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SPACE DEBRIS SYMPOSIUM (A6)
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AN APPLICATION OF STAMP (SYSTEMS-THEORETIC ACCIDENT MODELING AND PROCESSES) IN SPACE DEBRIS MITIGATION

Abstract

As the population of space debris continues to grow, the probability of collisions that could lead to potential damage will consequently increase; the intense spaceflight activity during the past 60 years has resulted in a growing population of debris objects that pose hazards to safe space navigation. In 2013, experts estimate that 29000 objects larger than 10 cm are orbiting Earth. Every satellite, space probe and manned mission can potentially leave space debris. The requirements contained in ISO 24113 (Space systems – Space debris mitigation requirements) are intended to reduce the growth of space debris by ensuring that spacecraft and launch vehicle orbital stages are designed, operated and disposed of in a manner that prevents them from generating debris throughout their orbital lifetime. Mitigation measures to restrict the creation of space debris will play a key role in the management of the future space debris environment and the sustainability of space activities. Traditional system safety approaches are being challenged by the introduction of new technology and the increasing complexity of the systems. STAMP (Systems-Theoretic Accident Modeling and Processes) is a new systems thinking approach to engineering safer systems. The objective of this work is to apply STAMP in the hazard analysis and mitigation of space debris.