

# Planetary Science Division Status Report

James L. Green, Director Planetary Science  
September 3, 2014

Committee on Astrobiology and Planetary Science

# NASA-DOE RPS Production Status

- DOE continues its NASA-funded Pu-238 Supply Project
  - Goal of 1.5 kg/year of Plutonium Oxide production capacity by ~2021
  - Technology demonstration efforts continue on schedule
    - Target development, irradiation tests, and Pu-238 chemical recovery continue to be individually developed
    - The first of two integrated end-to-end demonstrations is planned to start in 2015
    - Assessment of Pu-238 product quality will occur at the end of each demonstration
  - The remainder of the project involves scaling up to the 1.5 kg/yr production rate
- NASA is now funding DOE Operations and Analysis (infrastructure)
  - Maintaining worker certifications and performing operational maintenance activities to support future RPS fueling and assembly capabilities at multiple DOE laboratories
  - Augmented funding to accelerate design and installation of a new Hot Press and furnace capability to reduce fuel clad production risk at Los Alamos National Laboratory (LANL)
  - Heat Source Manufacturing for potential Mars 2020 use will begin at LANL in 2015

# RPS Status

- Fuel efficiency remains important even with restart of Pu-238 production
- Investments in thermoelectric technology to improve MMRTG capability
  - Enhanced thermoelectric couples could be on-ramped into future MMRTGs with minimal design change (improved couple life, and end-of-mission power)
  - Technology maturation evaluation in 2018 for an eMMRTG flight design
- Assembling Stirling hardware into Engineering Unit for testing
  - A 4x-efficiency improvement via Stirling still desired for certain missions
  - Study team assessing optimal Stirling sizes for Agency RPS and fission usage
- Mission pull continues
  - Heritage RPS on Voyager, Cassini, and New Horizons operating well
  - MMRTG operating well on Curiosity as it enters extended mission
  - MMRTG flight spares allocated for potential use by Mars 2020
  - Ready to support potential 2024 mission launch (possibly eMMRTGs)
  - Future potential for 2028-and-beyond mission launches