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

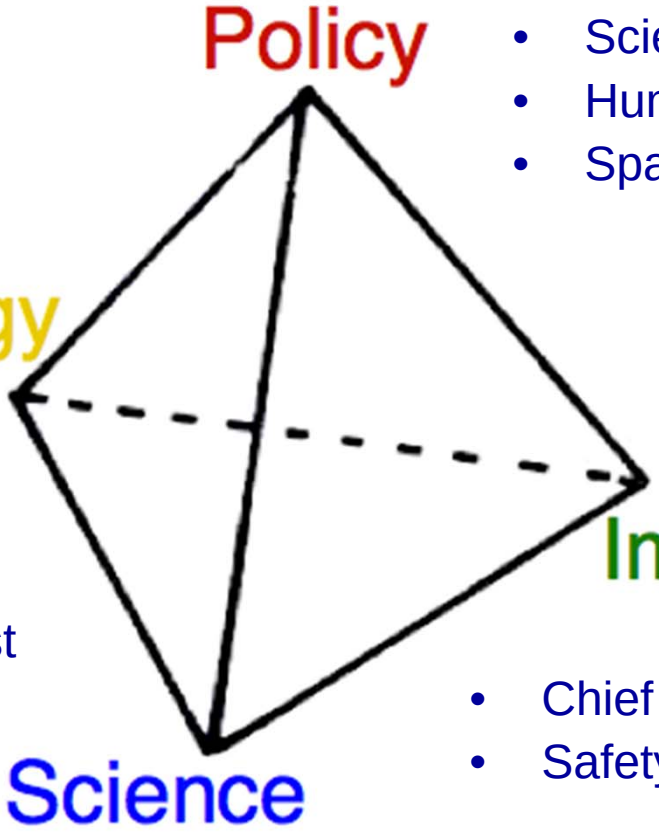
- The policy and its implementation requirements are embodied in NPD 8020.7G *(NASA Administrator)*
  - Planetary Protection Officer acts on behalf of the Associate Administrator for Science to maintain and enforce the policy
  - NASA obtains recommendations on planetary protection issues (requirements 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 shortly)

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
- Serves as a mechanism for interagency coordination within the US Government and internationally
  - Ex Officio membership from a range of US Gov't organizations, as well as other national/regional space agencies

Planetary Protection within NASA

- International Relations
- Legislative Affairs
- General Council



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

- Chief Engineer
- Chief Scientist
- Chief Technologist

- Chief Health and Medical Officer
- Safety and Mission Assurance

Coordination outside of NASA

UN-COPUOS
COSPAR
IAA

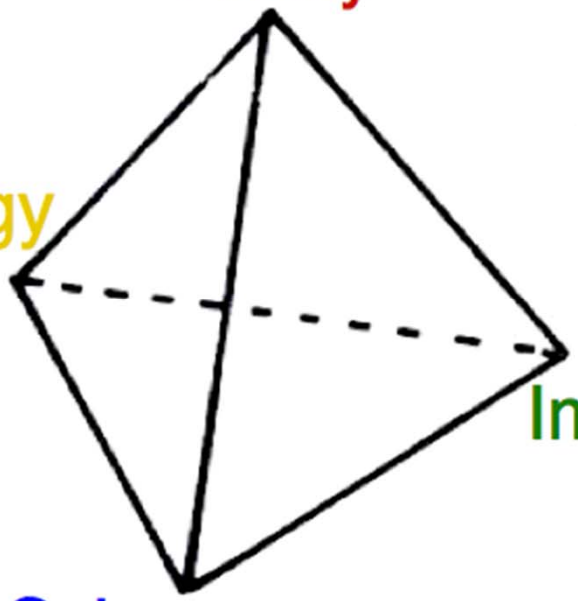
Policy

- State
- OSTP

Space Agencies,
ESA Letter
of Agreement

Technology

- CDC
- USDA
- DHS
- EPA



Implementation

- FAA
- Commerce

Science

- NSF
- NIH
- USGS
- DOE

Recent Recommendations

- May 2012 meeting
  - Recommendation
    - NASA should develop a NPR for human extraterrestrial missions at a level corresponding to the current COSPAR planetary protection policy in work
  - 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
    - Concern expressed regarding resources and staff support for the PPO
- Nov. 2012 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 study completed
- Apr. 2013 meeting
  - Recommendations
    - Include PPO early in mission planning and design in work; briefing requested by House Science Committee staffers

Relevant Prior Recommendations

- Nov. ’08 (R. Atlas, Chair) and May ’10 (E. Levy, Chair)
  - Presented to NAC Science Committee, 13 July 2010:
    “The PPS recommends that the reporting structure for recommendations on planetary protection permit direct input to the NASA Advisory Council and the NASA Administrator. Reporting through the Science Committee to the NAC creates the potential for conflict of interest with science and exploration programs that could undermine public trust.”

