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Floating in Space While Trying to Stand: Refining the Standing Test in Space Debris Litigation

Meghan E. (Miller) Termat*

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* © 2026 Meghan E. (Miller) Termat, Associate at Troutman Pepper Locke LLP. J.D., Villanova University Charles Widger School of Law. B.A., University of Pennsylvania. Special thanks to Professors Ann Juliano and Teresa Ravenell for their guidance during the writing and editing process, as well as the staff of the *Tulane Environmental Law Journal* for their editorial assistance and interest in this Article. The author is grateful to her family for their creative support and encouragement.

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I. HOUSTON, WE HAVE A PROBLEM: ASTRONOMICAL AMOUNTS OF SPACE DEBRIS RAISE ENVIRONMENTAL AND LEGAL CONCERNS

Consider the following scenarios:

- (1) A young man sits in a room at home when suddenly a large chunk of metal hurtles down from outer space and tears through the roof.¹
- (2) An astronomer sets up her telescope to peer into the night sky only to have the stars obscured from view by the hazy glow of artificial light.
- (3) In outer space, broken pieces of satellites drift past each other in close orbit; some collide, causing catastrophic damage to other spacecraft and releasing harmful chemicals into the atmosphere.

Who has standing to bring a lawsuit in each of these cases? Like the favorite answer of many law professors, it depends.

The first scenario provides a clear basis for standing. Falling space debris caused an actual injury that monetary damages can remedy.² But the question of which law provides the cause of action is more complicated. Insurance would cover property damage, but for the harm that insurance does not cover, the family would have to pursue other channels.³ Some lawyers say that under international space law, the National Aeronautics and Space Administration (NASA) is liable for damage its space debris causes.⁴ Since that convention governs

1. See generally Joe Hernandez, *A Florida Family Is Suing NASA After a Piece of Space Debris Crashed Through Their Home*, NPR (June 24, 2024, 11:29 AM), <https://www.npr.org/2024/06/23/nx-s1-501623/space-debris-nasa-florida-home-lawsuit>.

2. For a discussion on the elements of standing, see *infra* notes 67-74 and accompanying text.

3. See Editorial Board, *Space Trash Is Falling from the Sky. And That's not the Worst of It*, WASH. POST (Nov. 13, 2024, 8:00 AM), <https://www.washingtonpost.com/opinions/interactive/2024/space-trash-debris/spacex/>.

4. See Hernandez, *supra* note 1.

international incidents, other space law experts say that domestic tort law trumps in cases where NASA space debris falls on U.S. soil.⁵

In the second scenario, courts have found that light pollution caused by artificial light from satellites constitutes the requisite injury for standing when this pollution obscures an astronomer's viewing area of the sky.⁶ An individual astronomer could thus bring a claim, as could an organization on behalf of the astronomer, but only if the astronomer individually satisfies the legal definition of an organization member.⁷

The third scenario is still unclear.⁸ If a collision occurs between two different countries' spacecraft, the 1972 Liability Convention tells us that liability is fault-based.⁹ But what about collisions between the spacecraft of two private companies? And what about a near-miss situation where the launch of a satellite network increases the possibility of a future collision? Does a party have standing to challenge an order approving a satellite launch to mitigate the risk of collision? According to the court, the possibility of a collision is "too speculative" to constitute an imminent injury.¹⁰

But the speculation becomes much more prognostic when one considers the amount of space debris orbiting Earth. Space debris consists of decommissioned satellites, material that disconnects from rockets during stage separation and launches, and other abandoned spacecraft, material, and machinery.¹¹ Most of the debris exists in low-Earth orbit,

5. See *id.*; see also Anna Hedgepath, *Mica Nguyen Worthy Submits First-of-Its-Kind Claim to NASA Seeking Recovery from Damages Sustained from Space Debris*, CRANFILL SUMNER LLP (June 21, 2024), <https://www.cshlaw.com/news/mica-nguyen-worthy-submits-first-of-its-kind-claim-to-nasa-seeking-recovery-from-damages-sustained-from-space-debris/>.

6. See *Int'l Dark-Sky, Assoc., Inc. v. Fed. Communications Commission*, 106 F.4th 1206, 1217 (D.C. Cir. 2024); see *What Is Light Pollution?*, DARKSKY, <https://darksky.org/resources/what-is-light-pollution/> (last visited Dec. 18, 2024) (explaining that light pollution is the artificial modification of natural outdoor light levels that causes a glare or glow and blocks a clear view of the night sky).

7. See *Int'l Dark-Sky*, 106 F.4th at 1217 (holding the representative association satisfied requirements for associational standing); *Viasat, Inc. v. FCC*, 47 F.4th 769, 779 (D.C. Cir. 2022) (finding the environmental plaintiff did not satisfy requirements for associational standing to bring claim on behalf of its members); see *infra* note 72 and accompanying text for a discussion on the requirements of associational standing.

8. See David A. Kaplow, *Large Constellations of Small Satellites: The Good, the Ugly, and the Illegal*, 15 HARV. NAT'L SEC. J. 257, 286-87 (2024) (noting current laws do not address various space actors' rights and liabilities).

9. Convention on International Liability for Damage Caused by Space Objects, Mar. 29, 1972, 24 U.S.T. 2389, T.I.A.S. No. 7762, 10 I.L.M. 965 [hereinafter 1972 Liability Convention].

10. *Viasat*, 47 F.4th at 779.

11. Inter-Agency Space Debris Coordination Comm. (IADC), IADC Steering Grp. and Working Grp. 4, *IADC Space Debris Mitigation Guidelines* 1, 8 (June 2021); *Space Debris and*

the area within two thousand kilometers of Earth's surface.¹² Letting space debris pile up poses risks to both the planet—through collisions that can release harmful chemicals into Earth's atmosphere—and space exploration, through the increased risk of space debris damaging active spacecraft.¹³

Of the millions of pieces of space debris orbiting Earth, some scientists estimate one million pieces are one to ten centimeters in size.¹⁴ Objects this size are large enough to explode spacecraft when traveling at over fifteen thousand miles per hour.¹⁵ Satellite and spacecraft launches, which result in debris, have increased at a rate faster than the natural

Human Spacecraft, NASA (May 26, 2021), https://www.nasa.gov/mission_pages/station/news/orbital_debris.html.

12. See *New NASA Report Reframes the Challenge of Addressing Orbital Debris*, NASA (Mar. 10, 2023), https://www.nasa.gov/offices/otps/New_NASA_Report_Reframes_the_Challenge_of_Addressing_Orbital_Debris.

13. See Kelly Kizer Whitt, *Kessler Syndrome of Colliding Satellites Could Make Low-Earth Orbit Unusable*, EARTHSKY (Nov. 15, 2021), <https://earthsky.org/human-world/kessler-syndrome-colliding-satellites/>. Astrophysicist Donald Kessler first considered the ramifications of space debris build-up in a theory known as the Kessler Syndrome. *Id.* His theory of collisional cascading posits that as the number of satellites in space increases, collisions increase, which in turn produce more and more debris until low-Earth orbit becomes unusable. Heather F. Riley, *Micrometeoroids and Orbital Debris (MMOD)*, NASA, (June 14, 2016), <https://www.nasa.gov/centers-and-facilities/white-sands/micrometeoroids-and-orbital-debris-mmmod/>; See Stephanie Safdie, *Why Is Space Junk a Problem Both for Exploration and the Earth?*, GREENLY INST., <https://greenly.earth/en-us/blog/ecology-news/why-is-space-junk-a-problem-both-for-exploration-and-the-earth> (May 9, 2024); Leonard David, *Space Junk Removal Is Not Going Smoothly*, SCI. AM. (Apr. 14, 2021), <https://www.scientificamerican.com/article/space-junk-removal-is-not-going-smoothly/>; see also Timiebi Aganaba, *Space Law Protects You from Falling Debris, but There Are No Legal Penalties for Leaving Junk in Orbit*, SCIENCE X (May 17, 2021), <https://phys.org/news/2021-05-space-law-falling-debris-legal.html>.

14. See NASA, *supra* note 11 (categorizing debris by size; The European Space Agency estimates that currently in orbit are: 36,500 objects greater than ten centimeters in size, one million objects between one and ten centimeters, and 130 million objects between one millimeter and one centimeter); *Space Debris by the Numbers*, THE EUROPEAN SPACE AGENCY, https://www.esa.int/Space_Safety/Space_Debris/Space_debris_by_the_numbers.

