NASA SMD
PI Forum

Industry Role in PI Led Missions

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Outline

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  - Value of Industry Involvement
- Mission Life Cycle Examples
  - Concept Definition
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Importance of PI Led Missions

- Enables High-Payoff Science
  - Focused Mission, Outside Directed Programs
- Builds Science Community Ownership
  - Buy-In from Competitive Process
- Early Science & Engineering Connection
  - Science & Eng Interact Early in Process
  - Science & Eng Develop Integrated Products

Value of Industry Involvement

- Risk / Reward Motive
  - Early Science Requirements Definition & Flowdown
  - Balance Complexity & Cost
  - New Technology Only If Well-Developed and Significant Payoff
  - Fee-Based Incentives Unique to Industry
- Additional Perspective
  - Culture Driven by Different Experience Base
  - Independent from Govt & Science Team
- Leverage Internal Funding and Experience
  - Apply IR&D Results
  - Feed-Forward from Developments Funded by DOD, NOAA, etc.

Concept Definition

- Industrial Contractor Support
  - Help Balance Science Return with Mission & Spacecraft Complexity and Total Cost
  - Help Define Flowdown of Science Requirements into Mission & Spacecraft Designs
- Examples
  - Stardust:
    - Low-Cost Sample Return Capsule Concept *[Different Culture, IR&D]*
    - Encourage Use of NAVCAM for Flyby NAV and Comet Imaging *[Balance Complexity and Cost]*
  - Genesis:
    - Low-Cost Sun-Pointed Spinner *[Leverage Corporate Experience]*
    - Expanded Sample Return Capsule *[Early Science Flowdown]*
  - Phoenix:
    - Soft-Lander (versus Airbags) *[Balance Complexity and Cost]*
    - Deployable High-Area Compact Solar Arrays for Power Robustness *[New Technology Well-Developed and Significant Payoff]*

Phase B

- Industrial Contractor Support
  - Diligent Risk Management
  - Allocation of Requirements to Spacecraft & Other Project Elements
- Examples
  - Stardust: Early Science Requirements Document and Interface Control Documents *[Early Science Flowdown]*
  - Genesis: Parallel Path for C-C Heatshield *[Risk Management, IR&D]*
  - Phoenix: Determine Accessible Volume prior to Instrument Proposals; Providing a PEB (thermally controlled volume) for Instrument Electronics *[Early Science Flowdown]*

Phase C/D

- Industrial Contractor Support
  - Diligent Risk Management
  - Input into Management of Project Resources
    - Cost & Schedule Reserves
    - Technical Margins
- Examples
  - Stardust: Cost-Effective Contamination Control Techniques *[Leverage Corporate Experience]*
  - Genesis: Accommodated Late-Breaking Magnetic and Software Requirements of Charged-Particle Instrumentation *[Integrated Science & Engineering Team, Risk Management, Project Reserves]*
  - Phoenix: Accommodated Late Delivery of 2 Instruments *[Integrated Science & Engineering Team, Project Reserves]*
  - Overall: No Significant Instrument Descopes *[Early Science Flowdown, Risk Manage, Project Reserves]*

Phase E

- Industrial Contractor Support
  - Efficient Nominal Spacecraft Operations
  - Quick Resolution of Flight Challenges
- Examples
  - Stardust: Low-Cost Ops by Mission-Sharing; Active Participation in Flyby Risk Management *[Balance Complexity & Cost, Risk Management]*
  - Genesis: Early Detection of Thermal Paint Problem; Finding a Solution for Full Length Mission via Battery Environmental Testing *[Risk Management, Project Reserves]*
  - Phoenix / All Missions: Spacecraft Ops in Same Location with Development Engineering Team *[Balance Complexity & Cost, Quick Resolution]*

Summary

- PI-Led Missions Fill Important Role in Space Science Program
  - Enables High-Payoff Science
  - Builds Science Community Ownership
  - Establishes Early Connection between Science & Engineering
- Industry Involvement Adds Value to PI-Led Missions
  - Unique Risk / Reward Perspective
  - Additional Perspective & Experience Base
  - Leverage Internal Funding & Non-NASA Developments