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Commentary

Insights of the Mission Related to Rover Testing on Mars Planet

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DESCRIPTION

As an integral part of initiatives to explore Mars, NASA employs mobile robots 'chat are designed to rove across the surface in search of clues and evidence about the geologic, climatic and aqueous history of the planet. In early 2004, NASA began a Mars surface mission by landing two spacecraft each carrying a rover to explore distinct regions of the planet's surface. These rovers have greater mobility and autonomy than prior NASA rovers and can traverse further distances each Martian day while conducting more extensive exploration independent of their lander spacecraft. Scientific and technological objectives for the Mars Exploration Rovers mission (MER) are accomplished using the two rovers. During the years leading up to the launch of the MER vehicles, a series of extended field tests and operations campaigns were conducted in the deserts of south western USA. The intent was to physically simulate the mission operations approach planned for the MER mission by operating rovers in Earth terrain similar to that expected at the Mars landing sites. Mission operations personnel used a prototype Mars rover for these end-to-end field trials involving networked operations and command workstations, satellite communications equipment, remote field networking and support equipment, and science instrumentation that was fully integrated on board the autonomous rovers.

Key components of the rover systems are briefly defined in addition to salient variations among the prototype rover used for field checks and the rovers operated on Mars. The rover mission operations infrastructure is critical to the conduct of a successful remote robotic mission. The infrastructure governs how the rover system will be commanded throughout the mission, how its telemetry will be received and processed, and how the operations team of scientists and engineers will work together to maximize science return while making efficient use of robotic capabilities.

In preparation for conducting semi-autonomous rover activities after rover egress from the lander, the 2002 field operations test was performed using the FIDO (Field Integrated Design & Operations) rover. The rover mission operations infrastructure is critical to the conduct of a successful remote robotic mission. The infrastructure governs how the rover system will be commanded throughout the mission, how its telemetry will be received and processed, and how the operations team of scientists and engineers will work together to maximize science return while making efficient use of robotic capabilities. In preparation for conducting semi-autonomous rover activities after rover egress from the lander, the 2002 field operations test was performed using the FIDO (Field Integrated Design & Operations) rover.

CONCLUSION

This MER-FIDO field trial brought together planetary scientists, spacecraft engineers and operations personnel, and robotics technologists for active participation in a realistic simulation of rover operations planned for the MER mission. At the field site, a small team of field geologists and rover engineers handled all logistical activities. The primary goal of the operations testing was for the SOWG to use a remote rover device and rover-set up devices to acquire information for formulating and testing hypotheses about the geologic evolution of the sector site. Mission operations for the field trial were "blind" and completely remote. The rover instruments are then used to correlate hypotheses generated from this additional information to better understand the geology of the field site.

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