

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

In the Matter of)	
)	
REFLECT ORBITAL INC.)	File No. SAT-LOA-20250701-00129
)	
Application for Authority to Construct, Launch, and Operate a Non-Geostationary Orbit Satellite in the Space Operation, Space Research, & Earth Exploration Satellite Services)	Call Sign: S00711
)	
)	

**CONSOLIDATED OPPOSITION AND RESPONSE TO COMMENTS OF
REFLECT ORBITAL INC.**

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CERTIFICATE OF SERVICE

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**CONSOLIDATED OPPOSITION AND RESPONSE TO COMMENTS OF
REFLECT ORBITAL INC.**

Reflect Orbital Inc. (“Reflect Orbital”), respectfully submits this consolidated opposition and response to comments filed with regard to its above-referenced application for authorization to construct, launch, and operate a single satellite, EARENDIL-1.¹ The company has reviewed the approximately 1,800 comments filed by members and organizations across both the professional and amateur astronomy communities, as well as the handful of other stakeholders.² Reflect Orbital appreciates the interest its inaugural mission has generated and is encouraged by

¹ See Reflect Orbital, *Application to Construct and Launch an NGSO Satellite*, ICFS File No. SAT-LOA-20250701-00129 (filed July 31, 2025) (“Application”).

² The record in this proceeding includes a large number of informal comments by members of the public. While Reflect Orbital cannot respond to each of these submissions individually, it does respond to the issues collectively. Reflect Orbital will separately address any unique issues raised by the sole petition filed on the record.

the open discourse around the development of its technology and the shared use and enjoyment of our night skies.

Though the majority of commenters hypothesize concerns that could be attributable to large-scale constellation deployments, only a single satellite mission is the subject of the Application. Thus, for the reasons provided herein, the Commission should expeditiously approve the Application, enabling Reflect Orbital to deploy its innovative satellite technology and advancing U.S. leadership in energy research in space.³

I. SUMMARY AND OVERVIEW

EARENDIL-1 is a path-finding mission.⁴ Reflect Orbital understands and appreciates the significant potential of its technology at scale and has been deliberate in its pursuit of a test-study-adapt model of deployment. Technical validation and scientific study have always been the primary mission objectives for this initial satellite.⁵ The learnings from this mission will inform not only the future design of the satellite, but also the potential use cases, necessary geographic restrictions or exclusions, and, ultimately, the limits (if any) on the size of a future constellation.

Reflect Orbital shares the many of the overarching objectives expressed by commenters in the docket, including those surrounding the preservation of the night sky, potential interference with ground-based astronomy, and mitigating the potential impacts of artificial light on human and animal habitats.⁶ In furtherance of these objectives, Reflect Orbital actively sought to collaborate

³ See, e.g., Executive Order 14369, “Ensuring American Space Superiority,” (Dec. 18, 2025).

⁴ Application at 5.

⁵ *Id.*

⁶ See, e.g., Comments of Dark Sky International, ICFS File No. SAT-LOA-20250701-00129 (filed Mar. 4, 2026) (“Dark Sky Comments”); Comments of the European Organisation for Astronomical Research in the Southern Hemisphere, ICFS File No. SAT-LOA-20250701-00129 (filed Mar. 4, 2026).

with several of the commenters—including Dark Sky International and the American Astronomical Society (AAS)—during the year leading up to the submission of the Application. Initial discussions were productive and Reflect Orbital is hopeful that this mission will provide an opportunity to deepen its connection with the organizations and individual members of the astronomical and scientific community, as the collected data will help Reflect Orbital refine its technology to ensure better precision and control, as well as mitigate potentially unwanted effects, should they arise.

Reflect Orbital is actively pursuing arrangements with several third-party institutions to conduct such scientific and technical studies and is further exploring opportunities for academic and scientific collaboration regarding the impact and design of its technology and the examination of potential use cases. The company continues to welcome constructive partnership with the astronomical community to contribute, design, and execute technical and scientific studies using the EARENDIL-1 satellite during the satellite’s operational mission.⁷

While Reflect Orbital seeks authority for only a single satellite to enable the testing and demonstration described, the record reflects a discourse muddled by commentary that misconstrues the Application and/or that addresses topics outside the scope of this proceeding.⁸

⁷ Individuals or institutions interested in partnering with Reflect Orbital to study the effects of the EARENDIL-1 satellite, including to receive access to data on and from the satellite, should submit a brief statement of interest here: <https://www.reflectorbital.com/contact> (select “Scientific Study” from the Topic of Interest drop down menu).