15. *Space Debris FAQ: Frequently Asked Questions*, THE EUROPEAN SPACE AGENCY, https://www.esa.int/Space_Safety/Space_Debris/FAQ_Frequently_asked_questions#:~:text=Collisions%20with%20debris%20larger%20than,subsystem%20of%20an%20operational%20spacecraft (last updated Apr. 2021); NASA Orbital Debris Program Office, *Frequently Asked Questions*, NASA, <https://orbitaldebris.jsc.nasa.gov/faq/#> (last visited Mar. 3, 2026); see generally Alexander William Salter, *Space Debris: A Law and Economics Analysis of the Orbital Commons*, 19 STAN. TECH. L. REV. 221, 222 (2016).

clearing process of atmospheric drag.¹⁶ Scientists project upwards of sixty thousand new satellites will launch into space by 2030.¹⁷

Regulation of space debris, however, has not kept up with the production of space debris.¹⁸ Agreements like the 1967 Outer Space Treaty and 1972 Liability Convention serve to protect parties whose spacecraft were damaged, but do not penalize parties for abandoning spacecraft.¹⁹ Further, disagreement over which governing body possesses regulatory authority paralyzes progress on producing clear regulations.²⁰ Mitigation guidelines promulgated by the United Nations outline measures to reduce harmful collisions but lack the force necessary to counter the problem.²¹ This leads to risks posed by unchecked space debris in the face of so-called mega-constellations—networks of hundreds to thousands of satellites orbiting Earth.²² Operated by SpaceX’s

16. See Lyndsey Gray, *Taking Out the Space Trash: Creating an Advanced Market Commitment for Recycling and Removing Large-Scale Space Debris*, FED’N OF AM. SCIENTISTS (Apr. 26, 2022), <https://fas.org/publication/taking-out-the-space-trash-creating-an-advanced-market-commitment-for-recycling-and-removing-large-scale-space-debris/>; see also Jonathan O’Callaghan, *What if Space Junk and Climate Change Become the Same Problem?*, N.Y. TIMES (May 12, 2021), <https://www.nytimes.com/2021/05/12/science/space-junk-climate-change.html> (updated May 24, 2021).

17. See U.S. Gov’t Accountability Off., GAO-22-105166, *Technology Assessment: Large Constellations of Satellites: Mitigating Environmental and Other Effects* (2022); Jamie Carter, *There Are Now 100 Trillion Bits of ‘Space Junk’ Circling Our Planet—and It’s About to Get a Lot Worse*, FORBES (Mar. 9, 2023), <https://www.forbes.com/sites/jamiecartereurope/2023/03/09/do-we-need-an-orbital-treaty-there-are-now-100-trillion-bits-of-space-junk-circling-our-planet-and-its-about-to-get-a-lot-worse/?sh=7ad651de34a5> (updated Mar. 10, 2023) (suggesting now is the critical moment in countering space pollution, drawing insight from comparison to oceanic pollution).

18. See Chris Impey, *Analysis: Why Trash in Space Is a Major Problem with No Clear Fix*, PBS (Sep. 3, 2023 9:00:00 AM), <https://www.pbs.org/newshour/science/analysis-why-trash-in-space-is-a-major-problem-with-no-clear-fix#:~:text=Because%20of%20its%20lack%20of,another%20from%20overexploiting%20the%20resource> (comparing unregulated space to tragedy of the commons’ depletion of common resource); Caitlin Kim, *The Space Debris Race*, THE REGULATORY REV. (Nov. 24, 2021), <https://www.theregreview.org/2021/11/24/kim-space-debris-race/> (noting current international law lacks force in regulation and assigning liability).

19. Aganaba, *supra* note 13.

20. See Marilyn Harbert & Asha Balakrishnan, *Why Space Debris Flies Through Regulatory Gaps*, Vol. XXXIX No.4, ISSUES IN SCI. AND TECH. (2023), <https://issues.org/space-debris-fcc-harbert-balakrishnan/> (explaining conflicting laws and guidelines caused by overlapping regulatory authorities).

21. Paul B. Larsen, *Solving the Space Debris Crisis*, 83 J. AIR L. & COM. 475, 479 (2018) (noting guidelines’ optional nature requires state adoption for effectiveness); see generally IADC, *supra* note 11.

22. See *Managing Mega-Constellations*, THE EUROPEAN SPACE AGENCY (May 30, 2017), https://www.esa.int/Enabling_Support/Preparing_for_the_Future/Discovery_and_Preparation/M_anaging_mega-constellations#:~:text=The%20existence%20of%20thousands%20of,debris%20

Starlink or Amazon's Leo (formerly, Project Kuiper), these satellite networks create new complications for an already congested low-Earth orbit as the next few years foresee launches of over fifty thousand satellites.²³ Further, it remains unclear whether these international space treaties can be applied to incidents between private companies since the language of the law refers only to a "State."²⁴

The lack of regulation, coupled with private companies' plans to ramp up satellite production and launches, raises environmental concerns.²⁵ Chemical emissions from space debris reentering Earth's atmosphere destroy the ozone and Earth's ability to reflect solar rays.²⁶ Deleterious effects stemming from chemical release on Earth and atmospheric pollution range from crippling wildlife to increased risk of cancer in humans.²⁷

In response to increasing concerns about space debris collisions, the Federal Communications Commission (FCC) effectuated a five-year rule for the disposal of satellites.²⁸ Under this rule, a satellite operator must

management%20and%20mitigation%20techniques (acknowledging the threat to spacecraft with increasing objects in orbit).

23. See Carter, *supra* note 17; Tereza Pultarova, *SpaceX Starlink Satellites Responsible for Over Half of Close Encounters in Orbit, Scientist Says*, SPACE.COM, <https://www.space.com/spacex-starlink-satellite-collision-alerts-on-the-rise> (last updated Aug. 20, 2021), (reporting SpaceX satellites involved in 1,600 near misses every week); see generally Jonathan O'Callaghan, *Satellite Constellations Could Harm the Environment, New Watchdog Report Says*, SCI. AM. (Nov. 24, 2022), <https://www.scientificamerican.com/article/satellite-constellations-could-harm-the-environment-new-watchdog-report-says/>; Mike Wall, *Amazon Signs Record-Breaking Launch Deals for Project Kuiper Internet Megaconstellation*, SPACE.COM (Aug. 17, 2022), <https://www.space.com/amazon-project-kuiper-megaconstellation-launch-deals>. These networks provide global broadband service. *Id.* (describing private companies' endeavors to increase global internet access through satellites).

24. 1972 Liability Convention, art. I.

25. See Meredith Rawls, *Megaconstellations Are Changing the Night Sky Forever, Forcing Astronomers to Adapt*, ASTRONOMY (Mar. 1, 2023), <https://www.astronomy.com/science/megaconstellations-are-changing-the-night-sky-forever-forcing-astronomers-to-adapt/> (last updated May 18, 2023).

26. See Leonard David, *Studies Flag Environmental Impact of Reentry*, SPACE NEWS (Dec. 22, 2022), <https://spacenews.com/studies-flag-environmental-impact-of-reentry/>; Rawls, *supra* note 25.

27. See Charlotte Luke, *What Is Space Junk and How Does It Affect the Environment*, EARTH.ORG (Sep. 6, 2021), <https://earth.org/space-junk-what-is-it-what-can-we-do-about-it/> (reporting on the suspected link between rocket fuel and the uptick in cancer patients); *Frequently Asked Questions About the Ozone Layer*, EPA, [https://www.epa.gov/ozone-layer-protection/frequently-asked-questions-about-ozone-layer#:~:text=.html\).-radiation,in%20the%20marine%20food%20chain](https://www.epa.gov/ozone-layer-protection/frequently-asked-questions-about-ozone-layer#:~:text=.html).-radiation,in%20the%20marine%20food%20chain) (last updated Oct. 23, 2020) (noting the depleted ozone layer removes protection from cancer-causing UV rays).

28. See David, *supra* note 13 (quoting scientists' view that existing debris will continue to multiply even without the launch of new spacecraft); Press Release, FCC, FCC Adopts New

discard its satellite within five years of mission completion.²⁹ While this rule begins to tackle the crucial task of clearing space debris, it fails to address the pressing interim issue of potential collisions given the surge in satellite launches.³⁰ The questions and contingencies the aforementioned three scenarios and others pose illustrate the need for more regulation of space activity as well as a modified standing test that clearly defines the injury and associational requirements to bring a claim.

In a standing analysis, the court must determine whether a plaintiff's alleged injury falls within the zone of interests the statute, under which the plaintiff brought the claim, was designed to protect. This Article argues that the court should clearly define the imminency requirement for injury in space debris cases and adopt the following two-part inquiry for the zone of interests test: (1) determine whether the plaintiff's interest is inconsistent with the statute and (2) assess whether the degree of inconsistency would make it unreasonable to assume Congress intended a suit of its nature. Part II discusses space law and how the Supreme Court currently addresses standing. Part III details the facts of several space debris cases and how the court analyzed standing. Part IV critically analyzes the court's standing test in space debris cases and supports adopting the new test. The Article concludes that absent a clearer doctrinal framework, the current standing doctrine becomes another barrier to meaningful regulation of space debris.

