

ABSTRACT OR SUPPORTING INFORMATION

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First Astronaut- Rover Interaction Field Test

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The first Astronaut - Rover (ASRO) Interaction field test was conducted successfully on February 22-27, 1999, in Silver Lake, Mojave Desert, California in a representative planetary surface terrain. This test was a joint effort between the NASA Ames Research Center, Moffett Field, California and the NASA Johnson Space Center, Houston, Texas. As prototype advanced planetary surface space suit and rover technologies are being developed for human planetary surface exploration, it has been determined that it is important to better understand the potential interaction and benefits of an EVA astronaut interacting with a robotic rover. This interaction between an EVA astronaut and a robotic rover is seen as complementary and can greatly enhance the productivity and safety of surface excursions. This test also identified design requirements and options in an advanced space suit and robotic rover. The test objectives were: 1. To identify the operational domains where the EVA astronauts and rover are complementary and can interact and thus collaborate in a safe, productive and cost-effective way, 2. To identify preliminary requirements and recommendations for advanced space suits and rovers that facilitate their cooperative and complementary interaction, 3. To develop operational procedures for the astronaut-rover teams in the identified domains, 4. To test these procedures during representative mission scenarios during field tests by simulating the exploration of a planetary surface by an EVA crew interacting with a robotic rover, 5. To train a space suited test subject, simulated Earth-based and /or lander-based science teams, and robotic vehicle operators in mission configurations, and 6. To evaluate and understand sociotechnical aspects of the astronaut-rover interaction experiment in order to guide future technologies and designs. Test results and areas for future research in the design of planetary space suits will be discussed.