

(Abstract)
How to Plan and Manage Reserves Effectively

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Purpose and Scope –

The project manager (PM) responsibility can really be reduced to three categories. To be successful, he/she has to control quality, schedule and budget. When these come together inside an agreement made initially with a customer/sponsor, all is well. Over the past decade of robotic space exploration, NASA has been transitioning from the paradigm of implementing a few “large” (> \$1B) projects to that of more “smaller” (< \$600M) cost-and-time-constrained projects. NASA’s 2003 Strategic Plan for the Space Science Enterprise still aims at the objective of lower mission costs while preserving, to the greatest extent possible, mission performance. Of course, all agreements are based on science results of the highest caliber. In other words, cheaper, faster, better are still fundamental ... to wit, quality, schedule and budget. The challenge for modern PM’s is clear.

Approach –

To maximize the likelihood of success, the PM is well-served with a strong buffer of margin and reserves. However, just having the buffer does not necessarily translate into understanding whether it’s really enough, or how and when to release/spend reserves. The roads to failure and “Chapter 11” are paved with enterprises who spent too much, too soon, or waited until no amount of reserve could save the situation...it was too late to spend it. Thus, a PM needs a well developed reserves management plan, a.k.a. cash flow planned inside the time boundaries to defeat threats.

Elements of Technique –

- Clearly define scope from a “capability” perspective.
- Document the success criteria crisply and hierarchically.
- Employ a Capabilities vs. Requirements Review (CRR) ... focus issues & threats.
- Set the Performance Management System (PMS) to stay current on cost-to-go.

Keep the Baseline in constant view.
Use Earned-Value & Event Progress for updates with respect to the Baseline.
Release Reserves consistent with updates on the threats.
“Ride the fence” on scope with tech margins guarding time & money.
Fear the 10% level on cost-to-go until you see the “checkered flag.”

Conclusions –

Early work developing the plan for cash-flow of reserves against a clearly understood scope, set within high-probability capability, pays great dividends in confidence and eventual success. Key process interactions and techniques for effective reserves management developed during the author’s experience as project manager for NASA’s *Stardust* mission to collect and return dust from comet Wild-2 offer insights for success in today’s PM environment. *Stardust*, developed with Lockheed Martin Astronautics (Denver, CO) as flight system partner, launched on time, February 7, 1999, with a little over one million dollars remaining in the development reserve. *Stardust* has logged over 4.5 years of successful flight and is in excellent condition to make a successful flight through the dust cloud of Wild-2 next January. The key lessons in designing-to-cost and managing-to-budget are continuing to flow into JPL project processes and practices.

Ken, former project manager of NASA’s *Stardust* mission, retired in February 2002 but continues part-time at JPL, providing mentoring/education for project managers. Ken’s career spans mission analysis, power systems, avionics systems, and project management. Ken’s background: 33 years @ JPL, PhD-University of Illinois (‘74), 9 years as USAF officer/pilot.