II. A BLACK HOLE OF REGULATION: THE LAW GOVERNING OUTER SPACE

While no prior case law addresses the issue of space debris, activity in outer space implicates other bodies of law.³¹ Cases like *Viasat, Inc. v. Federal Communications Commission*³² draw attention to gaps in current outer space legislation as well as potential outdated practices of agency

"5-Year-Rule" for Deorbiting Satellites to Address Growing Risk of Orbital Debris (Sep. 29, 2022), <https://docs.fcc.gov/public/attachments/DOC-387720A1.pdf> [hereinafter Press Release].

29. *Id.* This rule replaces its twenty-five-year guideline predecessor in an effort to combat orbital debris. *Id.*

30. See Pultarova, *supra* note 23 and accompanying text for a discussion of estimated launches.

31. See Brief of Petitioner-Appellant at ii, *Viasat, Inc. v. FCC*, 47 F.4th 769 (D.C. Cir. 2022) (Nos. 21-1123, 1125, 1128).

32. For a discussion on the facts, holding and court's reasoning, see *infra* notes 104-144 and accompanying text.

regulation.³³ Of significant importance is the application of constitutional standing to new categories of claims.³⁴

A. *Outer Space Treaties*

Before the FCC's introduction of the "5-Year Rule" for satellite deorbiting, no laws existed regulating the accumulation of space debris.³⁵ Two of the main authorities governing space are the 1967 Outer Space Treaty and the 1972 Liability Convention.³⁶ The Outer Space Treaty sets forth principles for governing space: making the use of space and space exploration equally available to all nations, prohibiting the weaponization of space, assigning liability to nations whose spacecraft damaged that of other nations, and prohibiting any nation or nations from colonizing space for their sovereign use.³⁷

The 1972 Liability Convention expounded on Article 7 of the Outer Space Treaty regarding liability for damage, and provides that a nation is strictly liable for any damage caused by its spacecraft on Earth or in orbit.³⁸ These agreements are the two main legal bases for establishing injury in space cases, yet they fail to address newer issues in space, chiefly the regulation of space debris.³⁹ Moreover, only one claim has ever been brought under the 1972 Liability Convention so there is a dearth of legal precedent to dictate how to treat these cases.⁴⁰ The uses of and countries present in space have drastically changed since these treaties were ratified,

33. For a discussion on the pitfalls of current FCC regulation and review, see *infra* notes 44-46 and accompanying text.

34. See Nicholas Beekhuizen, *D.C. Circuit Sweeps Away Space Debris Argument*, 35 AIR AND SPACE LAW. 1, 14-17 (2023).

35. See Press Release, *supra* note 28.

36. See Aganaba, *supra* note 13.

37. See United Nations, Off. Outer Space Affs., *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspace treaty.html> (last visited Mar. 3, 2026).

38. See United Nations, Off. Outer Space Affs., *Convention on International Liability for Damage Caused by Space Objects*, <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introliability-convention.html> (last visited Mar. 3, 2026).

39. See Scott Kerr, *Liability for Space Debris Collisions and the Kessler Syndrome (Part I)*, SPACE REV. (Dec. 11, 2017), <https://www.thespacereview.com/article/3387/1>.

40. See *id.*; see also *Outer Space Law: Lack of Regulation at the International Level Poses a Risk to Future Space Activity*, ORBITAL TODAY (Aug. 5, 2022), <https://orbitaltoday.com/2022/08/05/outer-space-law-lack-of-regulation-at-the-international-level-poses-a-risk-to-future-space-activity/#:~:text=Until%20now%2C%20these%20gaps%20have,to%20govern%20liability%20in%20space> (noting gaps in space law that were previously non-issues now pose a threat with increased space activity).

but regulation has not adapted to accommodate and regulate the developments in space.⁴¹ These agreements primarily address issues of militarization and colonization of space and require an overhaul to address new threats (notably, space debris) to space development and the environment on Earth.⁴² With the tens of thousands of satellites scheduled to launch in the near future, a lack of governance leads to increased risk of satellite collision.⁴³

FCC regulation has also failed to keep up with the commercialization of space. Historically, the FCC has routinely approved licenses for space stations without issue because developing space was a relatively new venture and research on its effect on Earth's environment was mostly non-existent, given that the activity operated outside Earth's atmosphere.⁴⁴ Today, however, more and more satellites are launched as space development has moved into the private sector, yet the FCC regulation process remains unchanged.⁴⁵ FCC applications for commercial satellite operation contain only one question that assesses whether the proposed activity would have a significant impact on the environment.⁴⁶

41. See Sophie Goguichvili, Alan Linenberger & Amber Gillette, *The Global Legal Landscape of Space: Who Writes the Rules on the Final Frontier?*, WILSON CTR. (Oct. 2, 2021), <https://www.wilsoncenter.org/article/global-legal-landscape-space-who-writes-rules-final-frontier>. The author notes that existing legislation was developed during the Cold War, primarily by the U.S. and Russia; today, however, over seventy countries have space programs. *Id.*

42. See *id.*; Olivia Cooper, *Climate Change and Space Debris, A Vicious Cycle*, ASTROBITES (Jan. 20, 2023), <https://astrobites.org/2023/01/20/climate-change-exacerbates-space-debris/> (explaining the relationship between space debris and climate change and its resulting atmospheric changes).

43. See *The Calls for More Progress on Space Governance Are Growing Louder*, RAND CORPORATION (Jan. 23, 2023), <https://www.rand.org/blog/rand-review/2023/01/the-calls-for-more-progress-on-space-governance-are.html>.

44. See *In the Matter of Space Exploration Holdings, LLC, Request for Modification of the Authorization for the SpaceX NGSO Satellite Sys.*, 36 F.C.C.R. 7995, 7997 (2021).

45. See Brian Kennedy and Alec Tyson, *Americans' Views of Space: U.S. Role, NASA Priorities and Impact of Private Companies*, PEW RSCH. CTR. (July 20, 2023), <https://www.pewresearch.org/science/2023/07/20/americans-views-of-space-u-s-role-nasa-priorities-and-impact-of-private-companies/#:~:text=The%20private%20sector%20has%20become,companies%20to%20accomplish%20its%20missions.>

46. See Ramon J. Ryan, Note, *The Fault in Our Stars: Challenging the FCC's Treatment of Commercial Satellites as Categorically Excluded from Review Under the National Environmental Policy Act*, 22 VAND. J. ENT. & TECH. L. 923, 931 (2020). The primary consideration for preparation of an environmental assessment (EA) is an action's effect on Earth's environment. 47 C.F.R. § 1.1307.

B. *The National Environmental Policy Act*

Tailoring existing space law to focus on environmental concerns is a relatively new proposition.⁴⁷ Claims regarding space activity, particularly space debris, have instead been brought under the National Environmental Policy Act (NEPA).⁴⁸ NEPA requires federal agencies to consider environmental impacts before taking any major federal actions.⁴⁹ Parties can bring suits under NEPA per the Administrative Procedure Act (APA) that allows plaintiffs to bring a cause of action alleging non-compliance against federal agencies.⁵⁰

To successfully bring a claim, plaintiffs must allege an injury within NEPA's zone of interests.⁵¹ In defining the zone of interests, courts look to the purpose of an act.⁵² NEPA's purpose is

to declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation ⁵³

This purpose is often generalized as to “protect and promote environmental quality.”⁵⁴

To review a proposed action under NEPA, the agency must determine under which level of review the action falls.⁵⁵ There are three

47. See generally Alessandra Marino & Thomas Cheney, *Centring Environmentalism in Space Governance: Interrogating Dominance and Authority Through a Critical Legal Geography of Outer Space*, 63 SPACE POL'Y 1 (2023); Kerr, *supra* note 39 (discussing the possibility of space debris non-compliance as an injury under the Liability Convention).

48. See *Viasat, Inc. v. Federal Communications Commission*, 47 F.4th 769, 778 (D.C. Cir. 2022); Michael B. Runnels, *On Launching Environmental Law into Orbit in the Age of Satellite Constellations*, 88 J. AIR L. & COMM. 181 (2023) (arguing for the application of NEPA to orbital environment regulation).

49. See EPA, *What Is the National Environmental Policy Act?* (last updated Oct. 5, 2023), <https://www.epa.gov/nepa/what-national-environmental-policy-act>.

50. See EPA, *Summary of the Administrative Procedure Act* (last updated Aug. 17, 2023), <https://www.epa.gov/laws-regulations/summary-administrative-procedure-act>.

51. See Sheldon K. Rennie, *Bennett v. Plenert: Using the Zone-of-Interests Test to Limit Standing Under the Endangered Species Act*, 7 VILL. ENV'T L.J. 375, 375 (1996).

