



Planetary Protection at NASA: Overview and Status

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2012 NASA Planetary Science Goals



Goal 2: Expand scientific understanding of the Earth and the universe in which we live.

2.3 Ascertain the content, origin, and evolution of the solar system and the potential for life elsewhere.

2.3.1 Inventory solar system objects and identify the processes active in and among them.

2.3.2 Improve understanding of how the Sun's family of planets, satellites, and minor bodies originated and evolved.

2.3.3 Improve understanding of the processes that determine the history and future of habitability of environments on Mars and other solar system bodies.

2.3.4 Improve understanding of the origin and evolution of Earth's life and biosphere to determine if there is or ever has been life elsewhere in the universe.

2.3.5 Identify and characterize small bodies and the properties of planetary environments that pose a threat to terrestrial life or exploration or provide potentially exploitable resources.

NASA Planetary Protection Policy



- The policy and its implementation requirements are embodied in NPD 8020.7G (*NASA Administrator*)
 - Planetary Protection Officer acts on behalf of the Associate Administrator for Science to maintain and enforce the policy
 - NASA obtains recommendations on planetary protection issues (requirements for specific bodies and mission types) from the National Research Council's Space Studies Board
 - Advice on policy implementation to be obtained from the NAC Planetary Protection Subcommittee
- Specific requirements for robotic missions are embodied in NPR 8020.12D (*AA, SMD*)
 - Encompasses all documentation and implementation requirements for forward and back-contamination control
- Draft NASA Procedural Requirements document for human exploration prepared, revisions in process (*more tomorrow*)

Role of PPS



- Provides expert advice to NASA on planetary protection, as part of the NASA Advisory Council
 - Reviews mission activities and makes recommendations on implementation options
 - Considers and advises on specific points of policy that are below the resolution of international policy set by the Panel on Planetary Protection of the Committee on Space Research
 - Provides guidance regarding programmatic direction and issues of importance/relevance to future missions and implementation of planetary protection requirements

Planetary Protection within NASA



- International Relations
- Legislative Affairs
- General Council

- Science Mission Directorate
- Human Exploration & Operations
- Space Technology

Technology

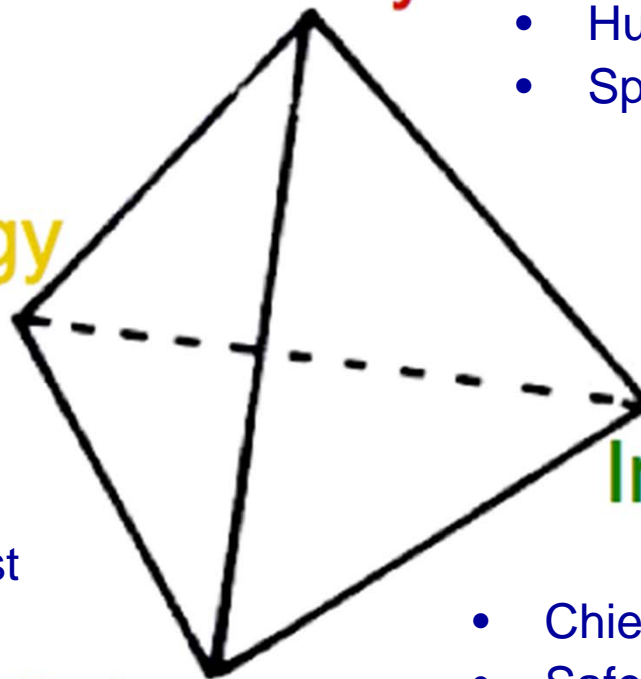
- Chief Engineer
- Chief Scientist
- Chief Technologist

