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THE GLOBAL DISTRIBUTION OF UNCONTROLLED RE-ENTRIES: RE-THINKING MISSION-END CONDUCT AND THE CALL FOR GLOBAL COLLABORATION

Abstract

The rate of uncontrolled re-entries with potentially survivable space junk has increased by over 350% during the last 5 years, driven by the significant increase in the number of launches and the survivability of re-entering satellites. While countries such as the United States, Russia, and China have historically been the primary contributors to space debris, accounting for the majority of the approximately 25,000 tracked objects in Low Earth Orbit, the unpredictable nature of re-entry events means that debris can impact any region globally. Some countries and organisations have demonstrated successful targeted controlled or semi-controlled re-entry, generally on larger platforms. However this remains the exception, not the norm. Most objects with a potential to survive re-entry remain uncontrolled, with location specific end of life disposal not a priority in spacecraft design or mission planning. As such, risk of re-entries is borne by all countries irrespective of their level of participation in the respective space activities, or any benefits received from those space activities, and is therefore disproportionally distributed. The ability to track and predict surviving re-entries is limited by available data, particularly as objects orbit over ocean areas, so enhanced collaboration in tracking and reporting across the international community will improve mitigation of risks. Ultimately safer end-of-life practices for satellite missions can have the greatest impact on reducing or eliminating the risks associated with uncontrolled re-entry of survivable space objects.