52. See Ilyssa Birnbach, *Newly Imposed Limitations on Citizens' Right to Sue for Standing in a Procedural Rights Case*, 9 FORDHAM ENV'T L. REV. 311, 329 (2017).

53. National Environmental Policy Act of 1969, 42 U.S.C. 4321 § 2.

54. See 42 U.S.C.A. § 4331(a)-(c) (West); *Committee to Save Rio Hondo v. Lucero*, 102 F.3d 445, 448.

55. See EPA, *National Environmental Policy Act Review Process* (last updated Oct. 3, 2023), <https://www.epa.gov/nepa/national-environmental-policy-act-review-process#:~:text=>

levels of review: categorical exclusion, environmental assessment, and environmental impact statement.⁵⁶ An activity that is a categorical exclusion is exempted from conducting a detailed environmental analysis because it does not have a significant impact on the environment.⁵⁷

Typically, space activity has been categorically excluded from review because FCC rules focus on effects to the environment at the Earth's surface.⁵⁸ Consequently, the FCC has rarely received petitions that highlight environmental issues and claim NEPA violations related to licensing space stations.⁵⁹ If the categorical exclusion does not apply, the next standard is an environmental assessment (EA).⁶⁰ This assessment is used to determine whether an environmental impact statement is needed.⁶¹ Included in an EA are the stated purpose for the action, alternatives, impacts on the environment of both the proposed action and the alternatives, and a list of people consulted in the preparation of the report.⁶²

If the agency determines that the environmental impact is significant, then the agency must prepare an environmental impact statement which is a more thorough analysis that proceeds in several stages.⁶³ First, the agency announces the preparation of the environmental impact statement, inviting the public to submit comments.⁶⁴ Once the public review period on the draft statement ends, the agency addresses the comments in a final statement.⁶⁵ After completion of the environmental impact statement, the agency produces a record that contains an explanation of the decision and other alternatives considered.⁶⁶

The%20National%20Environmental%20Policy%20Act,Categorical%20Exclusion%20determination%20(CATEX).

56. FAA, *What Are the Levels of Environmental Review the FAA Considers as They Follow NEPA?*, [https://www.faa.gov/faq/what-are-levels-environmental-review-faa-considers-they-follow-nepa#:~:text=Once%20the%20FAA%20determines%20that,Environmental%20Impact%20Statement%20\(EIS\)](https://www.faa.gov/faq/what-are-levels-environmental-review-faa-considers-they-follow-nepa#:~:text=Once%20the%20FAA%20determines%20that,Environmental%20Impact%20Statement%20(EIS)) (last visited Mar. 3, 2026).

57. EPA, *supra* note 55.

58. See 47 C.F.R. § 1.1307(a); *In the Matter of Space Exploration Holdings, LLC*, Request for Modification of the Authorization for the SpaceX NGSO Satellite Sys., 36 F.C.C.R. 7995, 7997 (2021).

59. See *Space Expl. Holdings*, 36 F.C.C.R. 7995 at 8034.

60. *Id.*

61. See FAA, *supra* note 56.

62. EPA, *supra* note 55.

63. See *id.*

64. *Id.*

65. *Id.* (allowing forty-five days for public review and comment submission).

66. *Id.*

C. Article III Standing

In order for a court to hear a NEPA claim, a party must have standing to bring a suit. Under the U.S. Constitution, the judiciary can hear all “cases” and “controversies” brought before it.⁶⁷ The Supreme Court set forth a test for standing to determine whether a plaintiff’s claim satisfies this limitation.⁶⁸ To successfully bring a claim, a plaintiff must (1) have “suffered an injury in fact” that is (a) “concrete and particularized” and (b) “actual or imminent,” (2) establish “causal connection between the injury and the conduct complained of,” and (3) have cause to redress the injury where a favorable outcome is “likely,” and not “merely speculative.”⁶⁹

If there are multiple plaintiffs in a case, standing must be analyzed separately for each one.⁷⁰ An organization can also bring a claim so long as it satisfies the same standing test as for an individual.⁷¹ Associational standing is another route available for organizations to bring claims on behalf of their members when (1) the member would himself satisfy the standing test, (2) the interests the organization seeks to protect are relevant to its purpose, and (3) the claim and the relief requested do not need individual members as parties to the lawsuit.⁷²

Because a mere procedural violation does not constitute adequate injury, bringing a claim under NEPA requires (1) causally linking the omitted NEPA review to a government decision that may have been improperly decided due to the omission and (2) establishing a connection between that decision and the plaintiff’s injury.⁷³ Redressability depends on whether the determination of an injury could go the other way after “adequately consider[ing] . . . environmental concerns.”⁷⁴

Given the precedential nature of this case, it is necessary to consider standing in other cases that involved NEPA claims.⁷⁵ In *Florida Audubon*

67. U.S. Const. art. III, § 2.

68. See generally *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560-61 (1992).

69. *Id.* at 560 (internal quotation marks omitted).

70. See generally *Havens Realty Corp. v. Coleman*, 455 U.S. 363 (1982).

71. See *id.* at 378.

72. *Hunt v. Wash. State Apple Advert. Comm’n*, 432 U.S. 333, 343 (1977).

73. See *Spokeo, Inc. v. Robins*, 578 U.S. 330, 342 (2016) (prohibiting injury in the form of “bare procedural violation”); *WildEarth Guardians v. Jewell*, 738 F.3d 298, 306 (D.C. Cir. 2013).

74. See *WildEarth*, 738 F.3d at 305 (explaining procedural violations involve relaxed redressability requirements).

75. See *Beekhuizen*, *supra* note 34 (observing the D.C. Circuit’s constitutional precedent-setting in *Viasat, Inc. v. FCC*, 47 F.4th 769 (D.C. Cir. 2022)).

Society v. Bentsen,⁷⁶ appellant environmental organizations brought a NEPA claim that the Secretary of the Treasury and Commissioner of the Internal Revenue Service failed to prepare an environmental impact statement related to a tax credit for a fuel additive.⁷⁷ The D.C. Circuit found that appellants' alleged injury rested on a "lengthy chain of conjecture" that did not meet a "substantial probability" of occurring.⁷⁸ The appellants' theory of injury posited the tax credit would cause increased production of the fuel additive, which would lead to producing more ethanol and thereby an increase in corn and sugar production to make ethanol—the production of which would increase agricultural pollution that would affect the wildlife areas appellants visit.⁷⁹ While the appellants had satisfied the geographical nexus by demonstrating potential harm to wildlife areas their members enjoy, their assertion that agricultural production would increase was too speculative.⁸⁰

In analyzing whether the alleged injury fell within NEPA's zone of interests, the court stated that the injury must be toward an interest protected by NEPA.⁸¹ Because the injury involved the preparation of an environmental impact statement, the court found this satisfied the zone of interests test.⁸² In order to have standing in an environmental impact statement claim, the court noted, a plaintiff must demonstrate a "particularized environmental interest of theirs that will suffer demonstrably increased risk, and whether the [alleged injurious action] promulgated by the defendant is substantially likely to cause that demonstrable increase in risk to their particularized interest."⁸³

The dissent disagreed with the majority's holding of no standing, asserting the impossibility of bringing a NEPA claim with this standard.⁸⁴ Courts can relax standing requirements for NEPA claims, the dissent noted, because a plaintiff must only allege a "risk of serious environmental harm," not a "certainty" that the harm will occur.⁸⁵ Instead,

76. 94 F.3d 658, 662 (D.C. Cir. 1996).

77. *See id.*

78. *Id.* at 666 (rejecting the assertion as "mere allegations" not equating to injury).

79. *Id.*

80. *Id.* at 668 (objecting for lack of evidence that agricultural production would increase and set off a chain of events leading to injury).

81. *Bentsen*, 94 F.3d at 665.

82. *See id.*

83. *See id.* (stating the standard for claims involving environmental impact statement preparation).

84. *See id.* at 673 (Rogers, J., dissenting) (claiming the majority misapplied the standing test for procedural rights).

