



# Forensics Studies to Understand Project Performance

Dr. James N. Ortiz  
Director, Independent Program Assessment Office  
NASA Headquarters

Naval Postgraduate School 9<sup>th</sup> Acquisition Research Symposium  
May 2012



# Purpose of Forensic Analysis

- The ultimate purpose of this analysis is to identify trends and/or systemic issues in terms of what NASA is doing well and not doing so well in managing Program and projects
- With the results of this analysis, it may be possible to affect policies and procedures that better ensure success across the Agency

“In the past, NASA has had difficulty meeting cost, schedule, and performance objectives for many of its projects. The need to effectively manage projects will gain even more importance as NASA seeks to manage its wide-ranging portfolio in an increasingly constrained fiscal environment.” – GAO, *Assessments of Selected Large-Scale Projects*, Feb 2010



# Background

- NASA programs and projects undergo a series of comprehensive independent assessments as part of the approval process
- These independent lifecycle reviews are required by NASA policies and conducted by independent review teams, known as Standing Review Boards (SRBs)
- The impetus for the forensics study was the recognition that while SRB assessments are reported for each individual review, more information is contained in the aggregate of all reports and this information could provide a picture of the systemic performance of the agency's projects and programs (“**data mine** the SRB reports”)
- This information in turn, could help shed light into the effectiveness of policy initiatives directed to improve project performance, or the need to improve methodologies, training, or core competencies
- The Independent Program Assessment Office (IPAO) is responsible for the independent review and assessment of NASA programs and projects at designated stages in the lifecycle to support approval decisions at key decision points in the lifecycle



# Methodology

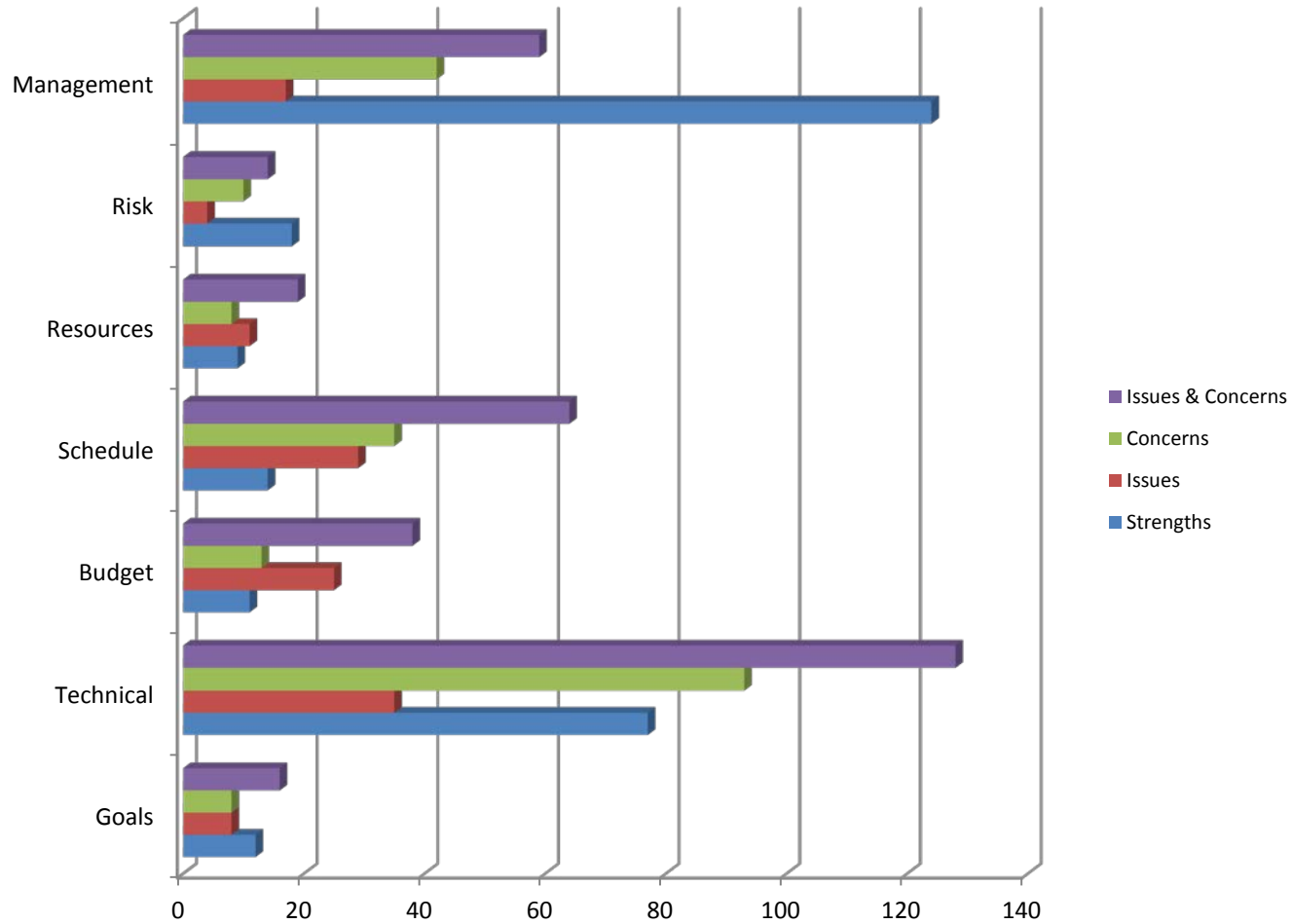
- Study being performed in phases (evolutionary)
- Results are presented at the aggregate level
- 1<sup>st</sup> phase was based SRB findings against agency criteria from 54 reviews over a three year period (2008-2010).
- Frequency information was used to develop frequency tables and graphs to show the distribution of positive and negative findings across the criteria elements

