

March 9, 2026

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In the Matter Of)
Reflect Orbital Application to construct)
and launch an NGSO Satellite.) ICFS File No.: SAT-LOA-20250701-
00129
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)

COMMENTS OF THE AMERICAN ASTRONOMICAL SOCIETY, THE AMERICAN GEOPHYSICAL UNION, THE AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES, THE AMERICAN METEOROLOGICAL SOCIETY, THE AMERICAN PHYSICAL SOCIETY, THE AMERICAN PHYSIOLOGICAL SOCIETY, THE ALLIANCE FOR DATA SCIENCE AND AI, THE ASTRONOMICAL ASSOCIATION OF WESTERN AUSTRALIA INC., THE ASTRONOMICAL SOCIETY OF AUSTRALIA, ASTROTOURISM WA PTY LTD, THE AUSTRALASIAN DARK SKY ALLIANCE, THE DUNEDIN ASTRONOMICAL SOCIETY, THE ECOLOGICAL SOCIETY OF AMERICA, THE ENTOMOLOGICAL SOCIETY OF AMERICA, THE HAMILTON ASTRONOMICAL SOCIETY, THE INTERNATIONAL SOCIETY FOR ARCHAEOASTRONOMY AND ASTRONOMY IN CULTURE, THE MATHEMATICAL ASSOCIATION OF AMERICA, THE NELSON ASTRONOMICAL SOCIETY, THE ROYAL ASTRONOMICAL SOCIETY OF NEW ZEALAND, THE SOUTHLAND ASTRONOMICAL SOCIETY, STARRY SKIES SOUTH, THE PALMERSTON NORTH ASTRONOMICAL SOCIETY, THE PERTH OBSERVATORY, THE TAURANGA ASTRONOMICAL SOCIETY, TE PŌ (NZ), THE WILDLIFE SOCIETY, THE VOYAGEURS CONSERVANCY, AND THE WELLINGTON ASTRONOMICAL SOCIETY

The undersigned 28 scientific societies and organizations, collectively representing tens of thousands of scientists and researchers both in the US and across the world, appreciate the opportunity to provide comments on this application from Reflect Orbital to construct and launch a non-geostationary (NGSO) satellite. We have grave concerns about the service that Reflect Orbital intends to provide, namely the intentional redirection of sunlight to illuminate parts of the Earth at night. This plan could have far-reaching consequences for human health, wildlife, and entire ecosystems, in addition to significant impacts on astronomical observations and access to the night sky, as well as potential unknown impacts from adding solar energy to the earth’s atmosphere and ocean. For these reasons, we believe that the proposal does not serve the public

interest, and urge the Commission to deny the application, or at least require a thorough environmental impact assessment before any license is granted.

Reflect Orbital plans to deliver sunlight after dark, noting the “problem” that solar energy cannot be produced at night. However, darkness at night is not a problem that needs to be solved. It is how our natural world functions, and we and other living beings rely on access to darkness to maintain circadian rhythms. Astronomers use the natural darkness at night to explore the universe, and humans around the world have drawn inspiration and cultural meaning from the night sky for millennia.

Reflect Orbital itself notes that the company will not be able to contribute to solar energy production until it has 5,000 satellites in orbit (even then, the “Energy Service” timeline on the Reflect Orbital website notes that these satellites will contribute a +1% capacity factor with 50 W/m² for 20 minutes).¹ Instead, with the proposed satellite, EARENDIL-1, and the next few thousand satellites Reflect Orbital is planning to launch, the company will be selling sunlight as a service. However, the light being delivered will, in practice, be indiscriminate, as any single beam will illuminate a region of at least 5 km in diameter on the ground. In developed areas, it is unlikely that all residents who find themselves within a Reflect Orbital beam will welcome such illumination, creating an issue of light trespass, compounded by the issue of unrequested illumination as the satellite slews to its next target. The proposed constellation raises the question of whether individuals have a right to a good night’s sleep and whether property owners have the right to control the illumination of their properties from above, both in the legal context of quiet enjoyment of their property.

