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THE 25-YEAR GUIDELINE: A NEW APPROACH FOR PRACTICE

Abstract

As space is more contested and congested, it is a prerequisite to keep space as clean as possible for long term sustainability. One mean is the disposal of spacecraft after the end of their mission. For the time between end of mission and re-entry, several suggestions have been made, and one acknowledged proposal is the 25-year guideline. This guideline states, that each spacecraft shall be either returned onto the Earth's ground or parked into a graveyard orbit 25 years after the end of mission. As the Sun and its activity is not predictable with high accuracy, mission designer make assumptions to calculate the remaining time in orbit. In most of the cases, the estimation is much shorter than in reality. To improve the situation, a new estimation approach is proposed and assessed by several decay objects. First, objects in space, which had been launched and already re-entered, are propagated from their end of mission to re-entry with existing atmospheric models and observed solar and geomagnetic values. The results and accuracy are presented. Subsequently, a simple model is established, which estimates the atmospheric drag with several uncertainties including the solar activity. Along with these models, the debris objects are propagated accordingly, resulting in new re-entry times. Based on the presented study, new rules can be established that ensure a better fulfilment of the 25-year guideline compared to the previous models.