Dear Space Scientists and Engineers: May 6, 2014

As you know, over a decade ago NASA launched twin robots to examine the surface of Mars and, more specifically, gather information to answer questions about the history of water on Mars. These rovers, **Spirit** and **Opportunity**, are part of **NASA’s Mars Exploration Program**. One of the primary purposes of their mission was to examine the rocks and soils on Mars and to determine water activity on the red planet.

These rovers carried a number of important scientific instruments so that they could conduct scientific experiments and send information back to Earth. These instruments included: a **Panoramic Camera** (Pancam), which can be used to determine the mineralogy, texture, and structure of the local terrain; **Miniature Thermal Emission Spectrometer** (Mini-TES), which is use for identifying rocks and soils that might be helpful in determining processes that formed Martian rocks and to provide temperature profiles of the Martian atmosphere; **Mossbauer Spectrometer** (MB), which can conduct close up investigations of the mineralogy of iron-bearing rocks and soils; **Alpha Particle X-Ray Spectrometer** (APXS) for close up analysis of what elements make up rocks and soils; **Magnet**s for collecting magnetic dust particles; **Microscopic Imager** (MI) to take close-up, high- resolution images of rocks and soils; **Rock AbrasionTool** (RAT) for removing dusty and weathered rock surfaces and expose material under the top layer to be examined.

Since then, NASA launched **Curiosity**, a large rover, to gather more data to help answer the question about whether or not Mars does now or has in the past had an environment able to support small life forms call microbes. Some of the design improvements in Curiosity included- demonstrating the ability to land a very large, heavy rover to the surface of Mars (which could be used for future Mars Sample Return mission that would collect rocks and soils and send them back to Earth for laboratory analysis), demonstrating the ability to land more precisely a 20-kilometer (12.4 mile) landing circle, and demonstrating long-range mobility on the surface of the red planet (5-20 kilometers or about 3 to 12 miles) for the collection of more diverse samples and studies [http://mars.nasa.gov/msl/mission/overview/]. Although Curiosity has been sending exciting new data back to Earth, the NASA Mars Exploration Program is seeking a team of engineers to design the newest addition to the NASA rover family. Therefore we are requesting proposals to:

1. Identify the next wave of missions for the NASA Mars Exploration Program. In other words, what should be the focus of data collection/studies for the next rover sent to Mars given the studies already conducted?
2. Design a rover that is capable of achieving this mission.
3. Create a video that captures your design engineering process.

Over the course of the next few weeks, you will work in teams to address the three needs above. Each of you will be asked to capture your thinking and learning in a notebook. We know you have the skill and commitment to be successful in this very important challenge. The Mars Exploration Program wishes to thank you in advance for your contribution to the next generation of space exploration.

Sincerely,

*Executive Council*

NASA Jet Propulsion Laboratory

California Institute of Technology