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English only

**Committee on the Peaceful
Uses of Outer Space****Sixtieth session**

Vienna, 7-16 June 2017

Item 6 of the provisional agenda*

**Report of the Scientific and Technical
Subcommittee on its fifty-fourth session****The “Dark and quiet skies” proposal as an initiative under
the auspices of the Committee on the Peaceful Uses of Outer
Space for protecting the environmental observing conditions
for large astronomical observatories and world citizens,
submitted by the International Astronomical Union (IAU)****Summary**

The free and unrestricted observation of the sky from the ground and from space is a value both for the scientific research community and — even more importantly — for humankind as a whole.

Artificial illumination degrades the visibility of objects in the night sky and negatively affects the billion-dollar investment currently deployed and planned in scientific observing infrastructures.

This document defines the terms of the problem, describes possible solutions, and proposes actions by the United Nations.

I. Background

1. Astronomy is the most ancient science, present in all world civilizations since the earliest times and still active worldwide both as a specialized scientific research activity and as a cultural heritage at large. Both facets of astronomy, the specialized research aimed at improving our understanding of the universe, and the natural fascination of humankind for the celestial sky need attention.

2. The recent decades have seen an enormous improvement of the research infrastructure of large astronomical institutions. This is true, in particular, for the data collection capabilities, i.e. telescopes (for the UV, optical, and IR wavelengths), antennae (for the radio frequencies), and more recently, detectors for neutrino and gravitational wave events.

* [A/AC.105/L.307](#).



3. Ground-based and space-borne assets do not compete, they complement each other. Space telescopes are free from the detrimental influences of the Earth's atmosphere, but they are disadvantaged by the mass and size limitations imposed by the launch vehicle, and by the fact that maintenance and upgrade of these facilities is difficult or impossible. Ground-based telescopes have a much higher light gathering capability, and their flexible instrumentation allows for a quick reaction to upcoming observing requirements.
4. In order to optimize the observing conditions for ground based assets they are placed in "near space" environments, such as high altitudes or mountain tops. The identification and selection of suitable observing sites is a lengthy and complex process, designed to optimize the combination of climatic, atmospheric, geological, and electromagnetic boundary conditions.
5. A modern observatory represents an investment in the billion-dollar range. This includes the cost of construction, of maintenance and upgrade, and of the science operations.
6. In order to secure the investment and to keep the facilities operating in optimal conditions for several decades it is becoming necessary to protect the environmental observing conditions of the observatories.
7. Ground-based observatories working at the limit of sensitivity are critical for supporting space assets. Many countries are now engaged in research and active observational programs to track and characterize space debris. In increasingly crowded orbits, these small, faint objects pose threats to working satellites. With adequate warning from ground-based telescopes, station-keeping manoeuvres can be executed to save valuable orbiting assets.
8. Another critical mission for planetary protection is the detection and cataloguing of small rocky asteroids with orbits that take them into potential collision courses with Earth. Depending on size, such near-Earth objects could destroy neighbourhoods or entire large cities should a collision occur. Absolute limiting sensitivity is required to detect them and to determine their size and orbits with accuracy well before their closest approach. A combination of ground-based and space-based assets is likely to be the most effective approach.
9. The extensive illumination of urban areas is extending in size and intensity all over the world. Notwithstanding the need for a proper illumination of our cities, one negative consequence is the deprivation of the vision of the night sky by the citizens.
10. At the XXVIIth International Astronomical Union General Assembly (Rio de Janeiro, 2009), a Resolution in defence of the night sky and the right to starlight was approved.

II. Proposed Actions

11. The United Nations Office for Outer Space Affairs and the International Astronomical Union (IAU), to organize a conference on the subject, with the purpose of fully summarizing the issues and making recommendations to preserve "dark" skies, reaching out to representatives of the astronomical communities at large.
12. The Office and the IAU welcomes the participation of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and other relevant entities, as appropriate.

III. Taken Actions

13. At its fifty-fourth session, in 2017, the Scientific and Technical Subcommittee had before it a proposal by the IAU, which was made available in a conference room paper “The “Dark and quiet skies” proposal as an initiative under the auspices of the Committee on the Peaceful Uses of Outer Space for protecting the environmental observing conditions for large astronomical observatories and world citizens, submitted by the International Astronomical Union (IAU)” ([A/AC.105/C.1/2017/CRP.17](#)). The Working Group of the Whole of the Subcommittee requested the Office for Outer Space Affairs to submit that proposal to UNESCO, with a view to obtaining an official reply for UNESCO on this matter (see [A/AC.105/1138](#), para.20).

14. In fulfilling that request, the Office submitted the proposal through a letter of the Director dated 5 April 2017.

Appendix

IAU 2009 Resolution B5

IAU 2009 Resolution B5 in Defense of the Night Sky and the Right to starlight

The International Astronomical Union XXVII General Assembly,

Recalling

1. The IAU/UNESCO International Year of Astronomy 2009 goal 8: facilitate the preservation and protection of the world's cultural and natural heritage of dark skies in places such as urban oases, national parks and astronomical sites,
2. The Declaration approved during the International Conference in Defense of the Quality of the Night Sky and the Right to Observe Stars (La Palma, Canary Islands, 2007),

Recognizing that

1. The night sky has been and continues to be an inspiration of humankind, and that its contemplation represents an essential element in the development of scientific thought in all civilizations,
2. The dissemination of astronomy and associated scientific and cultural values should be considered as basic content to be included in educational activities,
3. The view of the night sky over most of the populated areas of the Earth is already compromised by light pollution, and is under further threat in this respect,
4. The intelligent use of unobtrusive artificial lighting that minimizes sky glow involves a more efficient use of energy, thus meeting the wider commitments made on climate change, and for the protection of the environment, tourism, among other players, can become a major instrument for a new alliance in defence of the quality of the nocturnal skyscape,

Considering

1. The role of the IAU Division XII Commission 50 and its WG Controlling Light Pollution,
2. The role of the IYA2009 Cornerstone Project Dark Skies Awareness,

Resolves that

1. An unpolluted night sky that allows the enjoyment and contemplation of the firmament should be considered a fundamental socio-cultural and environmental right, and that the progressive degradation of the night sky should be regarded as a fundamental loss,
2. Control of obtrusive and sky glow-enhancing lighting should be a basic element of nature conservation policies since it has adverse impacts on humans and wildlife, habitats, ecosystems, and landscapes,
3. Responsible tourism, in its many forms, should be encouraged to take on board the night sky as a resource to protect and value in all destinations,
4. IAU members be encouraged to take all necessary measures to involve the parties related to skyscape protection in raising public awareness — be it at local, regional, national, or international level — about the contents and objectives of the International Conference in Defence of the Quality of the Night Sky and the Right to Observe Stars [<http://www.starlight2007.net/>], in particular the educational, scientific, cultural, health and recreational importance of preserving access to an unpolluted night sky for all humankind,

Further resolves that

1. Protection of the astronomical quality of areas suitable for scientific observation of the Universe should be taken into account when developing and evaluating national and international scientific and environmental policies, with due regard to local cultural and natural values.
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