- May ’11 meeting
  - Recommendations (reflecting pre-2010 discussions)
    - Develop orderly process for assessing NASA participation in international missions
    - Ensure appropriate inclusion of planetary protection in USG commercial launch approval procedures

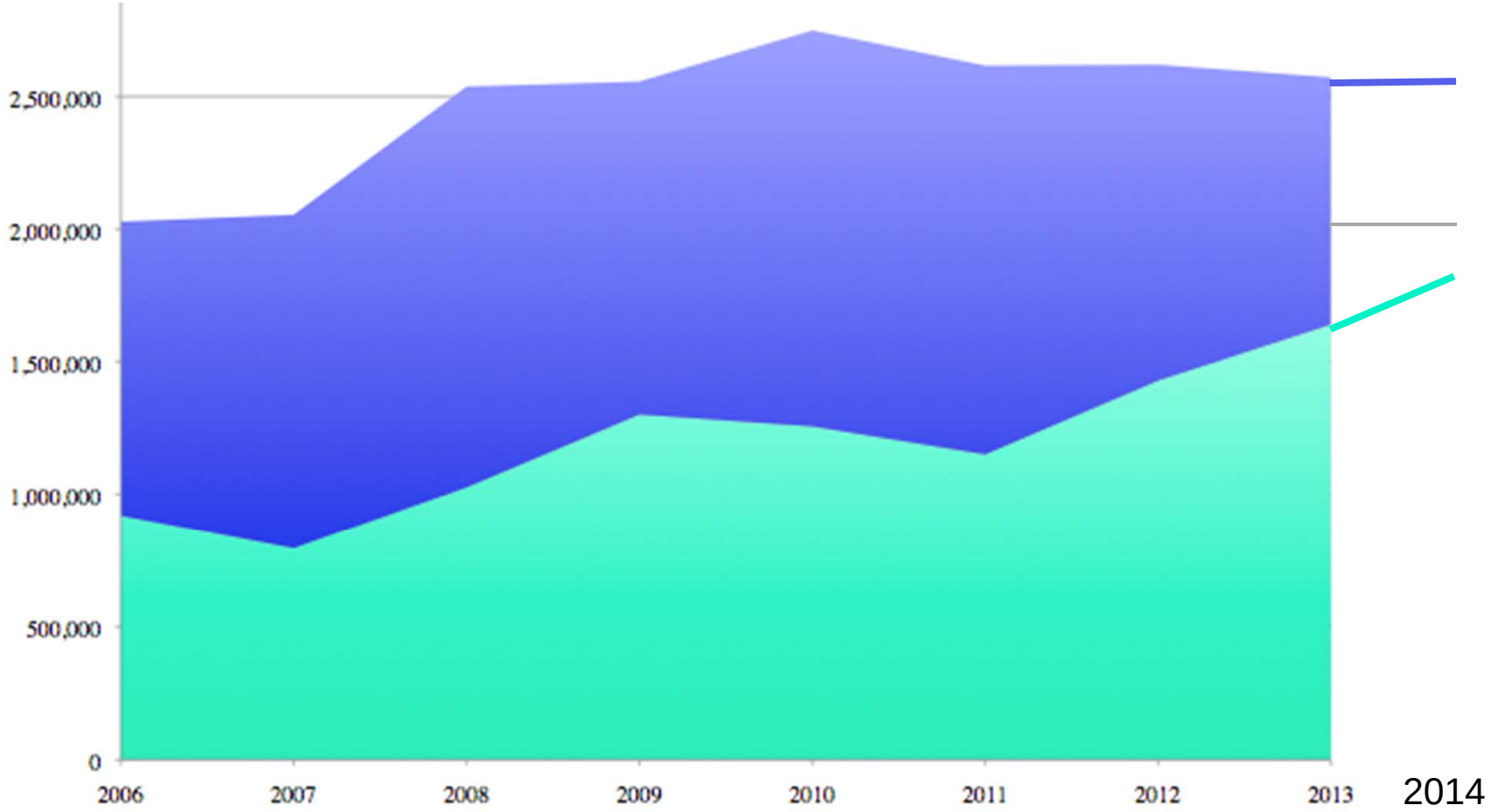
- Nov. ’11 meeting, held jointly with ESA PPWG
  - Recommendations
    - Renew formal Letter of Agreement with ESA in final approval process
    - Evaluate biological potential of the circum-Mars environment 2014 PSD support
    - Capture planetary protection lessons learned from MSL in work for next meeting
    - Continue joint meetings with ESA travel challenges likely to continue

