



Curtin University, Lead Organisation and operator for the Murchison Widefield Array, precursor for the Square Kilometre Array (SKA)

Research School of Astronomy & Astrophysics, The Australian National University, Operator of the Anglo-Australian Telescope (AAT) and the UK Schmidt telescope at Siding Spring Observatory

Australian Astronomical Optics AAO, a recognised world leader in innovative astronomical instrumentation, software, and research. Faculty of Science and Engineering, Macquarie University

Square Kilometre Array Observatory SKAO, building the low frequency component of the SKA, the world's largest radio telescope, at Inyarrimanha Ilgari Bundara, our Murchison Radio Observatory in Western Australia.

To: The Manager
Space Systems Section
Australian Communications and Media Authority

We would like to take the opportunity to respond to this consultation by proposing changes to the Australian filing procedures that help ensure that mitigating measures are implemented by satellite manufacturers and operators to preserve an unobstructed view of the sky for all users of this finite and precious resource.

The increasing number of LEO satellites already poses a significant challenge for all scientific users of the skies, including but not limited to the optical and radio spectrum. For reference, please see the following published scientific articles:

- "Detection of intended and unintended emissions from Starlink satellites in the SKA-Low frequency range, at the SKA-Low site, with an SKA-Low station analog": <https://arxiv.org/abs/2309.15672>
- "Unintended electromagnetic radiation from Starlink satellites detected with LOFAR between 110 and 188 MHz": <https://arxiv.org/abs/2307.02316>
- "The Case for Space Environmentalism": <https://arxiv.org/abs/2204.10025>

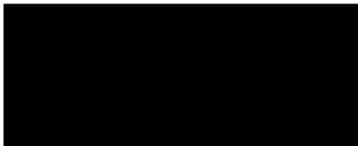
The number of pending filings with the ITU-R exceeds 500,000 satellites in the next decade and is unsustainable without implementation of significant mitigation measures to ensure the sky remains accessible for scientific research. These mitigation measures should apply in the radio spectrum regime, as well as in the visible and near infrared bands at night for optical/IR astronomical observations.

We would like to propose adding a paragraph to section 3.5 Australian benefit as follows:

3.5.3 Consideration of dark and quiet skies best practises

Australia is a global leader in astronomical research with world leading radio astronomical facilities built from public funds and in operation at many sites across the country. These facilities service the global astronomical community at no cost. To protect these investments of national and international significance, and recognising the vast increase in satellite numbers, satellite filings must demonstrate that best practises to mitigate the impact of the satellites on both the radio environment and the visible night sky are implemented. Specifically, this includes ensuring that the emission of unintended electromagnetic radiation by satellites remains below ITU-R RA.769 levels throughout the electromagnetic spectrum as well as out of band emissions in allocated radio astronomy service bands, except for at the satellites' allocated transmission frequencies, and ensuring the brightness of sunlight reflected off the satellites remains fainter than magnitude 7 (the limit of naked-eye visibility) at astronomical observatory sites.

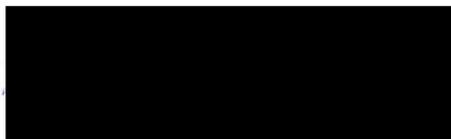
Respectfully,



Prof. Steven Tingay
Director, Murchison Widefield Array



Prof. Stuart Wyithe
Director, Research School of Astronomy & Astrophysics
The Australian National University RSAA/ANU



Prof. Mark Casali
Director, Australian Astronomical Optics AAO



Mr. Federico Di Vruno

Spectrum Manager, Square Kilometre Array Observatory
Co-Director, IAU Centre for the Protection of the Dark and Quiet Skies from Satellite
Constellation Interference