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RISK MANAGEMENT AND FLIGHT ASSURANCE FOR SMALLSAT MISSION SUCCESS

Abstract

In the world of small satellite design and flight, the central question is the execution of a elegantly functional vehicle. However, recognizing the basic modes in which the team and mission hardware can fail is inherent in fulfilling the purpose of a smallsat mission. In so doing, a team recognizes that the very process of building a novel system to explore a new frontier exposes that endeavor to the possibility of failure, and directly correlates the needs of a stakeholder with mission outcome. Recognizing the general lack of focus on the role of risk management in university mission success, this review is intended to illuminate risk management processes for university smallsat missions to enable innovation in flight assurance practices. This work examines risk in vehicle design and risk management documentation and illustration, as well as industry-standard analytical techniques. A case study of flight assurance implementation suggestions specific to a recent smallsat project is presented, including a suggested risk strategy for engineering phase and mission operations. Other major industry missions provide further lessons learned, and risk management software and analysis templates are discussed. Small satellites will have a fundamental role in upcoming exploration and scientific missions, but only if those flights can be assured from a risk management perspective.