

As part of this activity, HRS will develop a prototype rover in 2015, which will be used as a platform to develop and test the key rover technologies. Following on preliminary concepts developed in FY14 by HRS for AES, the prototype rover will have four wheel modules, each with independent propulsion, steering and active suspension. These features will assist in operation on soft soil, aid in getting individual wheels unstuck if they lose traction, and will allow the rover to drive in any direction (called crabbing) while keeping its solar array pointed at the sun (when available). Other technologies that will be developed/improved include:

- Motor control and avionics capable of driving rovers and controlling rover tools over the Earth-Moon time delay.
- Advanced navigation software for rover's operation in the dark, with low on-rover computation resources.
- Advanced ground software systems that support rover exploration at a high pace under moderate time delays (1 week mission duration, with <30 second time delay).

Resource Prospector Prototype

The prototype rover must operate under Earth's 1G gravity, but will be designed as closely as practical to the actual flight vehicle.

At the end of FY15, the Rover Technologies task will have generated a functional prototype rover designed for operations under a 1G environment, with designs focused on a path towards a lunar environment. This prototype will be available for functional testing with integrated ISRU payloads and for testing in rock yards, gravity offloaded conditions and environmental test chambers.

In FY16, the primary focus will be TRL advancement through environmental and field testing. During FY16, HRS will conduct quarterly integrated field tests with the rover at NASA's Johnson Space Center while being commanded from NASA's Ames Research Center. This action will serve

as a forcing function for software integration onto the rover, will engage the RP mission operations team early in the development cycle, and will serve as a baseline evaluation of progress.

Partnerships

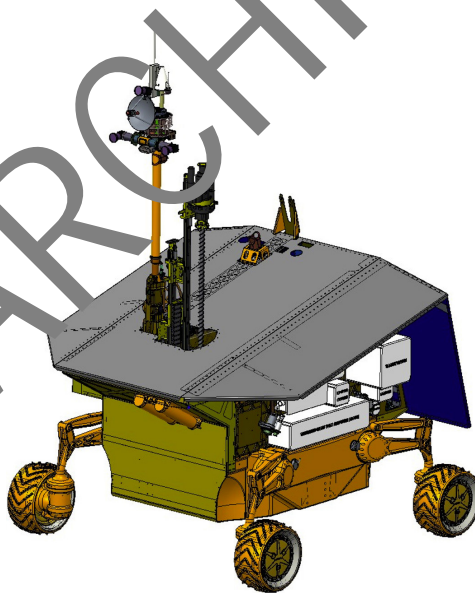
Human Robotic Systems is led by NASA's Johnson Space Center, with support across multiple centers. HRS resides within the Game Changing Development (GCD) Program. HRS is partnered with the AES Resource Prospector mission.

Projects under GCD investigate ideas and approaches that could solve significant technological problems and revolutionize future space endeavors. GCD projects develop technologies through component and subsystem testing on Earth to prepare them for future use in space. GCD is part of NASA's Space Technology Mission Directorate.

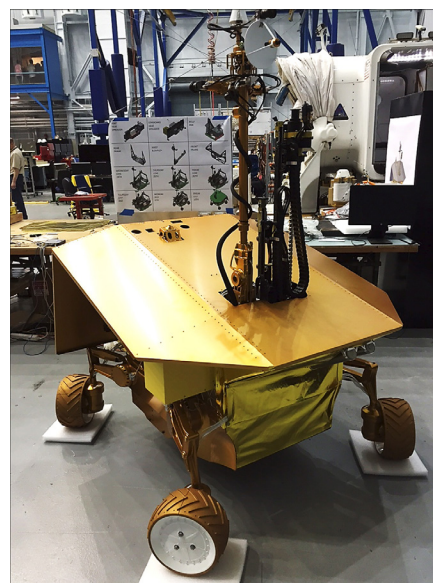
For more information about HRS please visit http://www.nasa.gov/directorates/spacetech/game_changing_development/human-robotic-systems.html (public)

For more information about GCD, please visit <http://gameon.nasa.gov/>

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Resource Prospector rover 2015 CAD design.



Resource Prospector prototype assembly.

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