HACKATHON

SPACE DEBRIS EXTRACTION

PROBLEM DESCRIPTION

The present-day man-made space-debris environment has been created by the space activities that have taken place since 1957, Sputnik's launch. There have been more than 4000 rocket launches since then by various countries, as well as many other related debris-generating occurrences such as more than 150 in-orbit fragmentation events. Among 8700 objects, larger than 10 - 30 cm in the Low Earth Orbit (LEO) and larger than 1 m in Geostationary Orbit (GEO) registered in the US Space Command Satellite Catalogue. Researchers track these objects with radars and optical telescopes to determine their orbits and other characteristic parameters, including their sizes.

The major concern with debris is that it might hit an operational spacecraft or a larger object such as the International Space Station, with a whole variety of detrimental consequences. The average collision velocity in LEO is greater than in the much higher circular (GEO) orbits andtypically ranges between 8 and 12 km/s.

Specific Constraints:

The debris travels with the velocity ranges between 8 and 12 km/s. Tracking such objects, measuring their size, velocity becomes important in order to have more understanding of the space debris environment. Collecting such fast-moving debris, deorbiting it and landing it safely on the earth is deemed necessary for any space researchers to reduce the potential risk for future launch and ISS.

Expected output:

Simulate a methodology to detect, track and measure the number of debris, size and its velocity. Formulate a concept to collect, deorbit and land the space debris safely in the earth's surface for future use or to avoid potential risk.