

IAF SPACE OPERATIONS SYMPOSIUM (B6)
Large Constellations & Fleet Operations (5)

Author: Dr. Mark A. Skinner
The Aerospace Corporation, United States, mark96732@me.com

Mr. Carson Coursey
The Aerospace Corporation, United States, carson.d.coursey@aero.org
Mr. Eric George
The Aerospace Corporation, United States, eric.r.george@aero.org

DARK AND QUIET SKIES: A PREDICTIVE TECHNIQUE TO MITIGATE THE IMPACT OF
SATELLITE REFLECTIONS ON ASTRONOMICAL OBSERVATORIES**Abstract**

Artificial satellites have generally been visible with astronomers' telescopes since the dawn of the space age, but with the recent advent of large low earth orbit constellations (LLCs), consisting of several hundreds to thousands of satellites, what was once at worst an annoyance has become a pressing issue for the astronomical community. Bright reflections (brighter than seventh magnitude in the visible band) from satellites can easily spoil night sky observations, not just for electro-optical sensor astronomy, but also for "naked eye" sky observations, important to the general public as well as traditional societies' cultural practices. Several groups are working on different aspects of this issue, including some collaborative efforts with the LLCs' owner-operators, to mitigate the impacts of optical reflections from the satellites. We are leveraging previous work at the Aerospace Corp. to accurately predict a satellite's position as a function of time, and its visibility from the location of a specified observatory. We are utilizing previously developed predictive tools along with the most accurate satellite ephemerides from the Space Surveillance Network (SSN) to estimate when and where in the sky a satellite will be visible to a given observatory. If successful, these predictions could be shared with both the observatory (to allow potentially less impacted astronomical target selection) as well as the satellite owner-operator, who may be able to adjust the attitude of the satellite to minimize reflections in the direction of the observatory while the satellite is visible from the observatory. We describe our methods, our findings, and our recommendations.