Undeveloped areas are also likely to be included in any illuminated footprint, which means that humans, animals, and plants that do not need the illumination will be subject to it, with significant consequences. Natural areas function as ecological laboratories, reference baselines, and refuges for vulnerable wildlife. Artificial illumination at landscape scales would impact not just individual living things, but interactions between them and even entire ecosystem processes.

Exposure to bright light at night will likely have an effect on the circadian rhythms of any humans or animals in the service area. One’s circadian rhythm not only controls sleep, but is also a key factor in many other bodily functions.² Disruption of circadian rhythm can affect metabolism, hormone production, the cardiovascular system,³ and regulation of appetite and

¹ <https://www.reflectorbital.com/>

² Reddy S, Reddy V, Sharma S. Physiology, Circadian Rhythm. [Updated 2023 May 1]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK519507/>.

³ Knutson KL, et al. American Heart Association Council on Lifestyle and Cardiometabolic Health; Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology; and Council on Lifelong Congenital Heart Disease and Heart Health in the Young. “Role of Circadian Health in Cardiometabolic Health and Disease Risk: A

body temperature for humans and other living things. Research shows that artificial light at night negatively impacts hormonal systems for many different kinds of animals, and combined with changes to activity timing and other traits, can result in altered behavior, reproduction, and survival.⁴ In consequence, the cues and hormones needed for certain behaviors may be disrupted or disappear altogether.

Additionally, animals that migrate or hibernate rely on the changes in daylight hours to cue those behaviors. It is well documented that artificial light at night can alter orientation, movement, foraging, communication, and migration in wild animals.⁵ Animals that navigate using darkness (including most migratory birds) can become disoriented or entrapped by artificial light. Even if an animal's circadian rhythm and hormones are not affected by the change of daylight hours, they can be affected indirectly by impacts elsewhere in their food web.⁶ Nocturnal prey animals that use the darkness to hide from predators at night will be exposed, while nocturnal predators who use the darkness to hunt will be exposed in turn. Artificial light can allow day-active animals to extend activity into lit periods of the night, and reduce activity of nocturnal animals.^{7,8} These changes could profoundly alter illuminated ecosystems.

In the long term, we could see impacts on wildlife in terms of birth rate, hibernation patterns, ability to hunt/access food, and group survival. Crucially, experimental studies show that artificial light can disrupt ecosystem-level processes like migration and decomposition, cascading to impact water quality and nutrient cycling.⁹ Such findings illustrate that nighttime illumination does not merely impact individual organisms; it can alter energy flow, interactions among living things, and even ecosystem stability.^{10,11}

These effects also threaten ecological research. Many long-term field studies depend on stable natural light regimes as baseline conditions. Introducing intermittent, high-intensity artificial light across multi-kilometer footprints would compromise experimental controls and alter

Scientific Statement From the American Heart Association." *Circulation*. 2025 Nov 25;152(21):e408-e419. Epub 2025 Oct 28. PMID: 41147137. <https://doi.org/10.1161/cir.0000000000001388>

⁴ Gaston, Kevin J., et al. (2017). "Impacts of artificial light at night on biological timings." *Annual Review of Ecology, Evolution, and Systematics*, 48(1), pp. 49-68.

⁵ Longcore, Travis, and Catherine Rich. (2004). "Ecological light pollution." *Frontiers in Ecology and the Environment*, 2(4), pp. 191-198.

⁶ Bloch G, Barnes BM, Gerkema MP, Helm B. (2013). "Animal activity around the clock with no overt circadian rhythms: patterns, mechanisms and adaptive value." *Proceedings of the Royal Society B: Biological Sciences*, 280(1765):20130019. doi: 10.1098/rspb.2013.0019. PMID: 23825202; PMCID: PMC3712434.

⁷ Longcore & Rich *supra* note 4

⁸ Gaston, Kevin J., and Alejandro Sánchez de Miguel. (2022) "Environmental impacts of artificial light at night." *Annual Review of Environment and Resources* 47(1), pp. 373-398.

⁹ Sanders, Dirk, et al. (2021). "A meta-analysis of biological impacts of artificial light at night." *Nature Ecology & Evolution* 5(1), pp. 74-81.

