

IISL COLLOQUIUM ON THE LAW OF OUTER SPACE (E7)
Balancing Needs: Protection of Space Science (3)

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SKY FULL OF STARS OR SATELLITES: THE IMPACT OF MEGA-CONSTELLATIONS ON
GROUND-BASED ASTRONOMY**Abstract**

In this globalized and digitized world, the demand for fast and affordable wireless communications is rapidly growing; in this respect, satellite mega-constellations are becoming a popular solution, with commercial projects such as Starlink and Kuiper promising to bring low-latency, high-speed broadband internet connectivity all around the world. Nevertheless, the deployment of tens of thousands of satellites could potentially lead to the overpopulation of non-GSO orbits, as companies like Amazon and SpaceX are planning to triple the number of the existing satellites within the next decade. The proliferation of LEO satellites entails the potential to negatively impact the pristine view of the natural night sky and - by extension - to hamper ground-based astronomical observations, resulting *inter alia* in considerable financial losses and scientific miscalculations in the methodical observation of the night sky. The present paper focuses on the impact of satellite mega-constellations on both radio and optical ground-based astronomy and evaluates the applicability of existing international and space law instruments towards achieving greater protection of space sciences *vis-a-vis* commercial space activities. Firstly, it examines whether the language relating to the “freedom of scientific investigation”, under Article I OST can be interpreted so as to implicitly include ground-based astronomy, in an effort to understand how different needs and the freedoms of exploration and use of outer space can be best balanced. Furthermore, the paper reviews the application of environmental law principles, such as the maxim *sic utere tuo ut alienum non laedas* and discusses the obligation of States to conduct environmental impact assessments in order to minimize light pollution and protect the Dark and Quiet Skies before authorizing the launch of satellites under the “due regard” principle of Article IX OST. What is more, the different policies adopted by international regulatory bodies (i.e. ITU, UNESCO etc.), as well as a number of national licensing regimes are scrutinized. To this respect, it is argued that relying solely on business “good practices” does not suffice. Hence, this paper discusses pragmatic proposals towards the preservation of the space environment and the sustainability of space activities. The paper concludes by advocating the need to adopt uniform national and international legal frameworks for the protection of ground-based astronomy from artificial light pollution and harmful radio interference.