Discovery Lessons Learned Workshop

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Ball Discovery Involvement

- Supported 18 concepts for 1992 San Juan Capistrano meeting
- Supported over 40 PIs in Step 1 AOs
- 5 Concept Study selections
- 2 Flight missions

Lessons Learned

- 2-Step AO process as implemented by Discovery leads to very strong missions
  - Excellent science
  - Well-understood risks, margins, and descopes
  - Carefully constructed management plans
  - Missions which have been selected have been able to meet cost and performance expectations

Some of the reasons for Discovery's success

- PI-mode mission ensures that the mission concept is built around focused science objectives
- PI balances mission scope with cost and technical risk
- PI forms strong working team of scientists and engineers with well defined responsibilities
- Excellent TMC review process makes risks visible and ensures that missions have a strong initial concept and plan

Program Stability is a key to Discovery success

- Regular release of AOs keeps community participation at a high level
- Stable mission scope and cost allow missions to mature with successive proposals
  - Debriefing sessions have helped to ensure very high quality future proposals
  - Subsequent proposals benefit from continued study and technology development
  - Benefit from lessons learned on missions that have been selected

Comments on 2-Step Process

- 2-Step process is an essential part of Discovery process
- Step 1 focus on science also demands that PI set a reasonable scope for the mission
  - This requires significant concept development to demonstrate that scope fits the cost cap
- Effort and expense is justified by the need to preserve the original scope during Step 2

Delta II Issue

- Delta II has been the Discovery work horse
- Delta II is not available to new missions
- There is no similarly-priced replacement
- Launch vehicle cost is increasing
- Suggest that Discovery cost cap be increased accordingly

Potential Improvements

- Cost cap increase to cover inflation, launch vehicle cost increases, and programmatic liens
- Increase page allocation in Step 1
- Interaction with PIs during Step 1 science and TMC evaluation to address key weaknesses
  - Should be much less elaborate than Step 2 site visit
  - Could be conducted through e-mail or interview
  - Would only address areas of uncertainty or confusion

Food for thought

- Cost and mass
  - $/kg is a dangerous metric that is inherently built into the cost models
  - Squeezing the science into a small mass could be more expensive (and riskier) than using a heavier LV but the cost model would not recognize it
  - Cost models include expended reserves but proposals show separate reserves