



# General Assembly

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## Committee on the Peaceful Uses of Outer Space

### Summary of discussions on dark and quiet skies for science and society

#### Note by the Secretariat

1. In 2017, the Committee on the Peaceful Uses of Outer Space agreed that the Office for Outer Space Affairs of the Secretariat would organize, jointly with the International Astronomical Union (IAU), a conference on the general topic of light pollution.
2. While travel was restricted during the coronavirus disease (COVID-19) pandemic, the Office for Outer Space Affairs, together with Spain and IAU, organized an online workshop on dark and quiet skies for science and society from 5 to 9 October 2020. Participants in the workshop discussed the impacts on astronomy of three classes of interference: (a) artificial light at night; (b) the large number of low Earth orbit satellites; (c) and radio-wavelength emissions. A scientific organizing committee prepared the online workshop, and working groups dedicated to each technical topic produced a report that was published by IAU in January 2021.
3. At the fifty-eighth session of the Scientific and Technical Subcommittee, held in 2021, Chile, Ethiopia, Jordan, Slovakia, Spain and IAU submitted a conference room paper entitled “Recommendations to keep dark and quiet skies for science and society” (A/AC.105/C.1/2021/CRP.17). The paper contained recommendations that mostly originated from the technical report published by IAU in January 2021, and those recommendations were included in a technical presentation of the results of the online workshop delivered by IAU during that session.
4. At the same session of the Subcommittee, Canada, Japan and the United States of America submitted a conference room paper in which they proposed to add a single issue/item entitled “General exchange of views regarding satellite system effects upon terrestrial-based astronomy” for discussion at the fifty-ninth session of the Subcommittee, in 2022 (A/AC.105/C.1/2021/CRP.24). In that paper, it was recommended that another opportunity be provided for delegations to exchange their views on both the issue of the effects of satellite systems on terrestrially based astronomy and the potential relevance of that issue for the work of the Subcommittee.
5. In addition, a side event was organized by the delegation of Switzerland on the margins of the fifty-eighth session of the Subcommittee, with a lecture by Michel Mayor and Didier Queloz, laureates of the Nobel Prize in Physics for 2019, entitled “From the shadow of exoplanets and lost dark skies”, in which the impact of light pollution and satellite constellations on astronomy was mentioned.



6. The Subcommittee, at its fifty-eighth session, encouraged the Office for Outer Space Affairs to engage with all relevant stakeholders, such as IAU and others, on the matter of dark and quiet skies as it related to the mandate of the Committee and its Subcommittees, and to present the outcomes of that engagement, including findings for furthering the discussion on the matter, to the Subcommittee for consideration at its fifty-ninth session, in 2022. In that regard, the Subcommittee noted that the conference on dark and quiet skies for science and society to be organized by the Office jointly with the Government of Spain and IAU, planned to be held in October 2021, could provide input to a focused discussion on opportunities for international cooperation (A/AC.105/1240, para. 233).
7. The Subcommittee also agreed that the industry symposium to be organized by the Office for Outer Space Affairs at the fifty-ninth session of the Subcommittee should be on the topic of dark and quiet skies (A/AC.105/1240, para. 274).
8. During the sixty-fourth session of the Committee, in 2021, discussions were held on the possible introduction of an agenda item on dark and quiet skies at the fifty-ninth session of the Subcommittee.
9. At that session of the Committee, a technical presentation was provided by a representative of Austria on the topic “‘Sky pollution’: how artificial light and satellite networks are impacting our night skies and research”. The representative stressed the need for astronomers to obtain more information from satellite networks.
10. The Committee noted that an agreement on how to procedurally address the matter could possibly be reached in the intersessional period before the fifty-ninth session of the Subcommittee (A/76/20, para. 299).
11. Throughout 2021, the Office for Outer Space Affairs continued to engage with IAU and other relevant stakeholders to prepare the United Nations/Spain/IAU Conference on Dark and Quiet Skies for Science and Society. The report on the Conference is available in document A/AC.105/1255. Various groups of experts, including astronomers and representatives of the lighting industry, the satellite industry and academia, met informally throughout the months leading up to the conference to clarify the issues from their respective points of view and prepare inputs for the event. They discussed how to propose specific measures to mitigate the impact of artificial light at night, of the large number of low Earth orbit satellites, and of radio-wavelength emissions from satellites on radio astronomy. Those discussions addressed both technical means of mitigation and measures of a legal and political nature.
12. In addition, it should be noted that two online satellite constellation workshops were organized jointly by the American Astronomical Society and the National Optical-Infrared Astronomy Research Laboratory of the United States National Science Foundation in 2020 and 2021. Several members of the scientific organizing committee of the United Nations/Spain/IAU Conference contributed to those workshops, the aim of which was to assess and help to solve the issue of the brightness of satellite constellations. The second workshop produced recommendations for astronomers, the satellite industry and decision makers in terms of both technical and policy activities.<sup>1</sup>
13. The United Nations/Spain/IAU Conference was held entirely online from 3 to 7 October 2021 owing to the eruption of the Cumbre Vieja volcano on La Palma, Spain, which disrupted activities on the island. The Conference included presentations and round-table discussions involving a total of 69 individual speakers from all regions of the world. A total of 724 participants from 76 countries registered to attend the Conference and were granted access to the online communication platform. The participants focused on the technical and policy actions that could be undertaken to implement the recommendations discussed in 2020, in particular with regard to identifying which stakeholders and partners would need to collaborate to

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<sup>1</sup> See <https://noirlab.edu/science/events/websites/satcon2/publications>.

implement satisfactory solutions for the preservation of dark and quiet skies. They also discussed possible options for activities at the level of the Committee on the Peaceful Uses of Outer Space and its Subcommittees.

14. In discussing options for future activities at the policy level, participants in the Conference stressed the central role of the Committee on those topics and discussed how to link the various issues of artificial light at night, radio frequency interference from satellites with radio astronomy, and satellite constellations. While an agenda item might be introduced on the agenda of the fifty-ninth session of the Scientific and Technical Subcommittee, in 2022, with the target scope of a “general exchange of views on the effect of satellites upon astronomy”, participants in the Conference stressed the need to consider not only the impact of satellites, but also that of artificial light at night and radio frequency interference on astronomy as a whole.

15. Participants in the Conference discussed the viability of establishing a multi-year workplan of activities, including with the participation of IAU, the European Southern Observatory and the Square Kilometre Array Observatory. Participants expressed the view that the impact of satellite constellations on radio astronomy should be addressed by the Committee, in coordination with the International Telecommunication Union, to determine suitable measures within their respective scopes of responsibility.

16. Following the Conference, detailed technical recommendations were provided in extensive reports that were made available online by IAU.

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