



**International Astronomical Union
Union Astronomique Internationale**

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Willy Benz, President
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**Before the
Federal Communications Commission
Washington, D.C. 20554**

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

Paris, March 3, 2026

To Whom It May Concern:

This comment on the Reflect Orbital (“RO”) application is provided by the International Astronomical Union (IAU).

The International Astronomical Union (IAU), founded in 1919, has today a membership of more than 12,000 professional astronomers from about 90 Countries. Therefore, the IAU can be considered representative of the world astronomical community. The IAU’s mission is to promote and safeguard astronomy in all its aspects, including research, education, communication, and development, through international cooperation.

The IAU:

- *Expresses* serious concern about sunlight as a service and RO’s plans to deploy space mirrors for the purpose of provisioning sunlight during twilight and portions of night. These concerns include
 - The potential for unintended direct illumination of observatories during specular beam repositioning or, if there is a loss of control, tumbling,
 - Indirect illumination effects due to mirror imperfections (inherent or debris and meteoroid induced) and diffuse scattering components, which due to the satellite’s size, could produce an on-orbit brightness in substantial excess of the IAU-recommended brightness threshold for the visual magnitude,¹
 - Light pollution effects well-beyond the intended illumination sites due to Rayleigh and aerosol scattering of the specular beam.
 - Impacts at other wavelengths, such as thermal emission, as well as reflections from terrestrial radio transmissions and occultations of astronomical sources.

¹ See the IAU CPS position paper, “Call to Protect the Dark and Quiet Sky from Harmful Interference by Satellite Constellations”, March 2024, at: <https://noirlab.edu/public/media/archives/techdocs/pdf/techdoc102.pdf>. The justification behind the altitude dependence is further explained in the “IAU CPS Satellite Optical Brightness Recommendation: Rationale”, *Res. Notes AAS* (9), 60, at: <https://iopscience.iop.org/article/10.3847/2515-5172/adc12f>.

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- *Reaffirms* previous concerns regarding sunlight as a service. In December 2001, the IAU provided a background paper² to the United Nations General Assembly at the invitation of the Science and Technical Subcommittee of the UN Committee on the Peaceful Uses of Outer Space. The focus of the paper was on obtrusive space advertising (which the United States prohibits),³ but it also noted sunlight as a service in response to the Znamya 2.0 and 2.5 projects. The paper emphasized that scattered light from a source as bright or brighter than the Moon would substantially degrade astronomical observations. The RO Earendil-1 space mirror is expected to be up to several times brighter than the full Moon when within the beam, depending on its efficiency.⁴
- *Notes* that while a single mirror may be managed through coordination, the intent of RO is to provide a constellation of mirrors, which is expected to have wide-ranging astronomical impacts.
- *Further notes* that, in addition to astronomical concerns, redirected sunlight to Earth will produce unwanted lighting over large areas, whether persistent illumination or “flashes” from mirrors changing their attitudes. Based on specular reflection estimates, the anticipated beam width would be approximately 5 km, with scattered light effects extending many beam widths beyond this distance.
- *Emphasizes* that while the RO Earendil-1 space mirror is unlikely to cause eye damage when flashes are seen with the unaided eye, people observing the cosmos through binoculars and especially small hobby telescopes could experience serious eye damage should a mirror flash occur within an observer’s field of view.⁵

Sunlight as a service is fundamentally different from challenges associated with on-orbit satellite brightness, as the purpose of space mirrors is to be as bright as possible. The IAU views sunlight as a service as incompatible with preserving dark and quiet skies for science and society.

Notwithstanding the serious concerns expressed above, should RO be granted approval for launch of Earendil-1, and especially if further launches of a space mirror constellation are reviewed, the IAU urges the FCC to require:

- The submission of scattered light profiles over the visible spectrum, with estimates of the impacts on the night sky brightness, as a function of distance from the beam centre.
- A viable plan for controlling the pointing of the specular beam during all mission phases.
- No pointings of the beam within 160 km of observatories listed within the Minor Planet Center’s observatory record. The optical depth of Rayleigh scattering will become non-negligible around approximately 30 km altitude. A distance of 160 km will help to ensure that the visible column of light will be less than 10 degrees above the horizon.
- A viable plan for providing a mirror pointing schedule to the public to help prevent public eye damage during amateur astronomy.
- Continued consultation with the National Science Foundation and the American Astronomical Society in an effort to reduce additional impacts to astronomy, such as mitigating unintended reflections. The

² UN Document A/AC.105/777, available at https://www.unoosa.org/pdf/reports/ac105/AC105_777E.pdf

³ 51 U.S. Code § 50911

⁴ If the prototype is launched, the detailed brightness and variation will be verified by direct observations. Regardless, the satellite by design is expected to be extremely bright while in the beam.

⁵ Lafambrois and Chou, J2000, RASC 94 (237), at <https://articles.adsabs.harvard.edu/full/2000JRASC..94..237L>

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IAU and its Centre for the Protection of the Dark and Quiet Sky can provide further expertise and support.

Finally, the IAU emphasizes that there are further considerations to the large-scale deployment of sunlight as a service, including to ecosystems and human health. Such considerations can further be investigated through consultation with the National Science Foundation and professional and amateur science bodies.

A handwritten signature in cursive script that reads 'Willy Benz'.

Willy Benz,
IAU President

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