

Near-Earth Object (NEO) Discovery

The Impact of Satellite Constellations on Solar System Science with LSST

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Keywords: *Mega-Constellations, Artificial Satellites, NEO Discovery, LSST*

ABSTRACT

Constellations of tens of thousands of artificial satellites in low Earth orbit pose new challenges to ground based Astronomy. While previous satellite designs were bright enough to cause data-loss on detectors through saturation and CCD cross talk [1], some of the recently launched satellites reach apparent magnitudes around $V \sim 1$ mag [2]. If not actively avoided, such satellites could potentially damage detectors of the next generation of ground based telescopes such as the upcoming Vera C. Rubin Observatory's. In this contribution we present preliminary results on the effective data loss caused by constellations of artificial satellites for Solar System Science with the Legacy Survey of Space and Time (LSST) if no mitigation strategies [3] were employed. Preliminary results suggest that several percent of the LSST discovery Solar System object discovery yield could be lost due to the interference of fully deployed constellations of artificial satellites in Low Earth Orbit (LEO).

Acknowledgments: *This work was supported by the LSSTC Kickstarter Grant program (KSI-9).*

References:

[1] Tyson, J. Anthony, et al. "Mitigation of LEO satellite brightness and trail effects on the Rubin Observatory LSST." *The Astronomical Journal* 160.5 (2020): 226.

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[3] Hu, J. A., Rawls, M. L., Yoachim, P., & Ivezić, Ž. (2022). Satellite Constellation Avoidance with the Rubin Observatory Legacy Survey of Space and Time. *arXiv preprint arXiv:2211.15908*

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