⁸ For example, there are a substantial number of comments referencing the harm that will result from deploying a constellation of up to 50,000 satellites, as well as from the deployments of other operators who are actually seeking authority for large constellations. *See, e.g.*, Dark Sky Comments at 4 (“The action that Reflect Orbital proposes for FCC authorization will eventually add 50,000 light-reflecting objects to the night sky visible from earth.”); Comments of the Presidents of the Australasian Chronobiology Society et al, at 1 (filed Mar. 4, 2026) (“Joint Practitioners Comments”) (“we wish to express scientific and public health concerns regarding

The majority of commenters request the Commission deny or delay the company authority to deploy a large scale constellation without first conducting an environmental assessment under the National Environmental Policy Act (“NEPA”) to assess the potential harms of such a large constellation on the human environment.⁹ Some commenters assert that even the single satellite should be subject to additional NEPA review because it proposes a “novel” use case.¹⁰ However, the Commission has previously considered these same arguments and consistently held that space-based operations are categorically exempt under its NEPA implementation procedures.¹¹ This remains true as applied to the Application. For those same reasons, the Commission should dismiss or deny all requests for supplemental review under NEPA.

The Commission should similarly dismiss or disregard concerns surrounding the potential public interest concerns that a large-scale constellation may cause to the human and animal environment akin to those by artificial outdoor light sources. By their own admissions, commenters note that the single satellite sought in the Application is not capable of causing any of these harms, as it will neither be sufficiently bright nor overhead long enough. Since Reflect

proposals...from Reflect Orbital and...SpaceX which...could authorize the deployment of up to one million additional satellites in low Earth orbit in the coming decades.”).

⁹ Reflect Orbital notes that roughly two-thirds of the comments filed in the docket consist of one of two template letters provided by Dark Sky International and an anonymous website, starryprinceton.org. The templates are attached to this filing as Attachments A and B, respectively. *See also* Dark Sky Comments.

¹⁰ *See, e.g.*, Petition to Deny of the American Astronomical Society, ICFS File No. SAT-LOA-20250701-00129, at 2, 8 (filed Mar. 9, 2026) (“AAS Petition”).

¹¹ *See, e.g.*, Space Exploration Holdings, LLC, *Request for Modification of the Authorization for the SpaceX NGSO Satellite System*, Order and Authorization and Order on Reconsideration, 36 FCC Rcd 7995, ¶¶ 72–92 (2021) (“2021 SpaceX Order”); Space Exploration Holdings, LLC, *Request for Orbital Deployment and Operating Authority for the SpaceX Gen2 NGSO Satellite System*, Order and Authorization, 37 FCC Rcd 14882, ¶¶ 113–125 (2022) (“2022 SpaceX Order”). *See also International Dark-Sky Association, Inc. v. FCC*, 106 F.4th 1206 (D.C. Cir. 2024); *Viasat, Inc. v. FCC*, 47 F.4th 769 (D.C. Cir. 2022).

Orbital only seeks authority for the single satellite, and the mission is designed to help gather data on the potential effects of increased *natural* light on the environment, these arguments are outside the scope of this proceeding.

The Commission should generally dismiss or deny claims that are either outside the scope of its authority or seeking redundant information already provided in the record. Specifically, the Commission should deny in whole, the petition of the American Astronomical Society (AAS) which raises several assertions outside the scope of the Commission's jurisdiction, that lack standing, and that do not apply to a single satellite deployment.¹²

For all the reasons provided herein and in the Application, the Commission should not delay, defer, or condition grant of the Application. Reflect Orbital encourages the Commission to expeditiously grant the Application and further facilitate the timely deployment of this next demonstration of American innovation and leadership in space.

II. REFLECT ORBITAL SEEKS AUTHORIZATION FOR ONE PATHFINDER SATELLITE

To appreciate the merits of the comment record, the Commission must first separate the Application from the aspiration: what the company is *actually* doing versus what it *hopes* to one day achieve. Company executives are responsible for generating support for both the company and its future products.¹³ They are tasked with helping prospective partners envision the company's anticipated and ancillary use cases while helping investors and customers understand

¹² See generally AAS Petition, Section V *infra*.

¹³ See, e.g., Doug Bierend, "SpaceX Was Born Because Elon Musk Wanted to Grow Plants on Mars," VICE (July 17, 2014), <https://www.vice.com/en/article/spacex-is-because-elon-musk-wanted-to-grow-plants-on-mars/>; Kelly Dickerson, "Jeff Bezos dreams of 'millions of people living and working in space'" BUSINESS INSIDER (Dec. 29, 2015), <https://www.businessinsider.com/jeff-bezos-space-economy-dream-2015-12>.

how the products and services could potentially deliver value. In such exercises, scale is whatever helps stakeholders contextualize the use case—whether it is the number of satellites in the constellation, the size of the deployable, or the technical parameters of the beam—and better engage with the company’s potential.

