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## **Agenda Item 16 – Outer Space Institute Statement on preserving Dark and Quiet Skies**

Mr. Chair, distinguished Delegates,

The Outer Space Institute (OSI) greatly appreciates the opportunity to comment on options for fostering the preservation of Dark and Quiet Skies.

Ground-based astronomical observations are a principal way that humanity explores the cosmos. Light and radiofrequency pollution diminish that ability, with negative impacts on science and society.

We support the productive work within COPUOS on this issue, especially by member States in the Group of Friends, the International Astronomical Union (IAU), European Southern Observatory (ESO), Square Kilometre Array Observatory (SKAO), European Astronomical Society (EAS), and COSPAR, among others, and the results of related workshops co-organized by UNOOSA. Such work has helped to foster dialogue between member States and across national bodies and operators, raising awareness and taking steps toward addressing how the sky is being changed by the development of outer space. Some of those steps have led to coordination agreements between satellite operators and astronomical observatories.

This dialogue has further led to substantial discussion concerning the IAU's recommendation that satellites be kept dimmer than a visual magnitude of 7, with further considerations for operational altitude. Some efforts have already been made to include the magnitude 7 threshold into regional rule-making, such as the Draft EU Space Act. However, uncertainty about the current feasibility for many operators to achieve the 7<sup>th</sup> magnitude target has prevented such initiatives from being fully realized.

As the Subcommittee understands, there are multiple elements to preserving Dark and Quiet Skies, with the brightness of an individual satellite being only one aspect of the challenge. Other considerations include the number of satellites visible in the sky, the collective effects of those satellites, and the fraction of satellites with unintended electromagnetic radiation.

Mr. Chair, there are potential ways forward that would enable operators to meet the IAU visual magnitude threshold, while allowing some flexibility for them.

What might this look like? We give one example for discussion. Consider a technical metric that establishes the typical peak number of satellites brighter than 7<sup>th</sup> magnitude in an observer's local sky (1) at the boundary between nautical and astronomical twilight and (2) at local midnight. The transition between nautical and astronomical twilight occurs when the Sun is 12 degrees below the horizon. Together, these metrics serve as a key environmental indicator that can be widely adopted and easily verified, with verification provided by the operators themselves, as well as the astronomical community. Now consider the same metrics, but with



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gradation in magnitude. Thus, the metrics could track the number of satellites brighter than magnitude 7, 6, 5, and so forth.

Using this metric, member States could voluntarily establish targets among the different magnitude thresholds, with the aim of reducing the overall brightness to the 7<sup>th</sup> magnitude or dimmer. For systems that cannot yet achieve that reduction, targets could be used to help reduce their overall impact and help to manage the collective brightness on the sky.

If the targets do not immediately achieve the 7<sup>th</sup> magnitude threshold, it is reasonable to ask why have tiered targets at all? We see several advantages.

First, clear targets can help to establish a commitment to preserving the dark sky. And commitments – even non-binding commitments such as these – can help to change behaviour over time. Second, having tiered targets can be used to track progress and report successes. It can also highlight potential problems and provide a well-defined baseline for further decision-making. Third, the evaluation of the targets would be based on directly observable metrics.

Although the above example is for optical brightness mitigations, a similar approach could be taken to address unintended electromagnetic radiation and its impacts on radio astronomy.

International bodies of experts, such as the International Astronomical Union's Centre for the Protection of the Dark and Quiet Sky and the OSI, could aid member States in developing voluntary national mechanisms with scheduled, tiered brightness targets.

Finally, we express concern regarding sunlight as a service, as well as recent proposals for low Earth orbit constellations with up to one million satellites. Such constellations would pose numerous sustainability challenges and are expected to have severe consequences for astronomy.

The OSI wishes to affirm its support for the Chair and the work of the Subcommittee. We look forward to further discussions on Dark and Quiet Skies. Thank you for your attention.