital debris mitigation, that reflect the expanding proliferation of satellites and innovations in the space industry.<sup>6</sup> Finally, the Space Bureau's own experience in satellite licensing and addressing associated orbital debris concerns has also advanced and parties have provided additional views in specific licensing proceedings on approaches to debris mitigation, particularly for large constellations.<sup>7</sup>

Based on these considerations, the Space Bureau is providing an opportunity for additional comments in order to ensure an up-to-date record.

*Request for Additional Comment.* Accordingly, the Space Bureau invites stakeholders to update the record after reviewing the specific proposals, underlying analysis, and questions contained in the *FNPRM*, as well as the existing record in this proceeding. In particular, the *FNPRM* presented a number of questions and proposals regarding the debris mitigation practices for constellations, including specific considerations related to the total probability of collisions with large objects.

In this context, the Commission sought comment on whether it should analyze collision risks based on the entire system (system-wide, or in the aggregate) or on individual satellites (per-satellite) within a multi-satellite non-geostationary orbit (NGSO) system.<sup>8</sup> If the Commission were to opt for a system-wide approach, it sought comment on the process through which such collision risks should be considered and what factors would be relevant in performing such an analysis.<sup>9</sup> The Commission noted that if it adopted a system-wide safe harbor approach, systems that are able to demonstrate that they meet a system-wide collision probability metric (or another suitable risk indicator) would be considered as adequately addressing this aspect of debris mitigation, but systems that exceed the threshold would be subject to further review.<sup>10</sup> The Commission sought comment on using the U.S. Orbital Debris Mitigation Standard Practices' (ODMSP) 0.001 probability of collision metric as a threshold or safe harbor as a means of identifying systems that may need further review.<sup>11</sup> The Commission sought comment on

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<sup>5</sup> See, e.g., NASA Spacecraft Conjunction Assessment and Collision Avoidance Best Practices Handbook, (Rev 1, updated February 2023), [https://nodis3.gsfc.nasa.gov/OCE\\_docs/OCE\\_51.pdf](https://nodis3.gsfc.nasa.gov/OCE_docs/OCE_51.pdf); The Orbital Debris Interagency Working Group, Subcommittee on Space Weather, Security, and Hazards, of the National Science and Technology Council, *National Orbital Debris Implementation Plan* (2022), <https://www.whitehouse.gov/wp-content/uploads/2022/07/07-2022-NATIONAL-ORBITAL-DEBRIS-IMPLEMENTATION-PLAN.pdf>. Additionally, many conferences, workshops, and working groups that published research and recommendations pertaining to orbital debris mitigation and space sustainability have been held, such as the Second International Orbital Debris Conference (IOC II) on Dec. 4-7, 2023, <https://www.hou.usra.edu/meetings/orbitaldebris2023/>.

<sup>6</sup> See, e.g., Space Innovation; Facilitating Capabilities for In-space Servicing, Assembly, and Manufacturing, Notice of Inquiry, IB Dockets 22-271 and 22-272, 37 FCC Rcd 10022 (2022) (Chairwoman Rosenworcel's statement).

<sup>7</sup> See, e.g., *Exploration Holdings, LLC*, Request for Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System, Order and Authorization, 37 FCC Rcd 14882, 14924-25, paras. 84-85 (2022); *Kuiper Systems LLC*, Request for Modification of the Authorization for the Kuiper NGSO Satellite System, Order and Authorization, 38 FCC Rcd 1112, 1115-16, paras. 12-13 (2023). See also *Kuiper Systems LLC*, Request for Modification of the Authorization for the Kuiper NGSO Satellite System, Order and Authorization, ICFS File Nos. SAT-MOD-20230228-00043, SAT-AMD-20230613-00140, DA 24-224, paras. 15-18 (SB Mar. 8, 2024).

<sup>8</sup> 2020 *FNPRM*, 35 FCC Rcd at 4226-27, paras. 155-157.

<sup>9</sup> *Id.* at 4227, para. 157.

<sup>10</sup> *Id.*

<sup>11</sup> *Id.* at 4226, para. 154, 4228-29, para. 159.

whether a safe harbor approach like the one described above or a bright-line rule would be preferable in this context and asked for specific metrics or thresholds that would be appropriate for each scenario.<sup>12</sup>

The Commission also identified several factors that could be relevant in establishing a safe harbor or bright-line rule, the maneuvering capabilities and reliability of the satellite(s), orbital lifetime, the number of satellites in the system (possibly including constellation replenishment rate<sup>13</sup> and replacement satellites over some specific time period), and the size of individual satellites.<sup>14</sup> The Commission sought comment on if these factors were relevant for consideration in this regard, how these factors should be evaluated, and whether there were any more factors that should be considered.<sup>15</sup> As it pertains to large constellations, the Commission asked for input on whether it should make a bright-line distinction between large constellations and smaller systems in terms of the applicable metrics for collision risk assessment, or should it attempt to specify a scalable metric for both types of systems.<sup>16</sup>