The record is replete with concerns over the aspirational potential of Reflect Orbital’s technology. But Reflect Orbital is not seeking Commission authority for these concepts and ideas. Rather, the Application seeks a very narrow authority: Reflect Orbital seeks authorization to construct and launch *a single* satellite for operations in low Earth orbit in UHF, S-, and X-band frequencies to conduct space operation and space research services for approximately one year before deorbiting.¹⁴ The satellite is designed to test a novel technology, enable scientific measurement and study, facilitate demonstration of potential use cases, and inform further refinement and improvement of the technology. This test-study-adapt model enables Reflect Orbital to incorporate real world results into its spacecraft design, thereby improving the precision and effectiveness of its technology, while mitigating against any unintended effects, in order to achieve its commercial objectives.

As Reflect Orbital is only seeking authority for one satellite, the remainder of this filing will only consider the EARENDIL-1 satellite, as described in the Application, when responding to comments filed in the application docket. Reflect Orbital encourages the Commission to similarly, and consistent with precedent, consider only the requests for authority contained within

¹⁴ *See generally* Application. While Reflect Orbital plans to apply for authorization to deploy additional satellites, it will expressly seek authority for those specific satellite(s) and their relevant parameters in accordance with the Commission’s rules.

the Application and decline to speculate on how parties may act (or the technology may evolve) in the future.¹⁵

III. THE COMMISSION HAS RESOLVED THE ISSUES RAISED BY COMMENTERS

Reflect Orbital has diligently reviewed all of the comments, and perhaps unsurprisingly—given the name of the company and the stated objective of the solution—the concerns raised by commenters were relatively homogenous and consistent.¹⁶ Commenters raised concerns regarding the potential effects of reflective spacecraft on astronomical observations and enjoyment of dark skies.¹⁷ They also raise myriad secondary concerns ranging from impacts of light pollution on ecological balance, to changes in circadian rhythms and animal migration patterns, to reduced income from tourism.¹⁸

These concerns naturally stem from the fact that EARENDIL-1 is intentionally reflective. The satellite is equipped with a steerable reflector for the purpose of redirecting sunlight towards

¹⁵ See, e.g., *Public Citizen*, 541 U. S., at 767 (“...the fact that the project might foreseeably lead to the construction or increased use of a separate project does not mean the agency must consider that separate project’s environmental effects.”); SpaceX 2021 Modification Order, ¶ 78 (“We are not taking action through this modification on the separate request by SpaceX for authorization of a separate NGSO system. We do not speculate how we may act with respect to those potential future actions, but rather...consider whether the “particular action” at issue, the instant modification request, should be subject to” certain Commission rules).

¹⁶ See n. 9 *supra*; see also Attachments A & B.

¹⁷ See, e.g., Dark Sky Comments at 2; Comments of Elena Mason, ICFS File No. SAT-LOA-20250701-00129, at 1 (filed Mar. 9, 2026); Comments of Robert A. Burgess, ICFS File No. SAT-LOA-20250701-00129, at 1 (filed Mar. 5, 2026).

¹⁸ See, e.g., Comments of Presidents of the European Biological Rhythms Society (EBRS), ICFS File No. SAT-LOA-20250701-00129, at 2 (filed Mar. 5, 2026); Comments of the McDonald Observatory, ICFS File No. SAT-LOA-20250701-00129, at 3 (filed Mar. 5, 2026); Comments of Andrew Reagan, ICFS File No. SAT-LOA-20250701-00129, at 1 (filed Feb. 11, 2026).

a specific location on the Earth’s surface.¹⁹ To date, the United States—and the Commission in particular—has not adopted any regulations limiting the reflectivity of or resulting from spacecraft. As a result, some commenters insist that the Commission must require Reflect Orbital to submit an environmental assessment (“EA”) before acting on the Application.²⁰ Reflect Orbital disagrees and reaffirms its certification that the deployment of EARENDIL-1 is categorically excluded from further environmental review under the Commission’s rules.²¹

A. Commenters Seek to Invoke NEPA Procedures as an Administrative Roadblock, Not a Genuine Matter in Issue

NEPA is a procedural statute intended to ensure that Federal agencies consider the environmental impacts of their actions in the decision-making process. NEPA does not impose any substantive environmental obligations or restrictions, nor does it require an agency to weigh environmental consequences in any particular way.²² Yet despite the intended statutory purpose of NEPA, these commenters have demanded the Commission require a “comprehensive,”²³ even “rigorous,”²⁴ environmental assessment as “necessary prerequisite” for Reflect Orbital to receive

¹⁹ Application, Narrative at 2-3, ODAR at 1-2.

²⁰ *See, e.g.*, Comments of Dinah Bear, ICFS File No. SAT-LOA-20250701-00129, at 1 (filed Mar. 6, 2026); Comments of Joshua E. Meyers, ICFS File No. SAT-LOA-20250701-00129, at 3 (filed Mar. 5, 2026).

²¹ Application, Form 312 Q. 28(a); 47 C.F.R. §§ 1.1306, 1.1307(a); *see also* SpaceX 2021 Order, ¶ 72.

