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June 2, 2026

**VIA ICFS**

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
45 L Street N.E. Washington, D.C. 20054

Re: ICFS File No. SAT-LOA-20250701-00129; Call Sign: S00711

Dear Ms. Dortch:

On May 29, 2026, the American Astronomical Society (AAS) met with staff in the Space Bureau and the Office of Engineering & Technology; Will Holloway, legal advisor to Commissioner Trusty; and Edyael Casaperalta, legal advisor to Commissioner Gomez. The participants in each meeting are listed in Attachment A.

The meeting participants discussed Reflect Orbital's pending application for authority to deploy and operate a satellite, EARENDIL-1. AAS discussed the concerns of the astronomical community regarding this application for a single satellite, including the potential for eye damage to amateur astronomers looking through reasonably sized telescopes; temporary "flash blinding" of drivers and pilots; and negative impacts on the scientific research being carried out by federally funded astronomical facilities. AAS stressed the importance of advance modeling of the full effects of atmospheric scattering (of both downward reflection and upward re-reflection, and in both the active and the passive modes of EARENDIL-1's operation) as an input to understanding the severity of these risks. AAS also noted concerns related to ecology and human health that have been raised by other scientific groups representing ecologists, entomologists, physiologists, and others. These discussion points are set out in greater detail in Attachment B. Two handouts provided during the meetings are included as Attachments C and D.

AAS urged the Commission to deny the application since – in the absence of information about EARENDIL-1's design that would enable a comprehensive risk analysis – the proposed satellite cannot be considered to serve the public interest. Such a satellite could waste taxpayer dollars by degrading the scientific return of federally funded astronomical facilities, while also posing a serious threat to the public through the potential for eye damage. In its role as a pathfinder for a larger future constellation, although beyond the scope of the current application, EARENDIL-1



raises longer-term concerns about impacts on federally funded scientific research as well as ecology and human health.

Please contact the undersigned with any questions.

Sincerely,

*Roohi Dalal*

Roohi Dalal  
Deputy Director of Public Policy  
American Astronomical Society

**ATTACHMENT A: MEETING PARTICIPANTS**

**Office of Commissioner Trusty Meeting**

**Office of Commissioner Trusty**

Will Holloway

**American Astronomical Society**

Dara Norman

Andrew Baker

Roohi Dalal

**Space Bureau (SB) / Office of Engineering & Technology (OET) Meeting**

**SB / OET**

Jamison Prime (OET)

Brandon Moss (OET)

Sean Yun (OET)

Steve Duall (SB)

Karl Kensinger (SB)

Tom Hastings (SB)

Jon Markman (SB)

Jameyenne Fuller (SB)

Brandon Padgett (SB)

Carolyn Mahoney (SB)

Charles Horikami (SB)

Cindy Spiers (SB)

Jake Rhiem (SB)

Sam Karty (SB)

Julia Tu (SB)

**American Astronomical Society**

Dara Norman

Andrew Baker

Roohi Dalal

**Office of Commissioner Gomez Meeting**

**Office of Commissioner Gomez**

Edyael Casaperalta

Nia Grundy

**American Astronomical Society**

Dara Norman

Andrew Baker

Roohi Dalal



## ATTACHMENT B

### **The Reflect Orbital Application Does Not Serve the Public Interest**

*ICFS File No. SAT-LOA-20250701-00129*

- The American Astronomical Society (AAS), representing over 8,500 members (professional and amateur astronomers, astronomy educators, and students), urges the Commission to deny the application from Reflect Orbital to construct and launch EARENDIL-1, a demonstration satellite on the pathway to the company's goal of selling sunlight at night.
- AAS and the astronomical community have a history of successful coordination and cooperation with the satellite industry, including through the National Science Foundation (NSF) coordination agreements required by the Commission when it has granted licenses to satellite operators. AAS recognizes the important services provided by telecommunications satellites and looks forward to continuing to work cooperatively with operators of these satellites to mitigate their impacts on astronomical research.
- AAS opposes the granting of a license to Reflect Orbital, because this application is fundamentally different from those for telecommunications satellites. The proposed satellite would be intentionally reflecting sunlight to Earth and is designed to be as bright as possible, making impacts on astronomical research extremely challenging to mitigate. AAS also has grave concerns about the potentially serious harms and risks to amateur astronomers and other members of the public posed by this new type of satellite.
- AAS emphasizes that there are serious concerns related to public safety and the public interest raised by the launch of even a single satellite. While we have many concerns, we identify the following as the most significant for a single satellite:
  - o In its Consolidated Opposition and Response to Comments, Reflect Orbital admits (in footnote 41) that there is a risk of eye damage if someone were to view EARENDIL-1 through a telescope with an aperture larger than 12 inches. This is a common size for telescopes used by amateur astronomers and astronomy educators. Reflect Orbital does not have a way to warn everyone under the path of the satellite and therefore has no way to protect the public from eye damage upon viewing the satellite. AAS also notes that in our reply comment, we submitted calculations that indicate eye damage could be caused by anyone viewing the satellite through even smaller apertures (up to 4 in), posing an even greater risk to the public.
  - o The extremely bright beam from Reflect Orbital could cause temporary flash blinding of pilots and drivers, again posing serious safety risks to the public. AAS notes the additional concerns raised in the comment by the Air Line Pilots Association



