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SYMMETRICAL HYPERLOOP SYSTEM FOR MANAGEMENT AND MITIGATION OF SPACE DEBRIS IN LOW EARTH ORBIT

Abstract

Since the inception of the space age thousands of satellites have been launched into the earth's low earth orbit. Currently less than 10% of the man-made objects in space are active satellites, rest all pile up in the broad category of space debris. Ranging from the size of a paint fleck to a solar array, the speed of these debris could reach up to 17,500 mph which on collision with other debris split and multiply under a phenomenon known as "Kessler's Syndrome". This is not only creating heavy traffic in the low earth orbit, but it also poses a serious threat to active satellites and International Space Station as the debris could inflict catastrophic damage upon it's collision with them. Hence, with the resolve to clear up low earth orbit and to manage and mitigate the threat of space debris this paper presents the innovative system known as the "Symmetric Hyperloop" system. The Proposed system generates a strong magnetic field/ EMP, when the space debris comes within a range of 3m-5m. The Field/EMP causes the eddy currents to generate in moving debris. The eddies cause a major loss in chunk of its kinetic energy. This decelerates the object, which is then aligned to the desired path. This object is then steadily deorbited to re-enter the earth's atmosphere. The atmospheric drag leads to its heating up on re-entry and eventually burning up completely. The larger debris which account for less than 1The model incorporates electromagnetic tethers which are utilized to dissipate the momentum of the aligned debris. Current estimates and calculations depict that the symmetric hyperloop system can potentially clear up the low earth orbit of the earth in a single duty cycle of 5-7 years, hence proving to be a highly efficient system The threat of space debris is an alarm to our ambitious future space missions and its management and mitigation is a major problem due to lack of infrastructure. The symmetric hyperloop system not only manages and mitigates this threat but also provides a fixed end solution in a limited time-frame, hence catalysing our ambitions for interstellar travel and deep space exploration.