²² *Seven County Infrastructure Coalition v. Eagle County*, Colorado, 605 U.S. ___, at *3 (2025) (“Seven County Infrastructure”).

²³ Dark Sky International Template provides the demand to “require a comprehensive environmental review consistent with [NEPA]; and decline to approve this application until such review is completed and made publicly available.” The anonymous template provides the demand to “[a]t a minimum...require a thorough Environmental Assessment under the [NEPA] for this project” which “should be repeated if Reflect Orbital files for additional constellation satellites.” *See* Attachments A & B.

²⁴ *See, e.g.*, AAS Petition at 2, 8.

a grant of authority.²⁵ To the majority of commenters, the demand for an environmental assessment is the sole condition being sought.

But as the Supreme Court recently affirmed, NEPA is a “purely procedural statute,” where the objective is to help “inform agency decision-making, not to paralyze it.”²⁶ Moreover, even if an assessment is prepared, NEPA “does not require the agency to weigh environmental consequences in any particular way.”²⁷ As a result, commenters are simply asking the Commission to demand Reflect Orbital prepare an additional report, one that is not required by law, and that has not been demonstrated to provide any critical information to aid in decision-making for purposes of evaluating the Application in accordance with the Commission’s rules that is not already in the record.

B. EARENDIL-1 is Properly Excluded from Subsequent NEPA Review Under Existing Regulations

NEPA, as recently amended, requires federal agencies to determine whether any proposed Major Federal Actions (“MFAs”) will significantly affect the quality of the human environment and, if so, to assess those environmental impacts.²⁸ Each agency is charged with adopting procedures to determine whether a proposed action is an MFA subject to NEPA and then

²⁵ *Id.*

²⁶ *Seven County Infrastructure.*

²⁷ *Id.* Despite Dark Sky’s assertions, the purpose of the assessment is to ensure “negative impacts can be identified and mitigated.” See Dark Skies Comments at 13.

²⁸ 42 U.S.C. § 4332(C); 4336(b)(2). An MFA is defined as an action “subject to substantial Federal control and responsibility” as determined by the agency. 42 U.S.C. § 4336e(10)(A).

determining the appropriate level of review under the framework.²⁹ In determining the appropriate level of review, the initial review requires agencies consult available categorical exclusions.³⁰

NEPA charges agencies with “establish[ing] categorical exclusions for categories of actions that normally do not have a significant effect on the human environment, individually or in the aggregate, and therefore do not require preparation of an [EA].”³¹ Under the Commission’s current rules,³² space-based operations are categorically exempt from the requirement to submit an environmental assessment on the basis that these activities “individually and cumulatively...have no significant effect on the quality of the human environment”³³ and generally do not fall within the specifically enumerated categories that would require an EA.³⁴ After reviewing Section 1.1307(a) of the Commission’s rules, Reflect Orbital confirmed that EARENDIL-1 did not propose any activities specifically requiring submission of an EA and certified the Application accordingly.

²⁹ 42 U.S.C. § 4336.

³⁰ 42 U.S.C. § 4336(a). The Council of Environmental Quality (“CEQ”) assists the agencies with NEPA implementation and each agency issues their own NEPA procedures in consultation with CEQ.

³¹ 40 C.F.R. § 1501.4(a).

³² In 2025, the Commission released a notice of proposed rulemaking seeking comment on proposed updates to its NEPA implementation procedures, incorporating the revisions to NEPA and precedent. At time of filing, the proceeding is still on-going and no new rules have yet been adopted. See *Modernizing the Commission’s National Environmental Policy Act Rules*, Notice of Proposed Rulemaking, WT Docket No. 25-217, FCC 25-47 (Aug. 14, 2025).

³³ 47 C.F.R. § 1.1306(a); *Amendment of Environmental Rules in Response to New Regulations Issued by the Council on Environmental Quality*, 60 Rad. Reg. 2d (P&F) 13, ¶ 3 (1986); *United Keetoowah Band of Cherokee Indians in Okla. v. FCC*, 933 F.3d 728, 735 (D.C. Cir. 2019) (noting that “[c]ategorical exclusions are not exemptions or waivers of NEPA review; they are simply one type of NEPA review.”).

³⁴ SpaceX 2021 Modification Order, ¶ 72.

The Commission’s rules permit interested parties to challenge a categorical exemption based on allegations that a “particular action...will have a significant environmental effect.”³⁵ Until recently, the Commission did not typically receive petitions raising environmental concerns about space station licensing.³⁶ Despite these recent challenges, the Commission (and the D.C. Circuit in upholding the Commission’s decisions) has remained rightly skeptical of NEPA’s application to space-based operations.³⁷ As a space-based operation, the effects of the agency’s activities or decisions are located entirely outside of the jurisdiction of the United States and thus would be beyond the scope of NEPA.³⁸

Moreover, commenters have not demonstrated that the deployment of EARENDIL-1 will have any “significant environmental effect.”³⁹ Commenters provide many assumptions about the “expected effects of the anticipated [Reflect Orbital] operational model” on astronomy and “the health of humans and other life forms.”⁴⁰ Many of the assumptions are based on (1) other secondary sources interpreting what they have read about Reflect Orbital, (2) extrapolations from

³⁵ 47 C.F.R. § 1.1307(c).