85. *See id.* at 678 (Rogers, J., dissenting) (explaining procedural rights assertions do not require actual harm).

the dissent argued that the majority opinion essentially required the plaintiff to conduct the environmental analysis that his suit calls for the agency to make.⁸⁶

The Tenth Circuit offered another interpretation of the injury requirement in *Committee to Save the Rio Hondo v. Lucero*.⁸⁷ The appellant environmental organization brought suit challenging the Forest Service for failure to conduct an environmental impact statement after the Service approved summertime use of a ski area located near the Rio Hondo River in New Mexico.⁸⁸ The appellant claimed a concrete interest in the land and water near the ski area that summer use would impact.⁸⁹ The court found that increased risk of environmental harm due to an agency's "uninformed decisionmaking" came within NEPA's protection and could form the basis for the injury in fact requirement.⁹⁰

The court also stated that the appellant must "be among the injured" by this increased risk.⁹¹ In order to demonstrate this, the appellant must establish a "geographical nexus" to, or physically use, the location affected by the agency action making it reasonable that the appellant could be injured.⁹² Because appellants were in physical proximity to and actually used the land and water in the ski area, the court held the appellant satisfied the geographical nexus test sufficient to meet the injury requirement for standing.⁹³

In addition to an alleged injury satisfying constitutional standing for a NEPA claim, that injury must also fall under NEPA's zone of interests. The Ninth Circuit followed a two-part test to make this determination in *Presidio Golf Club v. National Park Service*.⁹⁴ In this case, the appellant golf club alleged the National Park Service prepared an inadequate EA

86. See *Bentsen*, 94 F.3d at 675 (Rogers, J., dissenting).

87. 102 F.3d 445, 450 (10th Cir. 1996) (holding the appellant satisfied the injury in fact requirement).

88. *Id.* at 446-47 (asserting plan approval required an environmental impact statement rather than the EA the Forest Service prepared).

89. *Id.* at 448 (arguing the Forest Service's failure to conduct an environmental impact statement rather than an EA brought injury to interest). The appellant argued the summer use of the ski area could result in decreased water quality. *Id.* at 450 (specifying the environmental impact to the water).

90. See *id.* at 448-49 (acknowledging the uninformed decision stemmed from a failure to prepare an environmental impact statement).

91. *Id.* at 449 (setting the scope of injury).

92. *Lucero*, 102 F.3d at 449 (explaining the geographical nexus component of injury requirement).

93. *Id.* at 450 (finding the appellant sufficiently demonstrated concrete injury).

94. 155 F.3d 1153, 1158 (9th Cir. 1998) (deciding whether the plaintiff's alleged injuries constituted standing).

and failed to conduct an environmental impact statement in conjunction with its plans to build a new public clubhouse on the land of the old private clubhouse after demolishing it.⁹⁵ The appellee contended that the golf club's interests were purely economic and thus fell out of NEPA's zone of interests.⁹⁶ The club, however, maintained that its interest in preserving the historic clubhouse and the surrounding environment fell under NEPA's protection.⁹⁷

The Ninth Circuit observed that a finding that the plaintiff's interest fell outside the scope of NEPA would require a determination that (1) the interests are "inconsistent with the purposes of NEPA" and (2) "the interests are so inconsistent that it would be unreasonable to assume that Congress intended to permit the suit."⁹⁸ In applying this test, the court found that the club's purpose to "improve and maintain grounds and buildings for athletic purposes," was in line with NEPA's purpose of creating "enjoyable harmony between man and his environment" and "stimulat[ing] the health and welfare of man" since maintaining the grounds implied maintaining the environment, and the club fostered a healthy lifestyle for members.⁹⁹ Thus, the court concluded, the club's interest was not inconsistent with NEPA and thereby it could not be presumed that Congress intended to prohibit such a suit.¹⁰⁰

III. PREPARING FOR LIFTOFF: STANDING IN SPACE DEBRIS CASES

To date, there have been very few lawsuits relating to space debris. The first claim, brought by a satellite operator and an environmental group against the FCC with an aerospace company as the intervenor, was dismissed for lack of standing.¹⁰¹ The second lawsuit, brought by a non-profit group against the FCC, with the same aerospace company as the intervenor, failed to show that the FCC's approval of a satellite license was arbitrary and capricious.¹⁰² A third claim, brought by individual

95. *Id.* at 1157.

96. *Id.*

97. *Id.*

98. *Id.* at 1158 (citing *Douglas County v. Babbitt*, 48 F.3d 1495, 1500 (9th Cir. 1995)).

99. *Presidio*, 155 F.3d at 1158.

100. *Id.* at 1159.

101. *See Viasat, Inc. v. Federal Communications Commission*, 47 F.4th 769, 779 (D.C. Cir. 2022).

102. *See International Dark-Sky Association, Inc. v. Federal Communications Commission*, 106 F.4th 1206, 1220 (D.C. Cir. 2024).

plaintiffs against NASA, is currently pending.¹⁰³ This section describes the facts and court's analysis in each case.

A. *Viasat, Inc. v. Federal Communications Commission*

1. Case Facts and Arguments

In 2021, Viasat, along with environmental organization The Balance Group, appealed in federal court an order the FCC issued to Space Exploration Holdings, LLC (SpaceX).¹⁰⁴ Viasat is a global communications company that provides broadband service to homes as well as military and commercial networks.¹⁰⁵ The Balance Group is an environmentally-focused consulting group that studies satellite and wireless networks and their impact on the environment.¹⁰⁶ In 2018, the FCC approved a license for SpaceX to launch a non-geostationary orbit satellite network.¹⁰⁷ SpaceX planned to deploy the satellites in order to provide more comprehensive broadband service in the U.S.¹⁰⁸ The company later applied to modify the grant in order to seek permission to fly the satellites at a lower altitude.¹⁰⁹

Viasat challenged this modification by petitioning the FCC on several matters including a petition to deny or defer the license as well as to suspend or revoke the license.¹¹⁰ Viasat argued that the order violated requirements under NEPA.¹¹¹ Viasat provided five categories of environmental impact under which the order should be reviewed: (1) the effect on the atmosphere and climate of launching and deorbiting high quantities of satellites, (2) the risks posed to Earth's atmosphere in the event of unsuccessful satellite reentry, (3) a spike in light pollution, (4) the safety and sustainability of the orbital environment, and (5) the effect of radio frequency emissions from the satellites.¹¹²

103. For a discussion of this pending litigation, see *infra* notes 169-173 and accompanying text.

104. See generally *Viasat*, 47 F.4th at 774.

105. See generally *Viasat*, <https://www.viasat.com/> (last visited Mar. 3, 2026).

106. See *The Balance Group*, <https://www.thebalancegroup.net/> (last visited Mar. 3, 2026).

107. See *In Re Space Exploration Holdings, LLC, Request for Modification of the Authorization for the SpaceX NGSO Satellite Sys.*, 36 F.C.C.R. 7995, 7997 (2021). Founded by Elon Musk, SpaceX designs, produces, and launches satellites and rockets. See *SpaceX*, <https://www.spacex.com/mission/> (last visited Mar. 3, 2026).

108. See *In re Space Expl. Holdings, LLC*, 36 FCC Rcd. at 7996-98; see generally *Starlink*, <https://www.starlink.com/technology> (last visited Mar. 3, 2026).

109. See *In re Space Expl. Holdings, LLC*, 36 FCC Rcd. at 7996-98 (noting the benefit of increased connection speed with satellites at lower altitudes).

110. *In re Space Expl. Holdings*, 36 F.C.C.R. at 7996.

111. *Id.* at 8036.

112. *Id.*

While the FCC declined to consider whether the alleged environmental harm violated NEPA, the agency held that Viasat's arguments were too speculative and vague to warrant the production of an environmental analysis under NEPA.¹¹³ Ultimately, the FCC denied all of Viasat's petitions and approved the modification to SpaceX's license.¹¹⁴ Viasat and The Balance Group appealed the order to the United States Court of Appeals for the District of Columbia Circuit, claiming the FCC violated NEPA by issuing the license without conducting an EA.¹¹⁵

Appellants claimed that they each satisfied Article III standing, particularly as it related to injury, to bring their claims against the FCC for NEPA violations.¹¹⁶ Viasat claimed injury through heightened risk of spacecraft collisions, increased costs in designing satellites to navigate a crowded orbital environment, and express competition with SpaceX.¹¹⁷ Viasat operates a satellite that flies near SpaceX's mega-constellation and alleged injury from SpaceX satellites colliding with other spacecraft that would produce debris damaging Viasat's satellite.¹¹⁸ The Balance Group claimed associational standing through injury to its members, particularly two astronomers whose research capabilities have been harmed by light pollution from Starlink satellites.¹¹⁹

Viasat also argued that the appellants collectively fell within NEPA's zone of interests.¹²⁰ Given that NEPA seeks to achieve a "responsible" and "efficient" use of environmental resources, Viasat contended that each appellant's mission came within the zone of interests that NEPA protects.¹²¹ The Balance Group fell under this umbrella through its work in protecting the environment from harm, and Viasat's interest in sharing and sustaining the orbital environment fit within this zone.¹²²

113. *Id.* at 8038, 8042-43.

114. *Id.* at 8048-49.

115. *See generally* Viasat, Inc. v. Federal Communications Commission, 47 F.4th 769 (D.C. Cir. 2022). For a discussion about the requirements for an EA, see *supra* notes 60-62 and accompanying text.

