

SPACE DEBRIS SYMPOSIUM (A6)
Modelling and Risk Analysis (2)

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NEW INSIGHTS ON THE ORBITAL DEBRIS COLLISION HAZARD AT GEO

Abstract

An analysis is performed of the orbital debris collision hazard to operational spacecraft at geosynchronous orbit (GEO). As part of the examination, the contribution of individual components of the population are considered and presented to provide a clearer linkage between object characteristic and resulting risk. Our examination of GEO collision risk reveals several critical new insights: (1) the current probability of collision in GEO is relatively low, yet the future is difficult to predict due to our limited ability to observe objects in GEO and the uncertainty in past and future debris-generating events in GEO; (2) the probability of collision in GEO is not uniform by longitude - it is seven times greater in regions centered about the geopotential wells; (3) the probability of a mission-terminating collision is greatly dependent upon the approximately 2,200 objects in the 10cm-1m range observed in GEO but not yet cataloged; and (4) hardware relocated to GEO “graveyard” disposal orbits pose a potential additional, but not fully understood, collision hazard to operational GEO satellites.