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SYSTEM VIEW ON SPACE SUSTAINABILITY SOLUTIONS

Abstract

Space industry is sending more critical assets to LEO in recent years, and is looking for a more sustainable way to operate in space. As more spacecraft exists, we are looking at pioneering workon the space sustainability solutions and methodology: from system integration, technology developer, ecosystem, and community.

Recent implementations of the US FCC and European regulations for satellites preparing for launch are drivers for industry pioneers to provide new zero-debris capabilities and practices. Larger satellites have been able to prove the capabilities with existing Active Debris Removal (ADR) capabilities with the propulsion systems on-board. Satellites will need to prepare extra fuel mass devoted to such an operation, and hence potentially reduce the satellite life time with reduced fuel available. Smaller satellites might not have enough space for the propulsion system on board and have traditionally not been able to do collision avoidance maneuver and were not able to de-orbit easily when flying at sufficient orbit and altitude. Passive de-orbit systems are recent technological developments to be able to address this issue.

We will look at system integration solutions, methodology of debris prevention and reduction measures, mindset, and economic incentives in this paper. We will also introduce experience and future missions in the verification of the execution of the end-of-life solutions.