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HUMAN EXPLORATION OF THE SOLAR SYSTEM SYMPOSIUM (A5)
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RAVEN II: A NOVEL MULTIPHASE MISSION ARCHITECTURE

Abstract

Dominated by high cost constraints, it is imperative that future human exploration programs take advantage of ways to efficiently utilize the subsequent limitations on payload mass. For this reason, the University of Maryland Space Systems Laboratory has developed an adaptable rover mission architecture that extends the capabilities of astronauts during extravehicular activity (EVA). This current architecture, RAVEN II, includes a pair of rovers equipped with robotic manipulators that augment astronaut mobility, expand the possible range of exploration, and enhance the ability of an astronaut to complete various science objectives. By incorporating robotic operations before, during, and after human occupation, the same mission will be capable of surveying a suitable area, extracting scientific knowledge and continuing observation after returning to Earth.

Without the ability to augment an astronaut's walking traverse distance, it would take an unreasonable number of missions to explore even a small fraction of a planetary body. Instead of current concepts to transport a large pressurized rover to a specific exploration site, it is envisioned that sortie-class missions would be sent to a number of widely separated sites of scientific interest, each carrying multiple RAVEN II-class small unpressurized rovers. These mobile platforms will each be capable of carrying two astronauts in a contingency scenario, and traverse far beyond the "walk-back" limits imposed on Apollo.