We seek to refresh the record on these points. In particular, in several *ex parte* presentations, commenters addressed a possible metric of 100 “object-years” for assessing the risks that may arise if satellites fail to complete planned disposal.<sup>17</sup> “Object-years” refers to the number of years each failed satellite would remain in orbit, summed across any other failed satellites that were part of the satellite system. We seek comment on this and other approaches for addressing the reliability of post mission disposal, especially for constellations. Is an object-years metric suitable for this type of analysis, and if so, what threshold should be applied?<sup>18</sup> The Space Bureau has used a 100 object-years metric in some licenses as a trigger for cases in which disposal failures would warrant additional Commission review of the execution of debris mitigation measures, and we seek comment on whether this approach should be utilized more or less widely, and in which types of cases. Are there alternative approaches for identifying which systems may pose more collision risk than others? We ask for comment on such approaches, as well as any potential alternative metrics, methods for risk analysis, or implementation strategies for managing these collision risks, especially as it pertains to larger systems.<sup>19</sup> Additionally, we seek comment on appropriate actions should an operator be granted a license and then exceed a 100 object-

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<sup>12</sup> *Id.* at 4228-29, paras. 157-158.

<sup>13</sup> The satellite replenishment rate refers to the rate at which new satellites are launched and deployed to replace aging or defunct satellites.

<sup>14</sup> *Id.* at 4229, para. 158.

<sup>15</sup> *Id.*

<sup>16</sup> *Id.* Similarly, the *FNPRM* also asked whether the Commission should establish a separate process for evaluation of system-wide collision risk for satellites that operate in Medium Earth orbit (MEO), *i.e.* between 2,000 and 35,786 kilometers above the Earth. *Id.*

<sup>17</sup> *See, e.g.*, Letter from Darren McKnight, LeoLabs, to Karl A. Kensinger, Chief, Satellite Division, FCC, IBFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105, IB Docket No. 18-313 (dated Mar. 29, 2022); *Ex Parte* Presentation of Astroscale U.S., ICFS File Nos. SAT-LOA-20200526-00055, SAT-AMD-20210818-00105, IB Docket 18-313 (filed Jan. 13, 2023); *Ex Parte* Presentation of Telesat LEO Inc., ICFS File Nos. SAT-MPL-2020526-00053, SAT-APL-20210104-00002, SAT-APL-20220616-00059, SAT-PPL-20211104-00138, IB Docket No. 18-313 (dated Apr. 28, 2023); *Ex Parte* Presentation of WorldVu Satellites Limited, ICFS File Nos. SAT-MPL-20220921-00115, SAT-MPL-20211104-00144, SAT-MPL-20220921-00116, IB Docket No. 18-313 (dated Apr. 7, 2023); *Ex Parte* Presentation of BlackSky, Hawkeye360, ICEYE US, Inc., Planet Labs PBC, Spire Global, Inc., Tomorrow.io, IB Docket No. 18-313 (filed Mar. 15, 2023); *Ex Parte* Presentation of Space Exploration Holdings, LLC, IB Docket No. 18-313 (filed Jun. 28, 2023).

<sup>18</sup> We note that the ODMSP, in a somewhat different context, suggests a threshold of 100 object-years per spacecraft for all planned debris released in LEO that is larger than 5 mm. *See* ODMSP 1-1.

<sup>19</sup> To the extent possible, we ask that commenters supporting or disagreeing with particular metrics provide analysis that includes sample constellation sizes, satellite area-to-mass ration, deployment altitudes, and other potentially relevant considerations.

year threshold, or any other metric that may be adopted. For example, should the operator be required to cease satellite deployment until the causes of the disposal failure have been identified and addressed sufficiently? If a cause and solution have been identified and successfully implemented, should the count of object years be re-set by removing object-years for those satellites from the operator's total object years? Are there other reporting conditions that could be used to address collision risks?

We recognize that many factors, including orbital altitude and maneuvering capabilities, may impact collision risk analyses. In the *FNPRM*, the Commission was specifically interested in understanding the role of maneuvering capabilities in mitigating collision risk and the extent to which their reliability should be factored into collision risk assessments. The Commission sought comment on how to evaluate the likelihood of individual satellite maneuvering failures within a multi-satellite system.<sup>20</sup> Additionally, the Commission requested input on how to assess the collision risk associated with failed satellites, including what the assumed location of the maneuvering failure should be (i.e., in the deployment orbit, the worst-case collision risk orbit, a combination of both, or a range of orbits representing the expected range and duration of satellite operations), and if there are any methods by which the Commission could apply historical data concerning the typical point in a satellite mission where failures occur in order to refine the analysis.<sup>21</sup> The Commission requested comment on this approach and on other alternatives for assessing an expected failure rate on a more detailed basis.<sup>22</sup> We request additional comment on these issues, especially how they relate to mitigating collision risks with large objects.

