Royal Astronomical Society

Ms. Marlene H. Dortch, Secretary,
Federal Communications Commission
45 L Street N.E.
Washington D.C. 20554

9 November 2022

Dear Ms Dortsch,

FCC Licence for Starlink Gen 2 satellite constellation

I am writing to you as the president of the Royal Astronomical Society (RAS), which represents around 4,000 astronomers, space scientists and geophysicists in the UK and in 60 countries worldwide.

We would like to express our concern at the SpaceX / Starlink Gen 2 proposal to deploy 30,000 satellites in Low Earth Orbit, a constellation intended to provide direct communication with mobile cell phones. To achieve this function the satellites will have large antennae around 7 metres across, with a surface area five times that of the first generation system.

Such large spacecraft are expected to be very obvious in the sky, and will certainly be significantly brighter than those in the first Starlink deployment that began in 2019. With necessarily powerful downlink signals, the constellation poses significant risks to the viability of science programmes in both optical and radio astronomy.

The proposed Gen 2 system is of course one of many under consideration, and we could easily see as many as 300,000 satellites in LEO by the end of this decade. Astronomers across the world continue to work with partners in industry, law and community organisations to understand in detail how this paradigm shift in the use of space will affect our science, the terrestrial environment, and the view of the night sky and its consequent impact for indigenous peoples.

The astronomical community is also working with those same partners on mitigation through design standards, software, and appropriate changes in the regulatory framework to embed good practice, and is very willing to assist the FCC in this regard.

The initial findings from this effort are set out in reports overseen by the International Astronomical Union (IAU), submitted to the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) at the start of this year, and now the subject of discussion by its Science and Technical Sub-Committee[1].

The IAU has also recently established the Centre for the Protection of the Dark and Quiet Sky from Satellite Constellation Interference (CPS)[2] to coordinate and develop further analysis, mitigation and regulatory work relating to satellite constellations. The RAS is a

[1] https://www.eso.org/public/unitedkingdom/announcements/ann22001/
[2] https://cps.iau.org/

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contributing member of the CPS and we strongly recommend it as source of authoritative global information on relevant mitigations.

Satellite constellations are by design intended to operate and to be visible across the whole globe, to enable communication with ground stations and individual users. Unlike light pollution and radio interference originating on the ground, this makes it impossible to escape their impact by travelling to remote sites.

This also means that regulatory bodies like the FCC have a responsibility to consider the global impact of their decisions, should evaluate the interests of a broader range of stakeholders than commercial entities alone, and in our view should not exclude large satellite constellations from environmental impact assessments, a concern set out in the US Government Accountability Office report[3] last week.

Our overarching belief is that the negative effects of satellite constellations on astronomical observation can be minimised, and we expect that any licensing agencies and commercial companies involved would wish to follow this route.

We therefore ask the FCC to act now to prevent long term damage to our science and to the night sky as a global public realm, and to take the following actions:

- To delay approval of the SpaceX / Starlink Gen 2 proposal until the operator has demonstrated it will meet the standards set out in the IAU report
- To apply similar considerations to all future filing requests, recognising the need to protect astronomy as a 'space activity'
- To end the exemption of large satellite constellations from review of environmental impact, acknowledging that their deployment has significant environmental consequences

Yours sincerely,

Professor Mike Edmunds
President, Royal Astronomical Society

[3] https://www.gao.gov/products/gao-23-105005