Criteria Element	Description
Goals	Alignment with and contributing to Agency needs, goals, and objectives, and the adequacy of requirements flow-down from those.
Technical	Adequacy of technical approach, as defined by NPR 7123.1 entrance and success criteria.
Budget:	Adequacy of estimated costs (total and by fiscal year), including Independent Cost Analyses (ICAs) and Independent Cost Estimates (ICEs), against approved budget resources
Schedule:	Adequacy of schedule
Resources	Adequacy/availability of resources other than budget
Risk	Adequacy of risk management approach and risk identification/mitigation
Management	Adequacy of management approach.

**NASA Criteria**



# Analysis results (phase 1)





# Summary results (phase 1)

- NASA appears to have offsetting strengths and weaknesses with respect to the Technical and Management criteria
  - Communication and Integration may be areas for improvement
  - Next generation of data analysis methodology should produce more actionable results (phase 2)
- Schedule preparation, analyses, management may be the area that presents the best opportunity for improvement
  - IPAO has seen moderate but steady improvement with respect to quality of schedules.
- Risk Management appears to be the area where NASA most consistently excels
  - 35% received at least one strength; 9% received at least one issue; 17% received either an issue or concern



# Recommendations (phase 1)

- Emphasize the “programmatics”
  - Strive for better balance between emphasis on technical excellence and cost and schedule performance
- Enable realistic planning
- Provide sufficient budget/resources to programs and projects to better enable success
- Encourage the use of good schedule practices (training)
- Ensure a more disciplined flow-down of Level 1 Requirements



# Current Status

- 2<sup>nd</sup> phase underway
- Emphasis is on a deeper level of understanding
  - Looking for 1<sup>st</sup> order root cause
- Updated classification criteria for:
  - Most recent version of NASA program management policy
  - Further detailing the criteria by formulating sub-categories (See an example of the following page)
- A pilot performed using a limited number (six) of 2010 SRB reports demonstrated the new sub-categorization was providing increasing levels of insight
- Analyses of 2010 and 2011 reports underway



# Expanded criteria for phase 2

<b>Technical Criteria Element</b>	Adequacy of technical approach, as defined by NPR 7123.1 entrance and success criteria.
Causes of Strength	
	Mission architecture and designs close with Program/project requirements
	Operations concepts close with mission designs and achieve mission needs
	Demonstrated design maturity is achieved for lifecycle stage
	Technology needs achieve proper level of maturity to support downstream development and integration.
	Test, verification and integration results are consistent with plans and support schedule and cost commitments
	Effective integration processes in place
Causes of Issues/Concerns	
	Mission architecture and designs do not close with Program/project requirements
	Operations concepts do not close with mission designs and achieve mission needs
	Demonstrated design maturity is not achieved for lifecycle stage
	Technology needs do not achieve proper level of maturity to support downstream development and integration.
	Test, verification and integration results are not consistent with plans and support schedule and cost commitments
	Lack of effective integration processes



# Summary

- This briefing described studies being performed by the IPAO to understand overall trends in project performance to provide information on any needed improvements to agency policies, training, or capabilities
- The accompanying paper describes in more detail the methodologies implemented, the status of the study, some of preliminary results and lessons learned, and a description of the way forward



Back Up Slide



# Definitions of Findings per SRB Handbook

- **Strength:** A strength is a finding of the SRB that describes a feature of the P/p that in the judgment of the SRB is better than expected at a particular stage of the life-cycle.
- **Issue:** A finding by the SRB; SRB issues are documented and briefed to the P/p and the management councils; issues typically drive the SRB's success criteria assessment and ultimate determination of the SRB rating for each review.
- **Concern:** A finding identified by the SRB; SRB concerns are typically documented and briefed to the P/p, but not specifically addressed with the management councils (unless asked).