In the event a safe harbor approach is adopted, the Commission sought comment on the review process for systems that did not meet the established safe harbor criteria.<sup>23</sup> The Commission invited comment on options such as allowing applicants to demonstrate a lower actual failure rate for their maneuvering capabilities than the assumed rate used in the safe harbor assessment.<sup>24</sup> For larger systems with multiple deployments, the Commission also asked commenters to provide feedback on the possibility of implementing a license condition requiring the applicant to provide additional demonstrations if the actual failure rate for the initial deployments is substantially higher than the expected failure rate expressed in its application.<sup>25</sup>

For NGSO systems that could not meet the safe harbor, if adopted, the Commission also sought comment on other aspects of a more detailed review process, such as asking operators to provide additional detail on alternative satellite designs that were considered during development or additional measures that will be taken to reduce the total collision risk.<sup>26</sup> To this end, the Commission sought input on what additional measures may correlate with lower risk and if there were specific measures that can be specified with a goal of minimizing the need for a case-by-case approach.<sup>27</sup>

We encourage interested parties to submit new or additional relevant information related to these and other questions laid out in the *FNPRM*, as well as information about the present state of the orbital debris environment and the satellite industry at large, including the types of mission profiles or additional considerations that may have arisen with more prominence since the *FNPRM* was first adopted. We recognize that the satellite industry is rapidly evolving and that issues or concerns may have arisen that

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<sup>20</sup> 2020 *FNPRM*, 35 FCC Rcd at 4229-30, para. 160.

<sup>21</sup> *Id.*

<sup>22</sup> *Id.* at 4229-30, paras. 160-61.

<sup>23</sup> *Id.* at 4230, para. 161.

<sup>24</sup> *Id.*

<sup>25</sup> *Id.*

<sup>26</sup> *Id.* at 4231, para. 162.

<sup>27</sup> *Id.*

were not expressly considered at the time the *FNPRM* was adopted, or that stakeholders now feel have otherwise rendered some of the initial considerations and proposals in the *FNPRM* obsolete or infeasible. Accordingly, we invite interested parties to provide additional specific recommendations or alternative proposals, supported by relevant experience and source material that may not have been available prior to this public notice, as it pertains to the issues raised here and presented in the *FNPRM*.

*Regulatory Flexibility Analysis.* The *FNPRM* included an Initial Regulatory Flexibility Analysis (“IRFA”) pursuant to 5 U.S.C. § 603, exploring the potential impact on small entities of the Commission’s proposals.<sup>28</sup> We invite parties to file supplemental comments on the IRFA in light of this request to refresh the record.

*Ex Parte Rules.* This proceeding has been designated as a “permit-but-disclose” proceeding in accordance with the Commission’s ex parte rules.<sup>29</sup> Persons making ex parte presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral ex parte presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the ex parte presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter’s written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during ex parte meetings are deemed to be written ex parte presentations and must be filed consistent with rule 1.1206(b). In proceedings governed by rule 1.49(f) or for which the Commission has made available a method of electronic filing, written ex parte presentations and memoranda summarizing oral ex parte presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission’s ex parte rules.

*Filing Requirements.* Pursuant to sections 1.415 and 1.419 of the Commission’s rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the Commission’s Electronic Comment Filing System (ECFS). See *Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121 (1998).

- *Electronic Filers:* Comments may be filed electronically using the Internet by accessing the ECFS: <http://www.fcc.gov/ecfs/>.
- *Paper Filers:* Parties who choose to file by paper must file an original and one copy of each filing.
- Filings can be sent by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission’s Secretary, Office of the Secretary, Federal Communications Commission.
- Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9050 Junction Drive, Annapolis Junction, MD 20701.
- U.S. Postal Service first-class, Express, and Priority mail must be addressed to 45 L Street NE Washington, DC 20554.

<sup>28</sup> *Id.* at 4250, para. 209, 4280-85, Appendix E.

<sup>29</sup> *See id.* at 4249, para. 206; 47 CFR § 1.1200 *et seq.*

Effective March 19, 2020, and until further notice, the Commission no longer accepts any hand or messenger delivered filings. This is a temporary measure taken to help protect the health and safety of individuals, and to mitigate the transmission of COVID-19. *See* FCC Announces Closure of FCC Headquarters Open Window and Change in Hand-Delivery Policy, Public Notice, 35 FCC Rcd 2788, 2788-89 (OS 2020), <https://www.fcc.gov/document/fcc-closes-headquarters-open-window-and-changes-hand-delivery-policy>.

*People with Disabilities.* To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to [fcc504@fcc.gov](mailto:fcc504@fcc.gov) or call the FCC's Consumer and Governmental Affairs Bureau at (202) 418-0530 (voice).

*Availability of Documents.* Comments, reply comments, and ex parte submissions will be available via ECFS. Documents will be available electronically in ASCII, Microsoft Word, and/or Adobe Acrobat.

*Additional Information.* For additional information, contact Alexandra Horn, [alexandra.horn@fcc.gov](mailto:alexandra.horn@fcc.gov), Space Bureau, Satellite Programs and Policy Division.

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