³⁶ 2021 SpaceX Order, ¶ 73.

³⁷ See *Int’l Dark Sky Ass’n v. FCC*, 106 F.4th 1206 (D.C. Cir. 2024); FCC Final Brief in *Int’l Dark Sky Ass’n v. FCC*, at 12 (Aug. 16, 2023) (“The Commission’s rules implementing NEPA identify specific categories of actions that require additional environmental review, none of which refer to the deployment and operation of space stations.”).

³⁸ The revised NEPA excludes such extraterritorial activities. 42 U.S.C. § 4336e(10)(B)(vi). The on-going Commission rulemaking on implementing the revisions to NEPA considers whether this exclusion should be explicitly applied to space-based operations under the Commission’s rules. *Modernizing the Commission’s National Environmental Policy Act Rules*, WT Docket No. 25-217, ¶ 33 (2025).

³⁹ See, e.g., *Dark Sky Comments* at 2 (claiming “there may be significant environmental effects”); *Comments of American Bird Conservancy*, ICFS File No. SAT-LOA-20250701-00129, at 2, (filed Mar. 6, 2026) (claiming “potentially significant environmental effects of Reflect Orbital’s proposal.”).

⁴⁰ AAS Petition at 2.

a failed Russian mission in the early 1990s,⁴¹ or (3) generally facts, figures, and studies on artificial lighting and the environment. But what they do not demonstrate is any significant environmental risk from EARENDIL-1 itself. The claims asserted in this record provide no more detailed reasoning or justification for supporting further environmental consideration than in previous proceedings where the Commission declined petitions related to potential impact on the night sky, including alleged impacts to human health, flora, fauna, and animal migration.⁴²

Reflect Orbital observes that the Commission has openly expressed doubts whether NEPA even applies to sunlight when “reflecting on a surface that is in space.”⁴³ As it stands, and the record reflects, there is no actual scientific or technical research on the effects of reflected light

⁴¹ Reflect Orbital appreciates the concerns raised about potential hazards to observations of the satellite while using binoculars or telescopes and has reviewed the source materials. These concerns stem from a December 2000 paper that constructs a “[r]udimentary [c]alculation” of resolvable object size, which incorrectly implies that the irradiance of the Russian spacecraft, *Znamya*, and the sun are identical, thereby resulting in a risk of eye damage, since the angular size of the satellite is similar to the angular size of the sun when “fully resolved.” The paper also makes biomechanical errors when performing its “[d]etailed [c]alculation” to arrive at a retinal image diameter. These calculations differ from the accepted International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines (publication 105(1):74-96; 2013) which outline that for retinal image dimensions less than 25-50 μ m, a source is considered a point source and it would be inappropriate to calculate the diameter of the spot on the retina using the formula $d_r = d_s \times (f/r)$ as Laframboise and Ralph did. Following the method suggested by the ICNIRP for exposure limits for point sources, Reflect Orbital has determined that aperture aids of 12 inches are acceptable for viewing of Earendil-1 before ICNIRP Retinal Irradiance limits will be exceeded. Very few satellite passes will approach maximum brightness, and those passes that do will experience brightness variation due to changing orbital range over that time period. Moreover, maximum pass lengths of any appreciable brightness are on the order of minutes. Combined, observations are unlikely to exceed published safety limits, let alone result in significant injury. See Laframboise, J. G. & Chou, B. R., *Space Mirror Experiment: A Potential Threat to Human Eyes*, Journal of the Royal Astronomical Society of Canada, Vol. 94, p.237 (rev. September 29, 2000).

⁴² SpaceX 2021 Order, ¶ 87.

⁴³ *Id.*, ¶ 77.

from space on the Earth’s environment.⁴⁴ For example, despite being 20 times larger than EARENDIL-1, possessing no visibility mitigations, and operating in space for almost thirty years, commenters have not provided any scientific evidence that the International Space Station has contributed to disruptions to circadian rhythm or obstruction of ground based astronomy.⁴⁵ The record instead extrapolates hypotheses from other research—mostly relating to the use of artificial outdoor lighting sources at night—but which have not been demonstrated to be accurate analogues.

