Protecting the Planets

An Overview of JPL’s Planetary Protection Center of Excellence

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March 27, 2018
This is NOT Planetary Protection.
What is Planetary Protection?

- **Planetary Protection** addresses microbial contamination of the solar system:
  - Spacecraft that we launch from Earth (forward contamination)
  - Contamination of the Earth and Moon (backward contamination), from restricted sample return missions

- To prevent either forward or backward contamination, spacecraft hardware must be cleaned and/or sterilized then evaluated for the presence of microorganisms.
  - Cleanroom environments
  - Cleaning the hardware
  - Routinely sample the cleaned hardware
Biotechnology and Planetary Protection Group

• Charter Statement
  • The paramount goal of planetary protection is to enable and enhance NASA’s ability to preserve the scientific integrity of current and future solar system exploration.
  • As JPL’s Center of Excellence in this discipline, the JPL Biotechnology and Planetary Protection Group has the responsibility to:
    • Ensure mission compliance with internationally agreed planetary protection requirements through implementation of NASA policy
    • Provide advocacy and education to the scientific, project and programmatic communities regarding the role of planetary protection.

• Goals
  • To enable NASA Planetary Protection (PP) compliance for JPL missions
    • Life detection and/or Restricted Sample Return
    • Develop technology and capabilities and perform research to support spacecraft design and implementation
  • Play an integral role in planning for humans to explore Mars

Mars2020  InSight  Europa Clipper
Personnel and Capabilities

• 29 people in currently group - 40% bachelor, 20% masters, 40% PhD
• Many partnerships with cutting edge research labs and contracts

• Expertise
  • **Microbiology and Molecular Biology**
    • Cleanroom and spacecraft low biomass identification
    • Biological contamination control
    • Bioinformatics, space biology, microbial reduction and sterilization modalities, biomaterial storage
  • **Engineering**
    • Systems engineering – integral part in life detection instrument development, requirements flow, etc.
  • **Flight Implementation and Research**
    • **Biodetection Assays** (NASA Standard Assay, spore, Adenosine triphosphate, *Limulus amebocyte lysate*)
  • **Genetic Inventory**
  • **Spacecraft Microbial Archive**
PP Mission Support

Current Missions
• InSight
• Mars 2020
• Europa Clipper

Future Mission Studies
• Europa Lander Concept
• Concepts for Mars Sample - Return

jpl.nasa.gov
Center of Excellence

Strategic Importance

- Helps promote and retain an institutionally recognized core capability
- Driver for staying at the “cutting-edge” of PP and technology development (biodetection, bioassay, and sampling)
- Provides framework for interdisciplinary, collaborative problem solving
- Promotes visibility of expertise that can help stimulate collaborations
- Recruit quality key personnel to build and train for the future
- Method for supporting/advocating for investment in maintaining required infrastructure/facilities
Capabilities

Flight Support Lab & Space Microbiology Lab

- Sample Hardware (e.g. wipe)
- Sample Hardware (e.g. swab)
- Microbial Archive
- Microbiological Characterization
- Counting Plates
Communication (https://planetaryprotection.jpl.nasa.gov)

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Training

Current Staff Training/Refresh
Internships

Conferences and Workshops

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Collaborations

NASA Centers and Facilities

Industry

Universities

Government Agencies
JPL Missions & Planetary Protection

Since 1958 NASA's Jet Propulsion Laboratory has taken part in more than 100 missions and instruments designed to explore our Earth, solar system and beyond.

Planetary Protection will continue to be at the center of exploration protecting the planets and preserving science!

Planning for human exploration
Contact Information

PP Center of Excellence

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