¹⁰ Longcore & Rich *supra* note 4

¹¹ Gaston et al. *supra* note 3

reference conditions in protected areas. Because documented biological effects occur even at low light levels,¹² the extremely bright illumination proposed by Reflect Orbital would represent a significant disturbance on unprecedentedly large spatial scales that would give rise to poorly understood risks.

Reflect Orbital’s website also claims that the company’s service will aid agriculture by boosting crop yields; however, some plant species may be harmed by artificial light at night (ALAN) exposure at times that are desynchronized with their photoperiods. For example, past studies of soybean crops have shown that excess nighttime lighting reduced yields.¹³ ALAN has also been shown to disrupt the behavior, navigation, and activity of nocturnal pollinators, reducing pollination efficiency and threatening ecosystem stability.^{14,15}

Finally, the bright satellite proposed by Reflect Orbital, and the scattering of its reflected sunlight by the atmosphere, pose an immediate threat to our access to the night sky. The proposed satellite, EARENDIL-1, is expected to be at least as bright as the full moon when viewed from within the main beam. If it passes through the field of view of sensitive telescopes, it will likely saturate the image, causing a complete loss of data.¹⁶ Moreover, the brightening of the night sky due to the scattering of its light by the atmosphere will impact our ability to detect faint astronomical objects, such as asteroids that could collide with the Earth – a problem that will be compounded by the future deployment of a full constellation. The loss of the night sky is a concern that extends beyond professional astronomy to the broader public, given the enjoyment of natural dark skies that is evident in the growing astrotourism industry.¹⁷

In summary, the action proposed by Reflect Orbital has the ability to significantly harm scientific research, human health, and entire ecosystems. For this reason, we believe that the proposal does not serve the public interest, and urge the Commission to deny the application, or at least require a thorough environmental impact assessment before any license is granted.

Thank you for your consideration,

¹² Gaston & Sanchez de Miguel *supra* note 7

¹³ Illinois Department of Transportation, Roadway Lighting’s Impact on Altering Soybean Growth. (2017). https://rosap.ntl.bts.gov/view/dot/32411/dot_32411_DS1.pdf

¹⁴ Das, Kadambini, Niraj Kumar, Rajkumari Supriya Devi, Subhalakshmi Rout, Saraswati Majhi, Bhagwati Prasad Sharma, and Sanjeet Kumar. (2025). “Lost in the Glow: How Light Pollution Disrupts Pollinator Behavior”. *Asian Journal of Environment & Ecology* 24(12), pp. 23-32. <https://doi.org/10.9734/ajee/2025/v24i12830>.

¹⁵ Longcore & Rich *supra* note 4

¹⁶ While the Reflect Orbital website states “We maintain strict exclusion zones for astronomy and sensitive environments,” the AAS has not received any information about what those exclusion zones would be, or how they would be selected and implemented. Reflect Orbital’s FCC application also does not offer any details in this vein.

¹⁷ National Park Service, Night Skies: An Economic Value. (2025) <https://www.nps.gov/subjects/nightskies/economic.htm>.

American Astronomical Society
American Geophysical Union
American Institute of Biological Sciences
American Meteorological Society
American Physical Society
American Physiological Society
Alliance for Data Science and AI
Astronomical Association of Western Australia Inc.
Astronomical Society of Australia (ASA)
Astrotourism WA Pty Ltd
Australasian Dark Sky Alliance
Dunedin Astronomical Society
Ecological Society of America
Entomological Society of America
Hamilton Astronomical Society
International Society for Archaeoastronomy and Astronomy in Culture
Mathematical Association of America
Nelson Astronomical Society
Royal Astronomical Society of New Zealand
Southland Astronomical Society
Starry Skies South
Palmerston North Astronomical Society
Perth Observatory
Tauranga Astronomical Society
Te Pō (NZ)
The Wildlife Society
Voyageurs Conservancy
Wellington Astronomical Society

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CERTIFICATE OF SERVICE

I, Roohi Dalal, hereby certify that on this 9th day of March, 2026, I have caused a copy of the foregoing Comment to be served as specified upon the parties below:

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/s/ Roohi Dalal
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