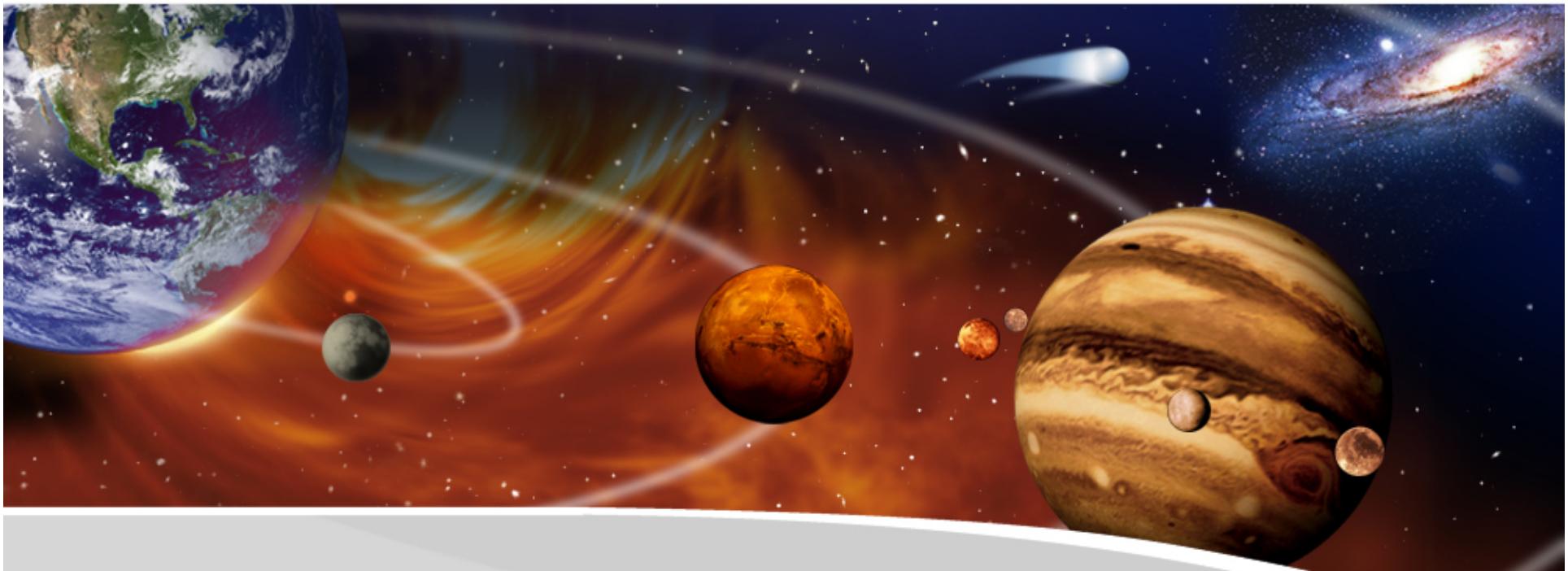
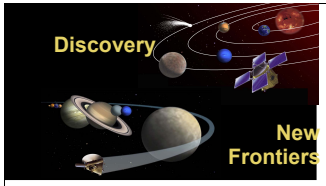


The Discovery AO Experience

Michael New, PhD
Lead Discovery Program Scientist



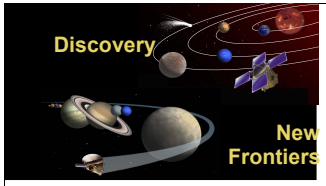
Targets from Step 1

Target Type	Number of Proposals
Inner Solar System Small Bodies	10
Inner Planets	13
Outer Solar System	5

- Four of the outer solar system proposals involved ASRGs.
- Clearly, offer of ASRGs enabled new mission concepts in Discovery.

General Comments

- "Heritage" must be treated carefully.
  - Cost savings often over-estimated in the opinion of reviewers.
  - No clear rules of composition for TRLs: using TRL9 components in a new configuration and/or environment does not yield a TRL9 instrument. But what *is* the TRL of the instrument?
- The era of flagship mission instrument flight spares is over (mostly) so most instruments need some development. It's far better to spend time creating and budgeting a solid technology/instrument development plan than spending time creating an argument for why an instrument *doesn't* need much development.
  - MatISSE is expected to help advance instrument tech.

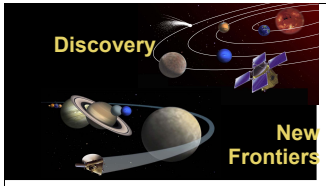


General Comments (2)

- Requirements are not simply a bureaucratic exercise; they are the skeleton upon which missions are built.
  - Even pure exploration missions can have clear, quantifiable, and verifiable requirements.
- Highly focused proposals (*i.e.,* few instruments) are generally, although not always, more feasible than more comprehensive ones. Incentives for use of NASA-developed technologies need to be reconsidered.
  - Incentives for use of ASRGs, for example, were considered disincentives by some members of the community.

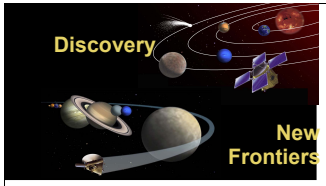
General Comments (3)

- Test plans need to be driven by requirements, not funds available.
- We are running out of experienced PIs and Deputy PIs and missions are not including plans to help develop new ones.
- We all need to accept that sometimes there are no viable descopes. Fortunately, descopes are *not required;* what's required is a contingency plan for potential cost/schedule over-runs *in development.*



Outer Solar System Mission-Specific Comments

- Missions to the outer solar system are longer and more complex than historical Discovery missions.
  - Phase E costs are greater.
    - More careful assessment of operations costs required from both proposers and reviewers.
  - Reliability requirements are more stringent.
  - Operating environments may be harsher.
    - Testing more important and expensive.
  - Teams have a greater need for succession planning.



Things HQ needs to re-think

- Formulae for incentives to use NASA-developed technology.
  - Also which technologies are incentivized.
- Treatment of Phase E costs.
- Philosophy on testing and risk reduction.
- Risk aversion:
  - Has HQ become too risk averse?
  - If so, can this be changed?
  - If it can't be changed, then what can be done to make complex missions less risky?
- Training opportunities for future PIs.