Developing a Strategic Plan for NASA JSC's Technology Investments

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Human space exploration has always been heavily influenced by goals to achieve a specific mission on a specific schedule. This approach drove rapid technology development, the rapidity of which adds risks as well as provides a major driver for costs. The National Aeronautics and Space Administration (NASA) is now approaching the extension of human presence throughout the solar system by balancing a proactive yet less schedule-driven development of technology with opportunistic scheduling of missions as the needed technologies are realized. This approach should provide cost effective, low risk technology development that will enable efficient and effective manned spaceflight missions.

As a first step, the NASA Human Spaceflight Architecture Team (HAT) has identified a suite of critical technologies needed to support future manned missions across a range of destinations, including in cis-lunar space, near earth asteroid visits, lunar exploration, Mars space, and Mars exploration. The challenge now is to develop a strategy and plan for technology development that efficiently enables these missions over a reasonable time period, without increasing technology development costs unnecessarily due to schedule pressure, and subsequently mitigating development and mission risks.

NASA's Johnson Space Center (JSC), as the nation's primary center for human exploration, is addressing this challenge through an innovative approach allocating Internal Research and Development funding to projects that have been prioritized using four focus criteria, with appropriate importance weighting. These four focus criteria are the Human Space Flight Technology Needs, JSC Core Technology Competencies, Commercialization Potential, and Partnership Potential. The inherent coupling in these focus criteria have been captured in a database and have provided an initial prioritization for allocation of technology development research funding. This paper will describe this process and this database, and the preliminary technology development prioritization results.