Moreover, while the Application is categorically exempt from subsequent NEPA review under existing Commission rules, the company does not assert that this will always necessarily be the case. As required by the Commission’s rules, Reflect Orbital has made the required assessments based on the specific requests for authority contained in the Application. The company understands and appreciates that requests for significantly larger deployments in the future may determine whether an environmental assessment is necessary or appropriate in those circumstances. EARNEDIL-1, as well as the several missions that follow, will help Reflect Orbital and the scientists and institutions partnering with the company to better understand the effects—both positive and negative—of marginal increases in sunlight on specified areas.

Consistent with recent precedent, the Commission should reject calls in the record to require an environmental assessment. EARENDIL-1 is categorically exempt under existing

⁴⁴ Interestingly, both the Commission and Dark Sky International have commended SpaceX for *adding* intentionally reflective surfaces to its Starlink satellites, since they can actually be used to mitigate the visibility of satellites in orbit. Dark Sky Comments, Attachment C “SpaceX Best Practices.”

⁴⁵ See, e.g., Comments of Cynthia Lapp, ICFS File No. SAT-LOA-20250701-00129, at 1 (filed Mar. 5, 2026) Comments of Jon McConnell, ICFS File No. SAT-LOA-20250701-00129, at 1 (filed Mar. 5, 2026); Comments of Center for Space Environmentalism, ICFS File No. SAT-LOA-20250701-00129, at 2 (filed Mar. 4, 2026); Comments of Karen Holt, ICFS File No. SAT-LOA-20250701-00129, at 1 (filed Mar. 9, 2026).

Commission rules and the commenters have not alleged any specific “significant environmental effect” from the satellite to warrant placing additional regulatory requirements on Reflect Orbital.

C. The Concerns Expressed Are Being Considered, Studied, and Incorporated as Appropriate into Technological Improvements

While Reflect Orbital disagrees with commenters’ calls to perform an environmental assessment for the EARNEDIL-1 satellite, the company does take the concerns expressed by commenters seriously. Nearly a year prior to filing the Application, Reflect Orbital began outreach to the astronomy community to ensure that their views were incorporated into the development of this novel technology and to provide an open channel through which they could collaborate and provide input into the development process. Reflect Orbital met with several of the organizations during the ensuing months, including Dark Sky International and AAS, to discuss their principles, review positions on responsible uses of outdoor light at night, and explore alternative use cases. Reflect Orbital also voluntarily initiated discussions with the National Science Foundation (“NSF”) and National Aeronautical and Space Administration (“NASA”). The recommendations from these stakeholders were shared within the company.

These early discussions helped Reflect Orbital shape three guiding principles to underpin satellite design and service deployment:

- **Controllable:** The service must be capable of being limited to a defined area for predetermined times, which can be coordinated with and conveyed to other stakeholders in advance.
- **Transparency:** The position of the satellite will be available in advance, through standard, accessible information-sharing channels, allowing stakeholders to know if there are planned operations in the area and, as necessary, coordinate operations to ensure critical observations are not missed or obscured.
- **Avoidable:** the satellite will systematically avoid reflecting light near observatories or other protected sites through geofencing, incorporating relevant GPS coordinates into the satellite service software. The satellite is remotely programmable and these exclusion zones can be updated at any time.

Perhaps ironically, because commercialization is the ultimate goal, it is in Reflect Orbital's own self-interest to reduce the potential for errant illumination. The steerable reflector will be adjusted to lower its cross-section attitude to minimize visibility when not actively engaged to provide service, including during commissioning and orbit raising. To reduce incidental dispersions of light, Reflect Orbital will continuously model and monitor EARENDIL-1 brightness during both the active reflection and passive non-reflection stages. Data collected from these observations will be used to inform updates to EARENDIL-1 operations and incorporated into the design of future satellites.

As a pathfinder, EARENDIL-1, is intended to help Reflect Orbital study the real-world effects of satellite-reflected sunlight and mitigate unintended or undesired side effects. Reflect Orbital invites commenters and other stakeholders to participate in these studies and share in the data collected. Reflect Orbital is actively working with third-party institutions to design such studies for the pathfinder mission.

IV. COMMENTERS RAISE PRIMARILY ISSUES OF GENERAL APPLICABILITY

Many of the concerns raised by Commenters, while inspired by the use case in the Application, are not actually specific to the Application. This is evidenced by the continuous reference to the deployment of spacecraft not sought (or even mentioned) by Reflect Orbital in this Application, by the nearly identical comments filed by many of the same commenters in another application seeking completely different authorities, as well as in the continuous demand for NEPA review to be applied to situations that are currently categorically exempt under the Commission's rules.⁴⁶ As such, the commenters are raising issues of general applicability,

⁴⁶ See n. 8 *supra*.

resolution of which must be conducted through a rulemaking proceeding in accordance with the Administrative Procedures Act. Once adopted, however, such rules can be applied to adjudicatory docket of individual operators based on the record before the Commission (or other appropriate regulatory body) in furtherance of the public interest.