Implementation

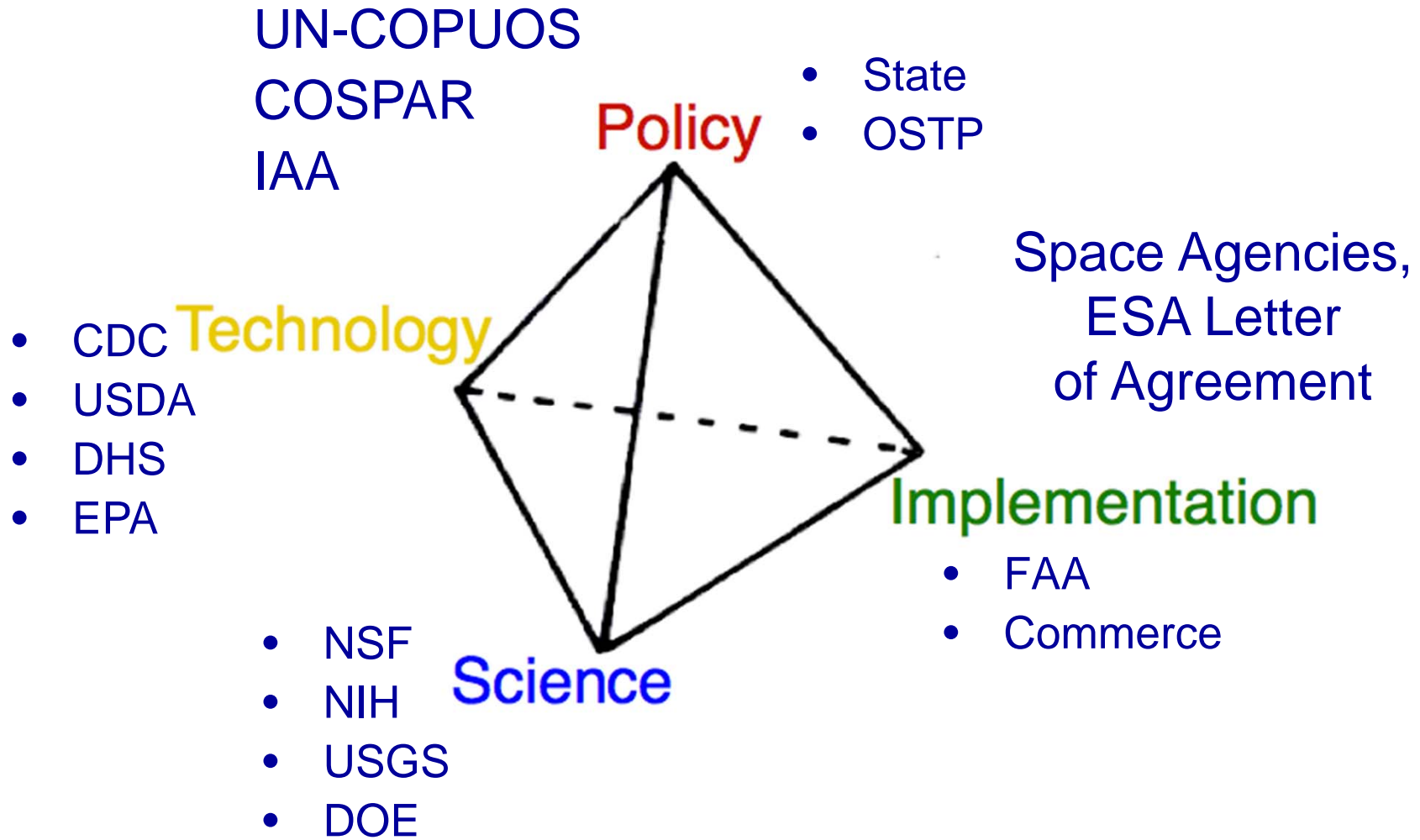
- Chief Health and Medical Officer
- Safety and Mission Assurance

Science

Policy



Coordination outside of NASA



Recent Recommendations



- Nov. '11 meeting, held jointly with ESA PPWG
 - Recommendations
 - Renew formal Letter of Agreement with ESA **in work**
 - Evaluate biological potential of the circum-Mars environment **in work; next PPWG**
 - Capture planetary protection lessons learned from MSL **in work; this afternoon**
 - Continue joint meetings with ESA **scheduling needed; travel challenges**
- May '12 meeting
 - Recommendation
 - NASA should develop a NPR for human extraterrestrial missions at a level corresponding to the current COSPAR planetary protection policy **in work; tomorrow**
 - Observations and information
 - Beneficial to involve the PPO in Mars Program Planning Group efforts
 - Concurred with JAXA's proposed classification of the Hayabusa-2 mission as Planetary Protection Category V, unrestricted Earth return **formal memo completed**
 - Concern expressed regarding resources and staff support for the PPO
- Nov. '12 meeting
 - No formal recommendations
 - Observations and information
 - Concern expressed regarding inclusion of planetary protection issues in the Office of Chief Engineer study on lessons learned from MSL **update this afternoon**

Updates to Policy and Requirements



- Joint ESF-SSB Study “MSR backward contamination – Strategic advice and requirements” released in July ‘12
 - Led by ESF with SSB participation
 - Presented to advisory bodies:
 - Preliminary conclusions presented to PPS in May ‘12
 - Final report endorsed by PPWG in Nov. ‘12
 - Copies of final report distributed to PPS in Dec. ‘12: available now
 - Presented to SSB/CAPS in March ‘12
 - Recommendations incorporated into current planning for MSR
 - Anticipated presentation to COSPAR Assembly in 2014

Programmatic Concerns



- An increasing number of mission concepts target locations of concern for planetary protection, both Mars and Outer Planets
 - Technology development for planetary protection, beyond basic research, has historically been left to missions: better coordination in planetary protection technology development and facilities support is needed
 - Increased coordination between NASA's robotic and human spaceflight efforts in planning for missions to Mars will require additional effort to ensure adequate oversight and consultation on planetary protection
 - Increasing interest in exploration activities by multiple national and private organizations raises a range of concerns: e.g., international cooperation, commercial exploration, and historical/environmental protection

Current and Upcoming Missions



- Several missions in operation and in preparation have planetary protection considerations to watch
 - The Dawn asteroid orbiter mission must avoid possible contamination of Ceres: **need to develop strategy for compliance**
 - The InSight Mars mission selected by the Discovery Program needs planetary protection facilities during ATLO: **facilities support still undefined**
 - The Europa Clipper concept has significant planetary protection technology development needs: **support still undefined**
 - The OSIRIS-REx asteroid sample return mission faces organic contamination constraints driven by science, but relevant to future planetary protection implementation concerns: **sample handling Centennial Challenge competition in development**
 - Refinement of planetary protection requirements for a Mars Sample Return campaign has been ongoing since 2007: **continuation of update activities is critical to ensure timely support of future mission needs**

