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Lessons Learned in Space Systems: Achievements, Challenges, Best Practices, Standards. (5)

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LESSONS LEARNED WITH RISK MANAGEMENT: A SYSTEMS ENGINEER'S PERSPECTIVE

Abstract

Risk management is a communications device that, when executed as an essential task, enables systems engineering to effectively balance risk across the project. Developing and baselining risks is an essential continuous task to ensure top project concerns both from bottom up and top down are being mitigated. Risk management provides the opportunity to avoid the consequence of the risk when mitigation steps start early enough. Just discussing risk with all the project flight elements during development, even if no risks are open, provides an excellent communication opportunity between systems engineering and those elements, ensuring concerns and worries have a platform for discussion. A well-managed risk identification process will identify concerns that are serious but not being clearly communicated, and it will enable mitigation of those potential problems before they cause a failure.

Effective risk management requires considerable time and effort. It must be frequent enough to be useful and in depth enough to bring out emerging issues. It also requires a trusting relationship between the lead systems engineer and element and subsystem leads. The discussions need to be with the right number of individuals (typically a handful) and the right duration in time (typically an hour a month). Outside of these risk working groups, there is a formal management process to input, status, and disposition risk, and a monthly Risk Management Board meeting where key project stakeholders are informed.

This paper provides good guidance on effective risk management from a systems engineering perspective and provides project lessons learned from NICER, Landsat 9, LRO, and OSIRIS-REx to demonstrate the effectiveness of risk management.