116. *See id.* at 15.

117. *Id.* at 19, 21.

118. *See Viasat*, 47 F.4th at 779.

119. *See* Brief of Petitioner-Appellant, *supra* note 31, at 17-18. The Balance Group claimed it had to redirect resources and personnel from other projects as a result of the SpaceX satellite license. *Id.*

120. *Id.* at 60.

121. *See id.* at 59.

122. *Id.*

SpaceX argued that Viasat and The Balance Group lacked standing to bring their claims.¹²³ SpaceX claimed that appellants failed to demonstrate a “concrete” injury caused by the FCC’s order and that Viasat’s economic interests underpinning their claims fell outside NEPA’s zone of interests.¹²⁴ Only economic harms that implicate environmental harm can fall into this zone; SpaceX, however, claimed that Viasat lacked a corresponding environmental claim with its economic competition concerns.¹²⁵

2. The D.C. Circuit’s Analysis

On appeal, the D.C. Circuit considered Viasat’s and The Balance Group’s standing to bring a NEPA claim.¹²⁶ The court did not rule on the merits of the environmental claim after concluding that neither Viasat nor The Balance Group had standing.¹²⁷ In deciding the case, the court began its individual standing analysis for Viasat with the injury-in-fact requirement, considering each injury alleged by Viasat in turn: (1) a possible collision between Viasat and SpaceX satellites, (2) the increase in Viasat’s operating costs due to SpaceX’s satellites, and (3) the FCC licensure of Viasat’s competitor.¹²⁸

As to the possible collision, the court concluded the allegation was “too speculative.”¹²⁹ Based on Viasat’s theory, a SpaceX satellite would have to collide with another object, create debris large enough to damage a satellite, and travel undetected in a collision course with Viasat’s satellite.¹³⁰ To satisfy standing for a future harm, the party must demonstrate that the risk posed is both “substantial” and “substantially increase[d]” by the other party’s action.¹³¹ In assessing imminency, the court relied on the FCC’s calculation of a one-in-forty-four to one-in-two hundred probability of a SpaceX satellite colliding with another object within the next hundred years to determine substantial risk.¹³² The court reasoned that both the risk and its likelihood of increasing were too

123. *Id.* at 66-67.

124. Brief of Respondent-Appellee at 67, *Viasat, Inc. v. FCC*, 47 F.4th 769 (D.C. Cir. 2022) Nos. 21-1123, 1125, 1128.

125. *Id.* at 68.

126. *Viasat, Inc. v. Federal Communications Commission*, 47 F.4th 769, 774 (D.C. Cir. 2022).

127. *Id.* at 779.

128. *Id.* at 779-780.

129. *Id.* at 779.

130. *Id.* (explaining the court’s interpretation of Viasat’s theory of injury).

131. *Id.*

132. *Id.*

attenuated based on the series of conditions that would have to occur for a SpaceX satellite to damage a Viasat satellite.¹³³

Regarding Viasat's second alleged injury, the communications company claimed that the addition of SpaceX satellites into low-Earth orbit would increase its operating costs by making it more challenging and costly to navigate launches into a crowded orbital space.¹³⁴ In response, the court determined this argument pertained to economic harms which are not covered by NEPA's zone of interests.¹³⁵ Viasat responded that environmental concerns, which are protected under NEPA, can flow from economic harms, and here the environmental concern is "orbital crowding."¹³⁶

For these hybrid claims, the court stated that "Article III standing is not geographically unbounded;" rather, a complainant "must be close to the . . . congestion that he wants to avoid."¹³⁷ The court provided examples of previous cases where a geographical nexus had been sufficiently established to satisfy a requirement for imminent injury, where the plaintiff was in close proximity to the alleged injurious activity.¹³⁸ An injury must rise beyond the level of a "cognizable interest," the court reasoned, and while space congestion may be a general problem, in this instance neither Viasat nor its stakeholders suffered a particularized injury.¹³⁹ The court quickly dismissed Viasat's third alleged injury, observing that competition is strictly an economic harm, with no corresponding environmental concerns.¹⁴⁰

Turning to analyze The Balance Group's claims, the court noted that associational standing requires "indicia of a traditional membership."¹⁴¹ Qualifying membership in an organization can include selecting leadership, funding the organization, and directing activities, but merely subscribing to a listserv or reading newsletters does not suffice.¹⁴² The court held that The Balance Group did not satisfy the associational

133. *Id.*

134. *Id.*

135. *Id.*

136. *Viasat*, 47 F.4th at 780.

137. *Id.*

138. *See id.* (citing cases where an apartment owner filed a lawsuit against a building across street, a downtown building owner sued for construction of a building downtown, and a "neighboring landowner" sued for environmental concerns regarding federal acquisition of land).

139. *Id.*

140. *See id.* at 779. Because pure economic harm does not fall under NEPA's protection, the injury requirement was not satisfied. *Id.*

141. *Viasat*, 47 F.4th at 781 (quoting *Sorenson Communications, LLC v. Federal Communications Commission*, 897 F.3d 214, 225 (D.C. Cir. 2018)).

142. *Id.*

standing requirements because it did not explain how the group “relates with its members.”¹⁴³ The court also found that the two affidavits from members did not describe involvement with the organization beyond an “assertion of membership,” and were thus insufficient evidence of an association.¹⁴⁴

B. International Dark-Sky Association, Inc. v. Federal Communications Commission

1. Case Facts and Arguments

International Dark-Sky Association, Inc. v. Federal Communications Commission was prompted by the FCC’s approval of a license for SpaceX to launch a satellite network of 7,500 satellites.¹⁴⁵ The International Dark-Sky Association (Dark-Sky), an environmental group of amateur astronomers and advocates of preserving a dark night sky, challenged the license.¹⁴⁶ The group argued that the FCC failed to conduct an environmental review, as required by NEPA, of the satellite network’s light pollution and atmospheric effects before issuing the license.¹⁴⁷ The FCC rejected Dark-Sky’s argument, concluding the law did not necessitate an environmental review, and the license remained valid.¹⁴⁸

On appeal, Dark-Sky argued that it had associational standing to challenge the FCC order on behalf of its members.¹⁴⁹ Dark-Sky first argued that its members had individual standing to sue.¹⁵⁰ To allege injury, the organization cited statements made by member-astronomers about light pollution from satellites in Earth’s orbit.¹⁵¹ Dark-Sky argued that the injury had already occurred through existing SpaceX satellites in orbit, and that further injury was imminent with the contested license issued by the FCC.¹⁵² As for the remaining standing elements, Dark-Sky claimed that the FCC’s failure to conduct an environmental review of the light pollution and atmospheric effects of SpaceX’s satellite launch caused the

143. *Id.*

144. *Id.* at 781-82.

145. *See International Dark-Sky Association, Inc. v. Federal Communications Commission*, 106 F.4th 1206, 1212 (D.C. Cir. 2024).

146. *See id.*

147. *See id.*

148. *See id.*

149. *See* Brief for Appellant at 9-10, *International Dark-Sky Association, Inc. v. Federal Communications Commission*, 106 F.4th 1206 (D.C. Cir. 2024).

150. *See id.* at 10-11. For a discussion of the elements of associational standing, *see supra* note 72.

151. *See id.*

152. *See id.*

harm, which could be redressed through the court requiring the FCC to perform a proper NEPA review.¹⁵³

Regarding associational standing's second element, Dark-Sky argued that its interest in preventing light pollution is germane to its purpose as an organization because its core mission is preserving dark skies through "responsible lighting" and educating the public on corresponding practices.¹⁵⁴ Dark-Sky also claimed to satisfy the third element, that its members' participation in the lawsuit was not required for a successful claim.¹⁵⁵

In response, SpaceX made two arguments regarding Dark-Sky's standing to sue. First, SpaceX argued the court should dismiss the claim for lack of standing.¹⁵⁶ If the claim succeeded, SpaceX argued that the court should narrow Dark-Sky's standing to be based only on light pollution and not atmospheric effects because the latter is unrelated to Dark-Sky's purpose.¹⁵⁷ On review prior to issuing the license, SpaceX claimed that the FCC found that the satellite network did not risk substantial environmental damage to sunlight reflectivity or atmospheric conditions.¹⁵⁸

SpaceX further argued that Dark-Sky did not satisfy all the elements for associational standing.¹⁵⁹ As for satisfying the requisite "indicia of a traditional membership association," SpaceX claimed that Dark-Sky's brief failed to discuss whether membership fees finance the association's activities—a quality that can satisfy this requirement.¹⁶⁰

2. The D.C. Circuit's Analysis

In assessing whether Dark-Sky satisfied associational standing to challenge the satellite license on behalf of the astronomers, the court determined that Dark-Sky is a bona fide membership organization.¹⁶¹ The court found that two statements by members alleging injury from the satellite license and confirming Dark-Sky represented their interests were

153. *See id.* at 10, 13.