Reflect Orbital understands the dedication of the commenters to the preservation of the night sky. The company is equally committed to ensuring that its satellite be minimally intrusive with regard to that experience. As noted throughout, the company is eager to collaborate with the astronomy community and other scientific interests to study the real-world impact during the operational mission of EARENDIL-1.

Reflect Orbital will continue to refine its technology based on the information learned during this pathfinding mission. That said, the Application as accepted for filing is compliant with existing U.S. law and should be expeditiously granted on that basis. As with all Commission licensees, Reflect Orbital's grant will be conditioned on a requirement to conform to any subsequent changes in regulations that may be adopted in future rulemaking proceedings.

V. THE COMMISSION SHOULD DISMISS THE AAS PETITION

The AAS requests the Commission to deny the Application on several bases that are unsupported by Commission regulations. In addition to the previously discussed claims regarding potential impacts on the astronomical community, harms to the environment, and eye-damage, AAS also claims that the Commission should deny the Application on the basis that the reflect sunlight may "trespass" on the property of an individual who had not requested service from Reflect Orbital.⁴⁷ Trespass and nuisance are both civil causes of action that require the appropriate

⁴⁷ AAS Petition at 4-5.

legal forum, standing, and a demonstration of each element of the offense. None of these are present here.

While Reflect Orbital appreciates AAS's creativity, the passing light reflected by the EARENDIL-1 satellite will amount to no more than that of moonlight when perceived on the ground. Regardless, in the event an individual does find themselves within the transient occurrence of additional moonlight, the inconvenience will be *de minimis*, particularly as assessed against the public interest advanced through the Application's contributions to the continued technological and scientific innovation and American leadership in space. For all of the reasons explained herein, the Commission should dismiss the AAS Petition.

VI. THE COMMISSION SHOULD DISMISS REQUESTS THAT ARE REDUNDANT OR OUTSIDE THE SCOPE OF THE PROCEEDING

Noting the volume of the record, Reflect Orbital generally encourages the Commission to review the Application in a manner consistent with all other spacecraft seeking authorization under Part 25. The Commission should dismiss or deny claims that are either outside the scope of its authority when assessing the public interest associated with the requested use of *spectrum* or that simply request the information already provided by the company in satisfaction of the Part 25 requirements or otherwise submitted to the record in a different format.⁴⁸

⁴⁸ Reflect Orbital notes that several commenters ask the Commission to require orbital debris showings that have already been provided in the Orbital Debris Assessment Report submitted at the time of filing. *See, e.g.*, Comments of Charles Huyck, ICFS File No. SAT-LOA-20250701-00129, at 2-5, (filed Mar. 9, 2026) (requesting Reflect Orbital be required to provide written responses to 95 listed concerns to, among other things, orbital debris concerns); Comments of Eric Bretschneider, ICFS File No. SAT-LOA-20250701-00129, at 2 (filed Mar. 9, 2026) (asserts claims that the company "failed to demonstrate any adequate safety testing").

VII. CONCLUSION

The Commission should move expeditiously to grant the narrow request in the Application for a single satellite. The comments do not offer any sufficient basis for deferring, denying, or conditioning approval. Accordingly, grant of this application should be granted to further American innovation in the public interest.

Respectfully submitted,

/s/ Ben Nowack

Jodi A. Goldberg

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12727 S. Van Ness Ave.
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March 24, 2026

ATTACHMENT A – DARK SKY TEMPLATE

USE THIS AS A STARTING POINT FOR YOUR OWN COMMENT

1. **Go to File → Make a copy** and save it to your Google Drive. You'll then be able to edit your own copy of the document.
2. **Please make this comment your own.** Priority is given to unique submissions, so use this template only as a starting point — rephrase it as much as possible and add your own perspective and concerns wherever possible.
3. **Add your own voice.** Briefly explain who you are, where you live, and why this issue matters to you or your community.
4. **Focus on one or two key concerns.** Use the language below as a guide, but emphasize the impacts that matter most to you.
5. **Save and submit your comment.** Save your response as a PDF or Word document, then upload it through the FCC portal.

To the Federal Communications Commission:

My name is **[Full Name]**, and I reside in **[City, State / Country]**. I am submitting this comment regarding Reflect Orbital's application, SAT-LOA-20250701-00129.

I am concerned about the potential environmental, scientific, and public safety impacts associated with illuminating Earth from orbit. Artificial light at night is a well-documented environmental stressor, and this proposal represents an unprecedented expansion of light into the nighttime environment.

[Optional: In 1 sentence, explain why the night sky, orbital environment, or space sustainability matters to you or your community.]

