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Conference: Eight Annual NASA Project Management Challenge 2011

Track Preference: Systems Engineering

Presentation Title: Systems Engineering Using Heritage Spacecraft Technology: Lessons Learned from Discovery and New Frontiers Deep Space Missions

Synopsis:
This presentation will explore the results of a recent D&NF Program Office study of the drivers behind cost growth resulting from the use of heritage and advanced technology, identifying systems engineering considerations for early identification and mitigation of heritage or advanced technology risks.

Abstract:
In the design and development of complex spacecraft missions, project teams frequently assume the use of advanced technology or heritage systems to enable a mission or reduce the overall mission risk and cost. As projects proceed through the development life cycle, increasingly detailed knowledge of the advanced or heritage systems and the system environment identifies unanticipated issues that result in cost overruns or schedule impacts. The Discovery & New Frontiers (D&NF) Program Office recently studied cost overruns and schedule delays resulting from advanced technology or heritage assumptions for 6 D&NF missions. The goal was to identify the underlying causes for the overruns and delays, and to develop practical mitigations to assist the D&NF projects in identifying potential risks and controlling the associated impacts to proposed mission costs and schedules. The study found that the cost and schedule growth did not result from technical hurdles requiring significant technology development. Instead, systems engineering processes did not identify critical issues early enough in the design cycle to ensure project schedules and estimated costs address the inherent risks. In general, the overruns were traceable to: inadequate understanding of the heritage system's behavior within the proposed spacecraft design and mission environment; an insufficient level of experience with the heritage system; or an inadequate scoping of the system-wide impacts necessary to implement the heritage or advanced technology. This presentation summarizes the study's findings and offers suggestions for improving the project's ability to identify and manage the risks inherent in the technology and heritage design solution.

Bio:
Bryan Barley is currently the chief engineer for NASA's Lunar Quest Program. Mr. Barley has worked for NASA Marshall Space Flight Center (MSFC) for over 18 years. He has served as a lead systems engineer on various projects including for the development of crew training systems and for the development of International Space Station flight hardware and flight simulators. Mr. Barley also supported Spacelab on-orbit experiment operations an astronaut crew training manager for science payloads and as a crew interface communicator for on-orbit science payload operations. Mr. Barley is currently focusing on the program level technical oversight of the Lunar Quest Program's various projects and technology development efforts. Mr. Barley is the recipient of the NASA Space Flight Awareness Honoree Award and the NASA Exceptional Service Medal.