Planetary Protection Research

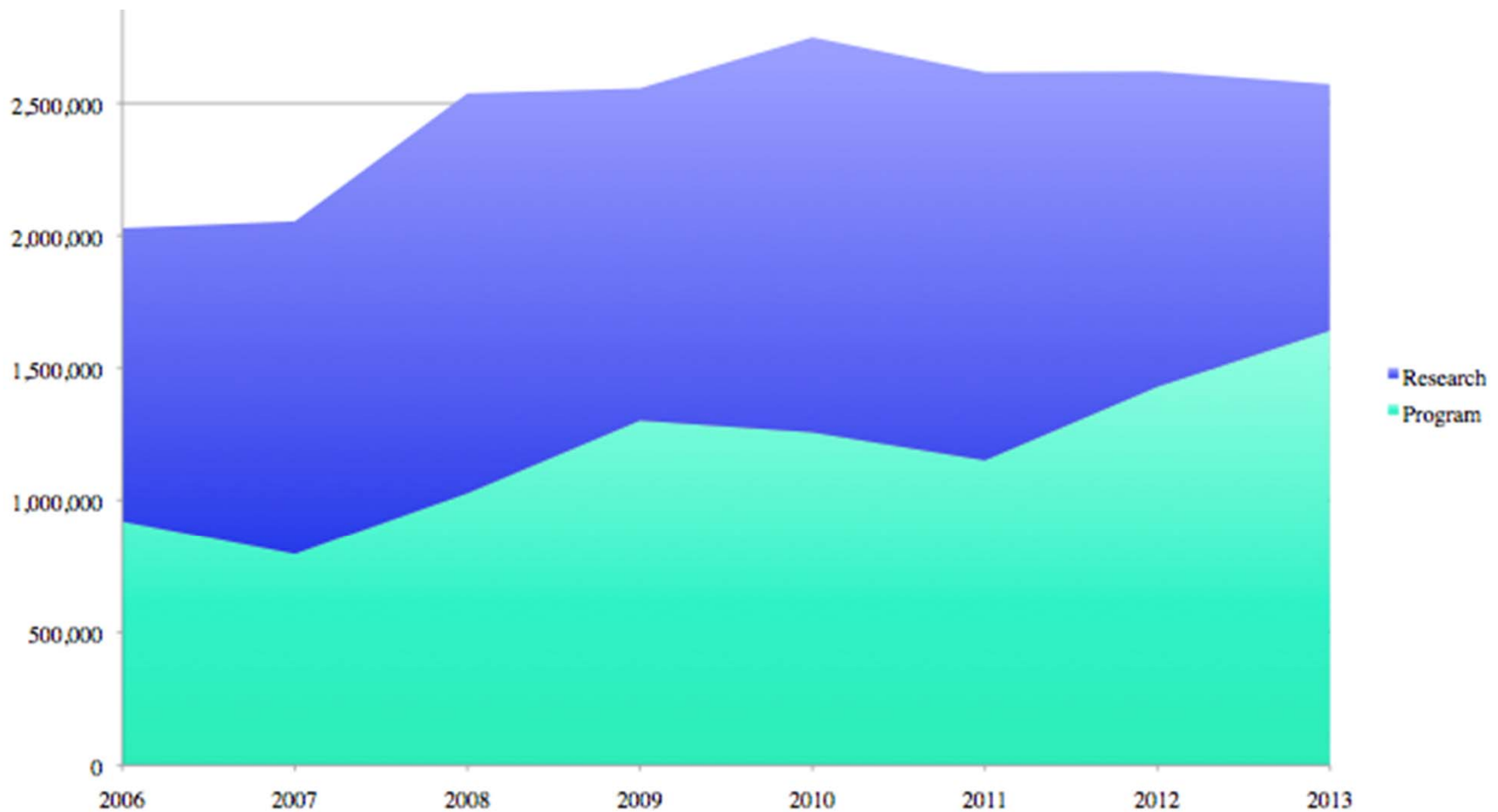


- Element of SMD ROSES call; solicits research that isn't covered by Astrobiology in these areas (13 awards total)
 - Characterizing the limits of life in laboratory simulations of planetary environments or in appropriate Earth analogs, particularly studies of the potential, distribution and dynamics of organism[s] (4 grants)
 - Modeling of planetary environmental conditions and transport processes that could permit mobilization of spacecraft-associated contaminants (2 grants)
 - Development or adaptation of modern molecular analytical methods to rapidly detect, classify, and/or enumerate the widest possible spectrum of Earth microbes ... and (4 grants)
 - New or improved methods, technologies, and procedures for spacecraft sterilization (3 grants)
- 21 proposals received to ROSES '12; 7 'selectable' letters sent

Planetary Protection Budget



Insufficient funds in FY13 PPR to select any new proposals; however, good coordination with other technology programs may fund some work.



Questions?