Key concerns include:

- **Environmental impacts:** Disruption of wildlife behavior, migration patterns, and ecosystem balance due to increased artificial light at night.
- **Human wellbeing and public safety:** Interference with sleep and circadian rhythms, along with potential glare risks affecting drivers, pilots, and individuals using optical instruments.
- **Astronomy and scientific research:** Increased sky brightness that interferes with ground-based observations and threatens sensitive scientific instruments.
- **Orbital environment and debris:** Additional congestion and collision risk in low Earth orbit, compounding existing debris challenges.

[Optional: Choose ONE concern above and add 1 sentence explaining why it matters where you live or work.]

These impacts are documented in scientific literature concerning artificial light at night and orbital congestion. Once implemented, large-scale orbital illumination would be difficult or impossible to reverse.

For these reasons, I respectfully urge the Commission to require a comprehensive environmental review consistent with the National Environmental Policy Act (NEPA); and decline to approve this application until such review is completed and made publicly available.

Technological innovation should proceed in alignment with environmental stewardship and scientific integrity. Until the full risks of orbital illumination are thoroughly evaluated through a transparent, science-based process, this proposal should not move forward.

Respectfully submitted,

[Full Name]

[City, State / Country]

ATTACHMENT B - STARRYPRINCETON.ORG TEMPLATE

Reflect Orbital Template for Public Comment:

[Date]

Federal Communications Commission
45 L Street NE
Washington, DC 20554
United States

Subject: SAT-LOA-20250701-00129

Dear Commissioners of the FCC,

My name is **[Name]**, and I am writing from **[Your Institution]** in **[city/country]**. **[Any further details you'd like to add about yourself, your profession, and your experience with the night sky]**

I write to **express my serious concerns** regarding Reflect Orbital's proposed sunlight-on-demand service. The NGSO satellite EARENDIL-1, and any proliferated constellation it precedes, would have detrimental effects on humans, ecosystems, the night sky, and the orbital environment. These impacts far outweigh the proposed benefits of such a system.

I therefore **URGE THE FCC TO DENY** Reflect Orbital's proposal for EARENDIL-1 and any future filings related to this project.

At a minimum, the Commission should require a thorough Environmental Assessment under the National Environmental Policy Act (NEPA) for this project, and this should be repeated if Reflect Orbital files for additional constellation satellites. Under the Commission's NEPA regulations (47 CFR §§ 1.1307 and 1.1311), an Environmental Assessment is required when an action may significantly affect the human environment and does not qualify for a categorical exclusion, or where extraordinary circumstances warrant further review. A satellite designed explicitly to direct concentrated sunlight to Earth represents a novel activity that does not fall within existing categorical exclusions and therefore warrants environmental review.

The substantial effects of Reflect Orbital's proposed system include:

1. Terrestrial safety risks: Bright glints can pose risks to pilots and to people operating vehicles and machinery. The satellites will be significantly brighter than the full moon, but with light concentrated into a glaring, star-like source, which the human eye will find unresolved.
2. Adverse impacts on human health: Excess Artificial light at night above baseline levels has been shown to disrupt our natural circadian rhythms and other biological cycles. Large, 5 km-wide areas will be lit without local zoning.

3. Adverse effects on wildlife behavior: Artificial light at night disrupts mating and pollination patterns of nocturnal species, and disturbs hunting, migration, and navigation, affecting wildlife preserves and protected species. These effects are widely documented, and site-specific ecological impacts should be formally investigated.
4. Orbital safety risks: The large surface areas of the satellite reflectors create collision and orbital debris risks, and any future constellation will increase orbital congestion. Additionally, the application does not describe what safeguards are in place to prevent uncontrolled reflection in the case where control or power of the satellite is lost.
5. Brightening of the night sky: Atmospheric scattering ensures that even a highly collimated beam and its reflected light will produce scattered diffuse radiation far beyond the intended area. This skyglow will add to the already declining ability to observe stars and the night sky. In other words, the skyglow from large floodlit patches will be seen from large distances. This also has consequences for astrotourism, a rapidly growing sector of the tourism economy.
6. Disruption to astronomical observations: Increasing sky brightness degrades the ability to observe faint objects: stars, galaxies, nebulae and asteroids. Satellites contaminate astronomical data and can saturate detectors. The quality of the night sky will be significantly affected across vast areas.

This project has the potential to harm vulnerable areas such as research facilities and wildlife habitats, let alone the general population and the orbital environments surrounding Earth. **I strongly oppose this proposal and do not see a way to move it forward in a sustainable, non-hazardous manner that serves public interest.**

[Any further details you'd like to add about your concerns]

Sincerely,

[Your Name]

[Contact information]

CERTIFICATE OF SERVICE

I hereby certify that, on this 24th day of March, 2026, a copy of the foregoing pleading was served via certified mail upon:

Joel Parriott, PhD
Interim CEO and Director of Public Policy and External Affairs
American Astronomical Society
1667 K Street NW, Suite 800
Washington, DC 20006
Public.policy@aaas.org

/s/ Betsy Craig

Betsy Craig