- (ALPA), which expresses “concerns that the license application does not adequately analyze the level of safety risk that the satellite poses to airspace users” and states that “the license application is extremely vague and ignores fundamental airspace safety and operations issues essential to a safe and efficient National Airspace System.”
- o The proposed operations of Reflect Orbital could compromise work with professional, federally funded astronomical facilities. Reflect Orbital notes in its Consolidated Opposition that the passing light reflected by EARENDIL-1 “will amount to no more than that of moonlight when perceived on the ground.” However, many astronomical observations cannot be carried out on moonlit nights because the sky brightness is too high to allow for the detection of extremely faint objects (see Attachment C). Additionally, Reflect Orbital appears to not have done a predictive analysis of how the light reflected by EARENDIL-1 will be scattered by molecules and aerosols as it travels down through the atmosphere, and as it travels back up after it is reflected from the ground. These effects will increase the sky brightness over much larger areas than the stated 2.5 km radius of the beam (see Attachment D). Moreover, a lack of clarity on how EARENDIL-1 would be operated (e.g., how it would slew from one position to the next) makes it difficult to assess what types of moon-like paths would be traced on the ground. Although beyond the scope of this application, we expect that the impacts on federally funded astronomical facilities would be exacerbated by a larger constellation of satellites, and for the envisioned tens of thousands of satellites, ground-based optical astronomy as a scientific discipline would likely no longer be possible.
  - o AAS is concerned that some of the mitigation strategies that have been suggested by Reflect Orbital, such as detensioning EARENDIL-1's mirror, would actually increase the size of its beam -- amplifying concerns about scattered light, and thus exacerbating one issue while attempting to solve another.
- In terms of exclusion zones, AAS notes that the comment from the International Astronomical Union on this proceeding suggests that the list of 2704 astronomical observatories maintained by the Minor Planet Center (<https://minorplanetcenter.net/iau/lists/ObsCodesF.html>) define those sites whose illumination should be avoided at all costs (subject to accurate modeling of how extended the EARENDIL-1 beam would actually be). However, AAS is concerned that Reflect Orbital has not accurately modeled (and has therefore underestimated) the full size of the scattered beam and therefore cannot reliably determine exclusion zones.
  - AAS also notes that amateur astronomers, including many of our members, often do not use professional observatories or protected dark sky sites to carry out their observations. AAS conducted a survey of the astronomical community to assess the potential impacts of Reflect Orbital's proposed satellite. Of the over 2000 respondents, 60% noted that their primary

nighttime sky observing location is from a home observing site, or a non-protected rural dark sky site. These locations are highly dispersed, and Reflect Orbital will not be able to definitively avoid illuminating all of them. This means that there will be impacts on individuals' use and enjoyment of the night sky even if Reflect Orbital works with NSF, NASA, and international peers to avoid illuminating observatories.

- AAS is concerned that Reflect Orbital has not done their due diligence to model and fully understand the illumination of the sky and Earth's surface from EARENDIL-1 prior to launch. The astronomical community has taken on studies of the potential impacts using what information is publicly available, but the onus of such due diligence should be on the company seeking a license.
- While some AAS members have had conversations with Reflect Orbital leaders, and Reflect Orbital employees have attended one AAS conference, key questions raised in several of these conversations, including how atmospheric scattering has been modeled, how EARENDIL-1 will slew, etc. have not been satisfactorily answered by the company.
- We note that concerns with Reflect Orbital's proposed satellites are not limited to the astronomical community. 28 scientific societies, collectively representing tens of thousands of scientists across the US and the world, jointly submitted comments to the FCC raising serious concerns about the widespread potential impacts of Reflect Orbital's application, including the Ecological Society of America, the Entomological Society of America, the American Geophysical Union, the American Meteorological Society, and the American Physical Society. It is clear that the activities that Reflect Orbital is proposing will have an impact on the Earth environment, including on human health, agriculture, and wildlife, in addition to astronomy. We therefore urge the Commission to consider these impacts in assessing whether to grant a license.
- The AAS notes that if the FCC is unable to consider the impacts of reflected light in evaluating whether an application for a single satellite is in the public interest, it will presumably be equally unable to consider the impacts of reflected light in evaluating whether future applications for up to 50,000 satellites will be in the public interest. It would be unfortunate if an entire scientific discipline were rendered non-viable because no federal agency was able to consider reflected light as a dimension of public interest. AAS notes further that if the FCC were to hire and/or develop additional in-house technical expertise in assessing the propagation of reflected light through the atmosphere, it might help the Commission better evaluate competing public interest claims by future applicants and commenters.
- We urge the Commission to deny the application to protect public safety and the public interest. At the very least, we urge the Commission to require Reflect Orbital to submit the

following public analyses, noting that these would be common-sense due diligence, prior to any granting of a license:

