

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Science Results from Ground Based Research (4)

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EVA-IVA CREW INDUCED LOADS TEST BED (E-LOADS)

Abstract

The Structural Engineering Loads Dynamics team is re-visiting the ISS Extravehicular and Intravehicular Activity (EVA-IVA) inadvertent crew-induced impact loads to improve on past design structural loads requirements, and to correct past loads data limitations, constraints, and inconsistent capability assessments. Improvement over past “static” load products, which are generally over-simplified and do not reflect accurate dynamic interaction between lab-measured impacts and actual vehicle impacted structures. We have developed a Test Bed “E-LOADS” to collect data on Crew-Induced EVA-IVA loads as a generic application and the development of a loads probability approach that can be applicable to microgravity and partial gravity environments. This simple testbed composed of a long pendulum and a stationary impact structure. The testbed allows us to run multiple impacts with least resources as possible, it is cost efficient and requires low operating cost. This study will allow for the development of a simplified structural capability assessment using high to low stiffness impacting materials as random variables for actual sub-systems and secondary structures of vehicles. The goal is to develop a large database performing tests measuring improved EVA-IVA inadvertent impact loads onto representative structures for structural capability and strength assessment.