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SYMPOSIUM ON COMMERCIAL SPACEFLIGHT SAFETY ISSUES (D6)
Commercial Space Flight Safety and Emerging Issues (1)

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CONSIDERATIONS FOR THE SAFE CONTROLLED TARGETED DE-ORBIT OF LARGE SPACE VEHICLES

Abstract

The International Space Station (ISS) is likely to be de-orbited sometime around 2025. The ISS will need to be safety retired, either in whole or as major segment. A controlled, targeted de-orbiting manoeuvre is the most likely scenario for disposal and due to the orbital design and geography, any break-up is likely to occur over mainland Australia - as will future commercial space flight missions of a similar scale and complexity. Building experiences modelling the Hayabusa re-entry in 2009 and recent improvements to Australia's space situational awareness capabilities and updates to space policy, this paper investigates considerations for ensuring the retirement of the ISS is safe. This paper builds on the approach employed by Aerospace Concepts in determining break-up of experimental vehicles, Failure Response Mode probabilities and dispersions in aerospace vehicles in applying Australia's Range Safety Template Toolkit (RSTT) – specialised software for determining probabilistic safety outcomes of space vehicles. The paper discusses the potential to use the re-entry of commercial cargo vehicles to assist with risk reduction and characterisation of break-up dynamics and understanding of high-atmospheric properties.