154. *Id.* at 11.

155. *See id.* at 13.

156. *See* Space Exploration Holdings, LLC's Final Response Brief as Intervenor for Appellee at 4, *International Dark-Sky, Association, Inc. v. Federal Communications Commission*, 106 F.4th 1206 (D.C. Cir. 2024).

157. *See id.*

158. *See id.* at 11.

159. *See id.* at 30.

160. *Id.* at 29.

161. *See* *International Dark-Sky Association, Inc. v. Federal Communications Commission*, 106 F.4th 1206, 1217 (D.C. Cir. 2024)

sufficient to make this determination.¹⁶² Specifically, the court explained that no further inquiry into an organization's operations is required when "an organization has identified members and represents them in good faith."¹⁶³

Applying the associational standing test, the court found that the individual members had standing to sue on their own.¹⁶⁴ The court explained the standard for successfully alleging injury: member declarations attesting to use of the "affected area" and that the activity in question will obstruct their use of the area.¹⁶⁵ Here, the affected area was the sky and, given that the members are astronomers, light pollution arising out of the satellite license would diminish the astronomers' viewing capabilities.¹⁶⁶ The court agreed with Dark-Sky's arguments for satisfying the causation and redressability requirements of standing as well as the remaining germaneness and participation requirements of associational standing.¹⁶⁷ Though Dark-Sky satisfied standing, the environmental claim did not succeed on the merits.¹⁶⁸

C. *Otero Claim Against NASA*

On March 8, 2024, a piece of space debris—later identified as NASA flight support equipment—crashed through the roof of the Alejandro Otero family home in Florida.¹⁶⁹ Otero filed a claim against NASA seeking damages for property destruction, business interruption, pain and suffering, and other costs under the Federal Tort Claims Act.¹⁷⁰ In addition to the negligence claim, Otero argued for strict liability.¹⁷¹ This is a liability regime under the 1972 Liability Convention, which Otero argued should apply here since there is no meaningful difference between NASA space debris falling into someone's home in a foreign country and

162. *See id.*

163. *Id.*

164. *See id.*

165. *Id.*

166. *See id.*

167. *See id.* at 1217-18.

168. *See id.* at 1220.

169. *See Hedgepath, supra* note 5.

170. *See id.*

171. *See id.*

a home in the United States.¹⁷² The claim remains pending as of the date of this Article.¹⁷³

IV. THE GRAVITATIONAL PULL OF PRECEDENT: A CRITICAL ANALYSIS OF THE COURT'S REASONING IN SPACE DEBRIS CASES

Although the D.C. Circuit decided both *Viasat* and *International Dark-Sky*, the court applied the standing analysis differently to yield divergent outcomes. While the D.C. Circuit appropriately determined that *Viasat* lacked standing to sue for economic injuries, the court missed an opportunity to delineate a clear threshold for imminent injury in space debris cases.¹⁷⁴ The court also inconsistently applied the zone of interests test in tandem with its standing analysis as well as the associational standing test in *Viasat* and *International Dark-Sky*. Given the precedential nature of *Viasat*—setting parameters for standing in claims involving space debris—the court had the opportunity to distinguish prior precedent and consider other circuit courts' reasoning in determining what constitutes an injury.¹⁷⁵

A. *The Imminency Requirement for Injury*

In line with a party's procedural right to bring a NEPA claim under the APA, some courts have lowered the standard for imminency.¹⁷⁶ According to the dissenting opinion in *Bentsen*, courts can relax standing requirements for NEPA claims because a plaintiff must only allege a "risk of serious environmental harm," not a "certainty" that the harm will

172. *See id.*

173. *See Florida Family Whose Roof Hit by Debris from Space Station Sues NASA for Damages*, CBS News (June 23, 2024), <https://www.cbsnews.com/news/florida-family-space-junk-iss-nasa-claim/>.

174. *See* Kenley S. Maddux, *NEPA's Zone of Interests*, 25 WASH. U. J. L. & POL'Y 189, 203 (2007) (describing circumstances for economic concerns as qualifying injuries). Claims that challenge an agency's failure to prepare an environmental review require an environmental injury. *Id.* (noting limitations to the injury requirement); *see* Beekhuizen, *supra* note 34, 16 (desiring clarity on the level of risk to constitute injury).

175. *See* Beekhuizen, *supra* note 34 (observing constitutional issues of space law have mostly existed in academic debate). The author acknowledged this case as setting the first significant precedent for commercial space law. *Id.*; *see also* J.B. Ruhl, *Where No EIS Has Gone Before*, 37 NAT. RES. & ENV'T 52, 53 (2023) (commenting that the connection between NEPA and outer space remains an open issue).

176. *See* *Salmon River Concerned Citizens v. Robertson*, 32 F.3d 1346, 1354 (9th Cir. 1994) (stating the procedural right protecting concrete interests does not require satisfying all of the typical standards for immediacy).

occur.¹⁷⁷ Instead of adopting this view, the court reaffirmed the precedential standard established in *Food & Water Watch, Inc. v. Vilsack*:¹⁷⁸ alleging future harm requires demonstrating a substantial risk that is increased by the challenged action.¹⁷⁹ In *Vilsack*, the D.C. Circuit admitted that there was no clear definition for “substantial,” but seven years later the court declined to take the opportunity to establish this definition in *Viasat*.¹⁸⁰ Instead, the court laid out its case for speculation.¹⁸¹

The court reasoned that Viasat’s alleged injury of increased collision risk contained too many “unlikely contingencies,” an analysis reminiscent of the D.C. Circuit’s opinion in *Bentsen*.¹⁸² Instead of defining what an imminent injury is, the court described what it is not.¹⁸³ Without comparing the data to a baseline collision rate, the court relied heavily on the probability range regarding potential collisions involving SpaceX satellites (a one-in-forty-four to one-in-two hundred chance of a collision within the next hundred years) extracted from appellee’s calculations to determine that appellant’s risk of collision injury was too attenuated.¹⁸⁴ But the court refrained from establishing a threshold for imminency because collision depends “on the number of satellites launched and the disposal failure rate.”¹⁸⁵ Given the amount of anticipated satellite launches and the exponentially increasing presence of space debris orbiting Earth, this vague qualifying statement dampens the efficacy of a statistic with potentially wide margins of error.¹⁸⁶

177. *Florida Audubon Society v. Bentsen*, 94 F.3d 658, 678 (D.C. Cir. 1996) (Rogers, J., dissenting).

178. 808 F.3d 905, 914 (D.C. Cir. 2015).

179. *Food & Water Watch, Inc. v. Vilsack*, 808 F.3d 905, 914 (D.C. Cir. 2015); *see Viasat, Inc. v. Federal Communications Commission*, 47 F.4th 769, 779 (D.C. Cir. 2022) (applying the standard promulgated in *Vilsack*).

180. *Vilsack*, 808 F.3d at 915 (acknowledging ambiguity in defining the term).

181. *Viasat*, 47 F.4th at 779 (describing Viasat’s theory of injury as “too speculative”).

182. *Id.* (listing the string of incidents that must occur to result in a satellite collision); *Bentsen*, 94 F.3d at 666 (describing the appellant’s alleged injury as a “chain of conjecture”).

183. *See id.* (maintaining the collision theory does not “cross the line” between speculation and imminency).

184. For a discussion of the court’s statistical analysis of collision, *see supra* notes 129-133 and accompanying text.

185. *Viasat*, 47 F.4th at 779 (subjecting accuracy of estimate to unknown future circumstances).

