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Author: Ms. Nathalie RICARD
United Nations Office for Outer Space Affairs, Austria

Prof. Piero Benvenuti
Italian Space Agency (ASI), Italy
Ms. Simonetta Di Pippo
United Nations Office for Outer Space Affairs, Austria
Ms. Casiana Muñoz-Tuñón
Instituto de Astrofisica de Canarias, Spain
Mr. Jose Miguel Rodriguez Espinosa
Instituto de Astrofisica de Canarias, Spain
Dr. Constance Walker
United States

KEEPING THE SKY DARK AND QUIET: RECOMMENDATIONS FOR NON-INTERFERENCE WITH ASTRONOMY

Abstract

Our window to the night sky is getting more and more opaque, as we are progressively widening the reach of artificial lighting on Earth. Besides interfering with nature and with human's view of the stars, artificial light impacts astronomical observations.

With the recent large increase in numbers of telecommunication satellites launched in low Earth orbit, some are visible even with the naked eye and the appearance of the pristine night sky, particularly when observed from dark sites, is altered. Observations from ground-based astronomical observatories are similarly impacted whenever these objects cross the instrument's field of view. The perspective of hundreds of satellites saturating astronomical instruments leads to question whether legal instruments should be considered to regulate the maximum brightness of a satellite. Since the Outer Space Treaty, governments have agreed, through the United Nations, treaties and guidelines that, collectively, have been governing activities in outer space for over half a century.

In February 2020, the International Astronomical Union expressed concern about the negative impact that the planned constellations of communication satellites may have on astronomical observations and on the pristine appearance of the night sky. While it is difficult to predict how many of the illuminated satellites will be visible to the naked eye and to instruments, because of uncertainties in their actual reflectivity, it is expected that they will be particularly visible during twilight hours. Their impact depends notably on the frequency of launches, transition to the final orbital position, properties of the satellite's surface material, as well as elevation.

To address the impact of artificial lighting and orbiting objects on astronomy, the United Nations Office for Outer Space Affairs and Spain, with the International Astronomical Union and support from the Instituto de Astrofísica de Canarias, are holding a conference dedicated to dark and quiet skies for space and society in Santa Cruz de La Palma, Spain, on 5–8 October 2020. The event will assess the extent of the issue, foster discussions between astronomers, public authorities and lighting equipment manufacturers, as well as the companies launching and operating satellite constellations. It will result in concrete recommendation for urban planners and for constellations in low-Earth orbit.

The Paper will present outcomes of the conference and how they will be considered by the United Nations Office for Outer Space Affairs in its work on the legal, policy and capacity-building aspects of international cooperation in the peaceful uses of outer space.