#1 Programmatic Concern

- Increasing need for programmatic monitoring and coordination, in the context of personnel turnover, places significant pressure on flat resources
  - Internal coordination within NASA's robotic and human spaceflight efforts, particularly on technology development, requires effort to ensure adequate education and oversight
  - Increasing interest in exploration activities by multiple national and private organizations puts NASA priorities at risk: e.g., international cooperation, commercial exploration, and historical/environmental protection
  - Continued and improved coordination with US Government and international agencies is essential to ensure protection of NASA goals and objectives
  - Three detailees (B. Adde, 25%; B. Pugel and J. Johnson, 100%) are providing short-term relief; candidate replacement(s) for P. Stabekis identified

Planetary Protection Budget

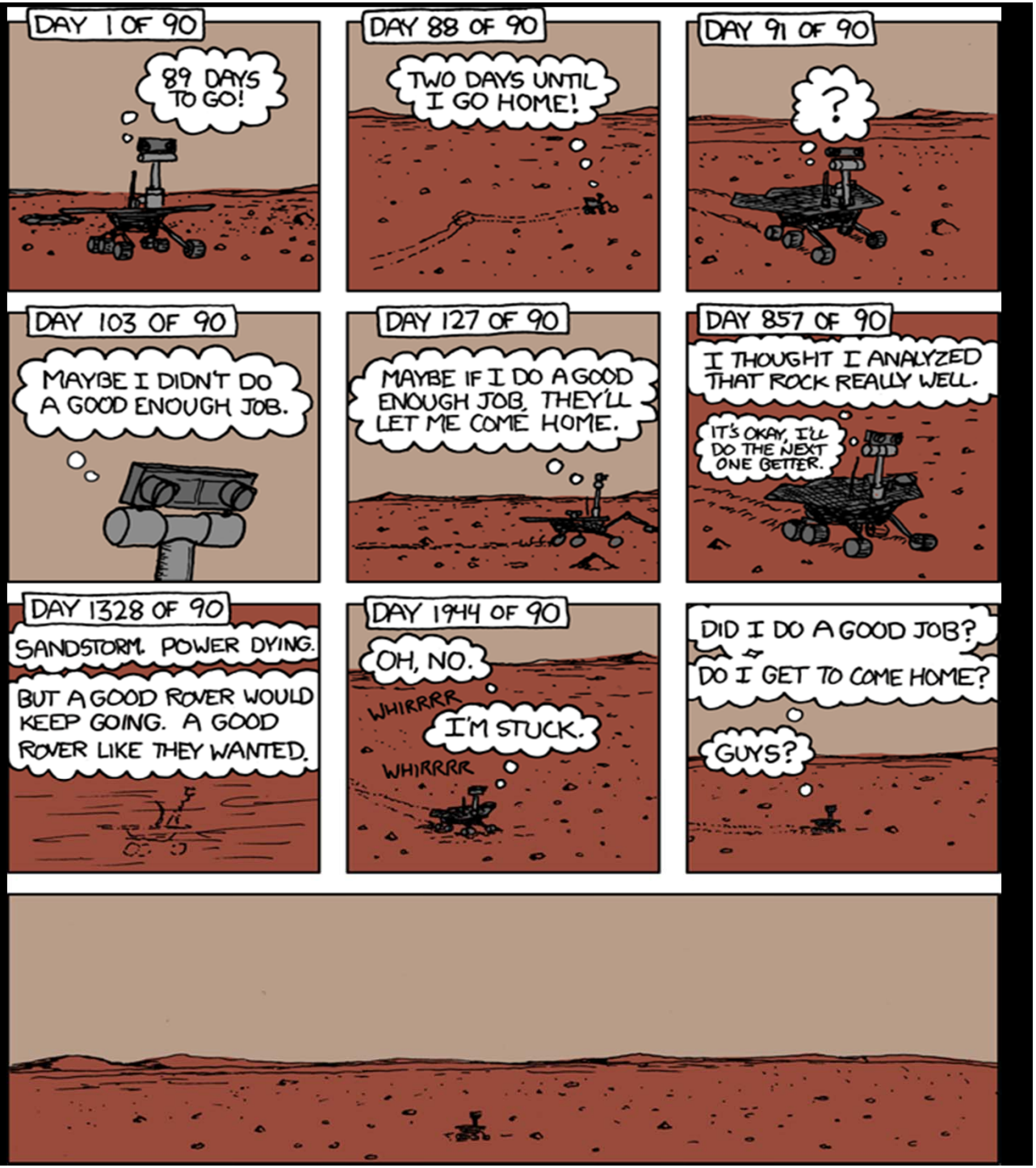
No solicitation for PPR in ROSES 2014
programmatic needs currently covered



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: impact avoidance assured
  - The InSight Mars mission selected by the Discovery Program implementing planetary protection communications: working well
  - The Europa Clipper concept has significant planetary protection technology development needs: addressed in planned work; implementation still open
  - Future sample return missions face organic contamination constraints driven by science and 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 is essential to support Mars 2020: continuation of update activities is critical to ensure timely support of mission needs

Questions?



When Do We Get To Come Home?