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SPACE DEBRIS MITIGATION MEASURES IN ISRO

Abstract

For several decades orbital debris have been identified as a serious concern by all space faring agencies and nations as it potentially threatens the current and future space endeavors. The Indian Space Research Organization (ISRO) is well aware of current space debris scenario and is committed to achieve the goal of preserving outer-space for mankind. ISRO works on different aspects to effectively manage the threats due to space debris. This paper highlights the measures taken in ISRO towards the implementation of space debris mitigation. One of the major step taken in debris mitigation is the end of life passivation of cryogenic upper stage of ISRO's Geosynchronous Satellite Launch Vehicle (GSLV). Another one is the successful design and development of propellant venting system for the upper stage of ISRO's Polar Satellite Launch Vehicle (PSLV). ISRO's constellation of communication satellites orbiting in GSO's are designed with adequate propellant so that it can re-orbit to the higher graveyard orbit at the end of their operational lifetime. The re-orbiting and decommissioning operation of INSAT-3E is described here. ISRO has successfully designed and developed the models and software to predict the atmospheric re-entry of satellites and launch vehicle upper stages, and to compute the collision risk between the debris and the operational satellites. ISRO has also developed models to study the evolution of space debris environment in LEO and GEO. ISRO actively support the efforts of United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS) and Inter-Agency Space Debris Coordination Committee (IADC) to develop and adopt the space debris mitigation guidelines.