

## IAF SPACE SYSTEMS SYMPOSIUM (D1)

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

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A NEW APPROACH TO MISSION CLASSIFICATION AND RISK MANAGEMENT FOR NASA  
SPACE FLIGHT MISSIONS

**Abstract**

The NASA risk classification system is meant to guide space mission development from formulation through completion of implementation. It is also meant to be the basis on which program and project managers develop and implement appropriate mission assurance and risk management strategies for the mission. In order to be useful, the risk classification system needs to provide consistent and reproducible classification results so that missions may be designed with the appropriate components, subsystems, and testing philosophy, all of which impacts mission schedule and cost. In a cost-constrained environment, a clear, robust, and reproducible approach to mission implementation becomes more critical than ever before. Once a project's risk classification level is established, the managers can define the appropriate management controls, systems engineering processes, mission assurance requirements, safety, and testing for that mission. The current NASA mission classification system will be reviewed before a new system is proposed. NASA manages space flight missions according to a four-tiered classification which assumes increasing levels of risk. We argue that risk does not change between classes. What changes are the means available to reduce risk. In performance-driven missions, the project will spend money in order to maintain performance without reducing margins. In cost-constrained missions, performance will be reduced in order to stay within budget or to maintain schedule: measurement requirements may be traded, design life may be reduced, or both. We then propose a new approach to the classification of NASA space flight missions, based on an assessment of how flexible the requirements, how exquisite the measurements, how long the lifetime, and how rigid the budget. Our proposed approach makes possible a clearer differentiation between classification levels and more effective guidance to program and project managers.