- o A clear derivation of the size of aperture above which an individual looking at EARENDIL-1 would have a risk of eye damage (based on guidelines from the International Commission on Non-Ionizing Radiation Protection).
- o A plan for how Reflect Orbital would alert all individuals at risk of such eye damage, not just within the nominal service area, but anywhere scattered light could continue to pose a risk.
- o A detailed predictive analysis of the scattering of light from EARENDIL-1's beam by the atmosphere and from the ground, including the expected sky brightness and visibility of the beam as a function of distance away from the nominal service area.
- o A plan for what areas would be illuminated by EARENDIL-1 and at what times, as well as a plan for how all astronomical research sites (e.g., following the Minor Planet Center list) would be avoided (again, noting that the impacts would be seen outside the nominal service area).
- o A detailed plan for how EARENDIL-1 would be slewed, and how flash blinding of pilots and drivers would be avoided.
- o A response to the concerns raised by the Air Line Pilots Association, which requests a thorough aviation safety risk analysis, including of the potential harm posed to airborne aircraft from heat, solar radiation exposure, light intensity, and turbulence.

**ATTACHMENT C: Impacts of a full-Moon-lit sky on astronomical observations**

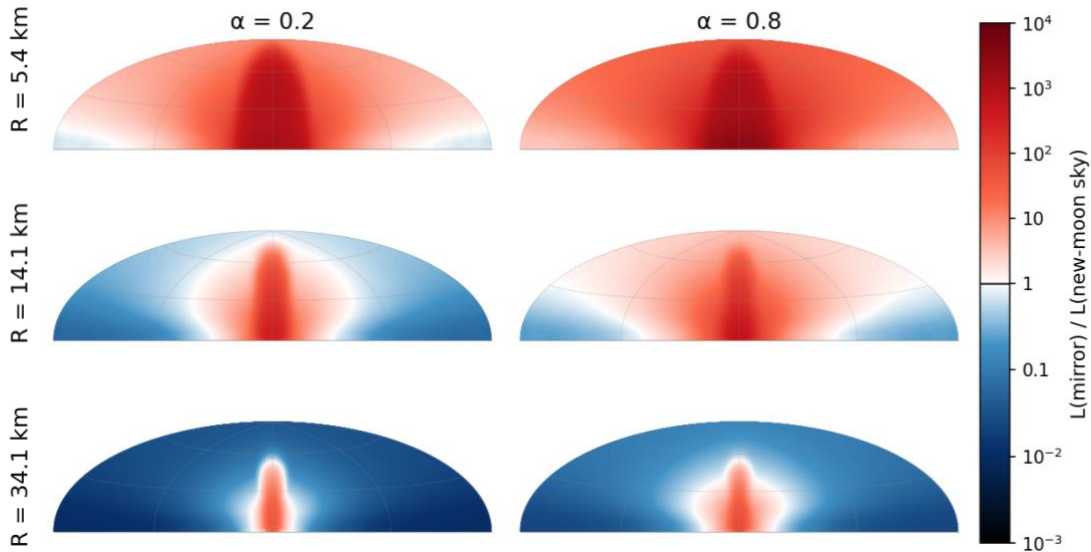


Simulated view of the Milky Way on a new moon night, as it would appear from a dark sky site, far away from any artificial light source.



The full-Moon-lit sky is much brighter, and the Milky Way is only faintly visible. This simulation uses sky luminance values for the full moon from calculations by Kocifaj et al. (2026, *The Astrophysical Journal Letters*, submitted), consistent with standard literature on the moonlit sky.

**ATTACHMENT D: Simulated brightness of Reflect Orbital beam as a function of off-axis distance**



This figure shows the ratio of the diffuse sky luminance produced by a 54 m mirror in Earth orbit to that of the dark sky on a new moon night (e.g., a value of 1 corresponds to illumination that would double the brightness of the new-moon sky). Left: upward reflection assumes a typical ground albedo ( $\alpha = 0.2$ ); Right: upward reflection assumes a highly reflective snow-covered surface ( $\alpha = 0.8$ ). From top to bottom, the observer is located at radial, horizontal distances of 5.4 km, 14.1 km, and 34.1 km from the axis of the light cone, all outside the directly illuminated area (radius 2.5 km). Reflected light would be 1/9 as strong for the 18 m EARENDIL-1 mirror compared to the level shown here for a full-size 54 m Reflect Orbital mirror; however, these simulations were done for a cloudless sky, and the presence of any clouds would add additional light scatter. Figure adapted from Kocifaj, Bakos, & Kundracik (2026), recently submitted to the *Astrophysical Journal Letters*.