186. Brief of Petitioner-Appellant, *supra* note 31, at 7 (noting SpaceX’s authorization to launch approximately ten thousand satellites over the next fifteen years). *See* NASA Off. Inspector Gen., *NASA’s Efforts to Mitigate the Risks Posed by Orbital Debris*, Rep. No. IG-21-011, at 1 (Jan. 27, 2011) (displaying an exponential increase of objects launched into space); *Frequently Asked Questions*, NASA.GOV, <https://orbitaldebris.jsc.nasa.gov/faq/#> (last visited Mar. 3, 2026) (reporting size categories in orbit ranging from twenty-five thousand to 100 million); *see also*

B. The Zone of Interests Test

In applying the zone of interests test in *Viasat*, the D.C. Circuit relied on precedent from *Bentsen*. Per *Bentsen*, the D.C. Circuit merely asked whether the alleged injury fell within NEPA's zone of interests.¹⁸⁷ However, *Viasat* can be distinguished from *Bentsen* because here plaintiffs had not asserted an omitted or insufficient environmental impact statement; instead they alleged failure to conduct an EA, a lower level environmental review.¹⁸⁸ Had it distinguished *Bentsen*, the D.C. Circuit could have adopted the two-part inquiry used by other courts that requires a determination that a plaintiff's interest is (1) inconsistent with NEPA and (2) the degree of inconsistency would make it unreasonable to assume Congress intended a suit of this nature, in order for the interest to fall outside NEPA's zone of interests.¹⁸⁹ This inquiry produces a lower threshold that does not require the interest to be squarely the type that NEPA protects, but rather that the interest correspond to the intention, purpose, or values of the act.¹⁹⁰ Had the court conducted its inquiry in this manner, it would likely have found Viasat's interest was not inconsistent with NEPA.¹⁹¹

In *Presidio*, as in *Viasat*, the appellee alleged the appellant's injury was purely economic.¹⁹² The Ninth Circuit in *Presidio*, unlike the D.C. Circuit in *Viasat*, concluded that the environmental implications of the interest fell under NEPA's protection.¹⁹³ The Ninth Circuit found that the club's purpose of maintaining its grounds and buildings implied

Carter, *supra* note 17 (estimating over 100 trillion untracked pieces of space debris in orbit); Ryan, *supra* note 46 (noting the increase of commercial satellites from under fifteen hundred to tens of thousands in the span of a few years).

187. For a discussion on the D.C. Circuit's analysis of zone of interests, see *supra* notes 134-140 and accompanying text.

188. See *Florida Audubon Society v. Bentsen*, 94 F.3d 658, 666 (D.C. Cir. 1996) (noting the higher standard for the plaintiff's challenging environmental impact statement).

189. See *Presidio Golf Club v. National Park Service*, 155 F.3d 1153, 1158 (9th Cir. 1998). The court connects the concepts of "interest" and "injury." *Id.* (explaining that the alleged competition injury relates to economic interest, which falls outside the zone of interests).

190. See *id.* (noting the nature of the test is not "demanding" but only requires a "rough correspondence of interests").

191. See *Viasat, Inc. v. Federal Communications Commission*, 47 F.4th 769, 780 (D.C. Cir. 2022) (responding to Viasat's argument alleging the protection of economic interests under NEPA also implicates environmental concerns).

192. For a discussion of the facts of *Presidio*, see *supra* notes 95-97 and accompanying text.

193. For a discussion of the court's holding in *Presidio*, see *supra* note 100 and accompanying text.

maintaining an environment.¹⁹⁴ This purpose related to NEPA's goals of creating "enjoyable harmony between man and his environment" and "stimulat[ing] the health and welfare of man."¹⁹⁵ Applying this reasoning in *Viasat*, the court could have found that Viasat's interest in reducing orbital congestion from the overcrowding of satellites exemplified NEPA's purpose of creating a "productive and enjoyable harmony between man and his environment."¹⁹⁶ As to productivity, reducing the amount of satellites and debris in orbit would better ensure the safe deployment and use of satellites in a less crowded environment.¹⁹⁷ Reducing the amount of satellites in orbit also reduces the potential for harmful chemicals released into the atmosphere, allowing people to safely enjoy life on Earth.¹⁹⁸ Instead, the D.C. Circuit rejected the alleged injury as merely a "cognizable interest" insufficient to fit within NEPA's zone of interests, despite not citing any language from NEPA in its determination.¹⁹⁹

The court based this determination on the geographical nexus inquiry because activity that does not occur in close proximity is unlikely to produce an imminent injury.²⁰⁰ According to the court, proximity requires "being close to the congestion that [the plaintiff] wants to avoid."²⁰¹ Viasat attested to operating a satellite that flies close to SpaceX's satellite network, which would appear to match the neighboring property owner example the court cited as a sufficient geographical nexus.²⁰² But the court did not recognize a geographical nexus in *Viasat*.²⁰³ In *International Dark-Sky*, however, the same court held it was sufficient

194. For a discussion of the court's analysis in *Presidio*, see *supra* notes 98-99 and accompanying text.

195. *Presidio*, 155 F.3d at 1158.

196. National Environmental Policy Act of 1969, 42 U.S.C. § 4321.

197. See Brief of Petitioner-Appellant, *supra* note 31, at 45 (arguing the addition of a satellite network increases space pollution and risks continued use of satellites as well as the safety of people and property in space and on Earth).

198. See *id.* at 29 (explaining ozone-destroying alumina results from satellite decay).

199. See *Viasat, Inc. v. FCC*, 47 F.4th 769, 780 (D.C. Cir. 2022) (explaining Viasat must have suffered personally from orbital congestion rather than simply be interested in its reduction).

200. See *id.* (requiring the plaintiff or the plaintiff's activity to be physically close to the alleged injurious activity).

201. *Id.*

202. See *id.* (citing *Match-E. Band of Pottawatomi Indians v. Patchak*, 567 U.S. 209, 227 (2012)) (observing a "neighboring landowner" can allege environmental claim for federal land acquisition).

203. See *id.* at 779.

for Dark-Sky to simply “aver” that it used the “affected area.”²⁰⁴ Moreover, the court stated in *Viasat* that “Article III standing is not . . . unbounded,” but permitted the “sky” to constitute the affected area in *International Dark-Sky*.²⁰⁵

The D.C. Circuit also failed to address the second element of the zone of interests test regarding Congress’ intention. Congress has recognized the need for an environmental impact review of actions for expanding technology.²⁰⁶ Specifically, Congress calls for the use of “all practicable means and measures” to preserve a harmonious balance between human activity and the environment.²⁰⁷ Given Congress’ call for “all practicable means and measures,” it would not be unreasonable for *Viasat* to claim the FCC failed to conduct an EA—had the court permitted this alleged NEPA violation to constitute injury.²⁰⁸

In *International Dark-Sky*, the court did not apply the zone of interests test at all. This was a key factor in dismissing *Viasat*’s claim for lack of standing, yet not applying this test in *International Dark-Sky* led the environmental group to successfully achieve standing to sue. This inconsistency in applying the zone of interests test proved to be outcome-determinative, as it directly influenced the success of *International Dark-Sky*’s standing while contributing to the dismissal of *Viasat*’s claim.

C. Associational Standing

The court also applied the associational standing test differently in *Viasat* and *International Dark-Sky*. Both sets of affidavits in these cases described the same injury of light pollution and all members attested to their association with the respective environmental group.²⁰⁹ Yet the court loosened the membership requirement in *Dark-Sky*, observing that “when an organization has identified members and represents them in good faith, our cases do not require further scrutiny into how the organization operates.”²¹⁰ But the court pursued that inquiry in *Viasat*, requiring details about the group’s connection to its members. Again, this differently

204. *International Dark-Sky Association, Inc. v. Federal Communications Commission*, 106 F.4th 1206, 1217 (D.C. Cir. 2024).

205. *See id.*; *see Viasat*, 47 F.4th at 780.

206. *See* 42 U.S.C.A. § 4331(a).

207. *See id.*

208. *Id.* (setting the parameters to achieve a harmonious relationship between humans and their environment).

209. *See Viasat, Inc. v. Federal Communications Commission* 47 F.4th 769, 781-82 (D.C. Cir. 2022); Brief of Petitioner-Appellant, *supra* note 31, at 17-18; *International Dark-Sky*, 106 F.4th at 1217.

210. *International Dark-Sky*, 106 F.4th at 1217.

applied analysis led to The Balance Group claim failing on standing and the Dark-Sky claim succeeding. These discrepancies and inconsistent applications of the geographical nexus and zone of interests tests raise questions about the criteria used to determine proximity and highlight the need for a universally applied test.

V. CONCLUSION

Through these decisions we see a patchwork application of tests. In *Viasat*, we see a stricter application of geographical nexus for the injury requirement and the membership requirement for associational standing. We also see more scrutiny through the application of the zone of interests test. By contrast, in *International Dark-Sky* we see the court broadening the geographical nexus, applying a looser definition of membership, and excluding the zone of interests test from its analysis.

An inconsistent standing analysis leads to the court's inability to address legitimate environmental claims on the merits, resulting in the persistent standoff between advancing space exploration and mitigating environmental damage. Three months after the *Viasat* decision, the Government Accountability Office released a report finding that the FCC had not sufficiently reviewed environmental effects before applying categorical exclusions to satellite launches.²¹¹ Had the standing test been correctly applied in *Viasat*, the court may have reached this same conclusion on the merits. Modifying and conforming the threshold requirement of standing would enable the court to consider the underlying claims allowing for greater legal accountability in addressing space debris and protecting the planet.

211. See U.S. Gov't Accountability Off., GAO-22-105166, *Technology Assessment: Large Constellations of Satellites: Mitigating Environmental and Other Effects* (2022). The FCC has neither changed nor reviewed its categorical exclusion rules since their development in 1986, despite guidance that recommends agencies review policies every seven years. *Id.* at 24.