

MONITORING OF HIGH-ALTITUDE SPACE TRAFFIC AND DISTANT SATELLITE DISPOSAL DESIGN.

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High-altitude orbits are populated with satellites on essential missions, including geostationary platforms and GNSS constellations. Constant monitoring of the active satellite and debris population is of paramount importance to maintain the orbital environment safe for future missions. Break-up events and collisions could proliferate the resident object population if not detected in time and avoided if possible. Moreover, the lack of the atmospheric drag makes disposal options limited in high orbits, forcing operators to re-design their satellite end-of-life disposal plans.

In this work we discuss possible approaches to maintain the space traffic at high altitudes sustainable. A carefully designed and well-equipped network of optical sensors could support this goal. The challenges of operating and maintaining such sensors are discussed. In addition, proper post-mission disposal design alleviates the operational burden of satellite-debris conjunctions. According to the latest mitigation guidelines from NASA's Orbital Debris Office, long-term re-entry for structures in MEO, Tundra orbits and highly inclined GEO could be accomplished via maneuver to a disposal orbit where orbital resonances will increase the orbit eccentricity. We discuss the dynamical intricacies of such solutions and provide robust re-entry options for MEO and GEO systems.