



SMD Technology Program – Community Update

**Presentation to the 2010 Annual LEAG Meeting
Gordon Johnston, NASA HQ/SMD/PSD
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Outline

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 - Investment Areas and OCT Coordination

- **Planetary Science Technology Review (PSTR)
Panel**
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 - Current Status
 - Major Observations
 - Near Term Plans

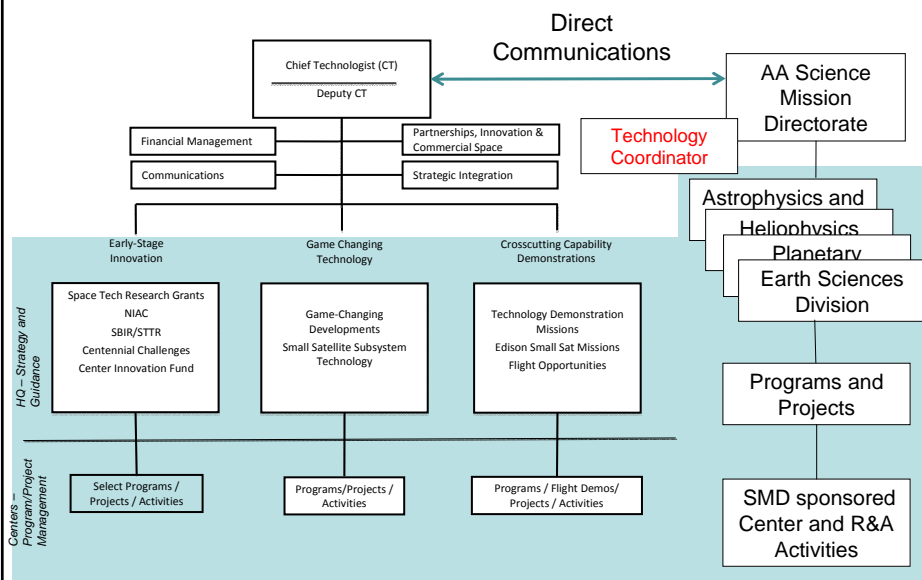
SMD Technology Investments

- NASA Science Mission Directorate invests over \$500M in technology development.
- Technology investments are made via four major avenues:
 - Mission-specific technology developments with flight projects
 - Individual PI-led research investigations
 - Suborbital research programs
 - Earth science technology program
- SMD is mission focused
 - Technology investments through the SMD Science Divisions
- SMD covers all TRL levels
 - Low to mid (R+A, instrument incubators, EST)
 - Mid to late (suborbital, EST, mission focused tech)
- SMD is coordinating with and supporting the OCT effort to improve the overall Agency capabilities in Science and Technology development.
 - Dr. Michael Moore is the SMD point of contact.

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Integration with OCT



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Planetary Science Technology Review Panel Purpose, Status, and Plans

Purpose

- The primary purpose of the Planetary Science Technology Review (PSTR) panel and its advisors is:
 - to assist the Planetary Science Division (PSD) of NASA Headquarters in developing a coordinated and integrated technology development plan that will better utilize technology resources.
- The panel will suggest process and policy changes
 - help answer the how questions.
- The panel will rely on the planetary decadal survey to identify what technologies PSD should invest in.

The full charter of PSTR can be viewed online <http://spaceflight systems.grc.nasa.gov/PlanetaryScience/>

Team

- Panel members are:
 - Peter Hughes, NASA GSFC
 - Tibor Kremic (chair), NASA GRC
 - Brad Perry, NASA HQ
 - James Singleton, AFRL
- Advisors are:
 - Pat Beauchamp, JPL,
 - John Clarke, Boston University
 - Ralph Lorenz, APL
- NASA HQ POC is:
 - Gordon Johnston
- Technical Support is provided by:
 - Waldo Rodriguez, NASA LaRC
 - Linda Nero, NASA GRC

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PSTR Activities and Products

- There are three phases to the PSTR charter
 - Assessment of current content and performance
 - Formulation of ideas and recommendations
 - Report and Communicate
- Products will be
 - An interim report of the results of the assessment phase
 - A final report detailing the work for all three phases
 - Two high-level notional technology roadmaps
 - One budget driven the other need-based

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- Observations/Issues can be grouped into four categories
 - Strategic - Issues that relate to an overall Planetary technology strategy
 - Process/Structure – Issues that relate to technology program processes and supporting institutional structures
 - Resource - Issues that relate to resources made available for technology development activities
 - Culture/Communication – Issues that relate to the cultures and communication among space projects teams, the supporting technologists, their respective institutions and external stakeholders



Strategic

- S-1) A comprehensive technology development strategy and an accountable owner is needed to set priorities and increase performance and coordination
- S-2) There is no clear path for technologies through the existing programs to mature from TRL-0 to TRL-9. Specifically there is an issue with funding at mid-TRLs (valley of death) and there is no mechanism within PSD for sub-orbital test flights or technology demonstration missions



Strategic

- S-3) PSD should be proactive and engage the OCT and ESMD as appropriate to ensure coordination and effective leveraging of plans and activities

- S-4) Technologies that address integration, ease of use, and system level issues need to be considered. Technology is more than just hardware and a qualified system is more than a set of qualified components

- S-5) Universities and other external organizations are not adequately and consistently engaged and supported in technology development



• Process/Structure

- P-1) The technology related decision making, planning, implementing, and review processes are not well defined and often inconsistent among programs
- P-2) Technology management is scattered across busy headquarters program executives and officers that also have other competing responsibilities
- P-3) A structure is needed that links technologists to missions and promotes early interaction with scientists. A “shepherd” function (guides a technology’s maturation) is also needed
- P-4) The heritage and TRL assessment processes need to be more accurate and consistent

Major Observations of Current Programs



• Resources

- R-1) Technology budgets are unstable and unpredictable. This makes technology maturation as well as sustaining skills and capability challenging and adds risk to overall mission success
- R-2) Previously identified technology priorities have not been adequately funded to make progress
 - E.g. the gap to infusion, extreme environments, planetary protection, sample return, and more
 - 2008 CASSE report (solar system decadal mid-term)
- R-3) Technology investments made by other agencies and the SBIR/STTR processes need to be better leveraged

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Major Observations of Current Programs



• Culture / Communication

- C-1) Technology investments do not always realize the benefits possible
 - Better documentation and accessibility to technology is critical to ensure broader use and to maximize investment potential
 - There is no easy way to comprehensively search and learn about technologies NASA is developing or has made available
- C-2) Increased communication and exposure among all stakeholders (scientists, technologists, mission teams, Centers,...) is needed for better technology planning, development, and infusion

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Major Observations of Current Programs



- Culture / Communication
 - C-3) Projects are too risk averse to new technologies
 - C-4) Tenuous top-level sustained commitment for technology
 - C-5) Technology capability and heritage is lost during gaps in flights or technology programs

Near Term Plans



- Complete interim report
- Formulate a set of recommendations
 - Continue to seek community input
 - Website
 - Blog
 - Direct contact/Email
 - AG's
 - DPS workshop

We welcome your inputs!



Inputs can be forwarded via the PSTR website at
<http://spaceflight systems.grc.nasa.gov/PlanetaryScience/>