TEST FLIGHTS AND FIELDWORK IN ANTARCTICA, 1992-1994: THE ANTARCTIC SPACE ANALOG PROGRAM. J. D. Rummel, Friday Harbor Partners LLC, Friday Harbor, WA 98250 (<rummelj@ecu.edu>).

Introduction: A set of innovative science and technology projects designed to use the Antarctic continent to test equipment and procedures that may be used to explore the Moon and Mars was fielded for the first time during the 1992-1993 austral summer. The projects, jointly sponsored by NASA and the National Science Foundation (NSF) under the Antarctic Space Analog Program (ASAP), demonstrated space technology that was thought to have the potential to enhance the NSF's conduct of the United States Antarctic Program, and that could be factored into future NASA planetary exploration missions. Operating under a joint NASA-NSF Program Committee, ASAP was intended to use Antarctica, "the last place on Earth" as an analogue that would allow NASA to take some of the first steps to Mars." Those steps emphasize robotic exploration and human support technologies in an isolated and harsh environment.

Included Projects: Within NASA, individual project development was supported by appropriate Program Offices, while communications infrastructure and services were provided through the NASA Science Internet. All projects were supported logistically by the NSF. The first year's projects (1992) included:

Telepresence/Power Demonstration Project: An investigation of a permanently frozen Antarctic lake used telepresence technology developed at the Ames Research Center's Space Science Division. The Project was supported by a remote, field-deployable power system developed at the Lewis (now Glenn) Research Center. Investigators studied life in the lake to demonstrate the scientific use of telepresence capabilities and to provide further insight into environments thought to be analogs to those found on ancient Mars. The Project also demonstrated—via satellite—remote operation of the telepresence capabilities from Ames Research Center. The Solar System Exploration Division, the Life Sciences Division, the NSF Office of Polar Programs, and NASA's Office of Advanced Concepts and Technology (OACT) jointly sponsored this work. For the 1993-94 season, telepresence activities in McMurdo Sound were undertaken from Ames (and as a demonstration, from the National Air and Space Museum). The power system developed for 1992-1993 was transferred to the NSF to support a long-term ecological research project in the Taylor Valley, one of the Antarctic "dry valleys."

Dante, the Mt. Erebus Rover: An autonomous robotic system attempted the exploration of Antarctica's Mt. Erebus, one of the most challenging to reach open-pit volcanoes in the world. In early January 1993, the rover successfully demonstrated its robotic and teleoperations capabilities via the Tracking and Data Relay Satellite System (TDRSS) link from Goddard Space Flight Center, and photographed the interior of Mr. Erebus. Due to a break in a key fiber optic link, Dante failed to reach the inner crater where it would have measured both the temperature of the lava lake and the composition of the gases released by the volcano. The Erebus Rover was built by Dr. Red Whittaker of the Carnegie-Mellon University Field Robotics Center in Pittsburgh, Pennsylvania, and was sponsored by NASA's OACT. A follow-on activity in Alaska took place in spring 1994.

Controlled Ecological Life Support System (CELSS) Antarctic Analog Project (CAAP): This effort was undertaken by the Advanced Life Support Division at NASA's Ames Research Center, and was cosponsored by NASA's Life and Biomedical Sciences Division and the NSF Office of Polar Programs. The CAAP allowed the production of fresh food and the recovery of water at the South Pole. For 1992-1993, project personnel travelled to the South Pole to conducted a site evaluation and to analyze waste materials that were to be recycled by the system, which was employed in the 1993-94 field season in Antarctica, and eventually in the rebuilding of the Scott Amundsen South Pole Station.

Impact: ASAP was an example of a successful interagency program dedicated to rapid field testing and adaptation of space technologies. From the NASA perspective, the Antarctic, by virtue of its physical challenges, isolation, and rugged terrain, is Earth's highest-fidelity analog to the lunar and Martian environments, and is advantageous for testing exploration technologies to support scientists who are doing space science-related work under rigorously difficult conditions. From the NSF perspective, NASA-generated technology demonstrated ways to ease the difficulties of conducting the US Antarctic Program. The 1993-1994 ASAP activities were coordinated through the Mission From Planet Earth Study Office, and included daily coverage in the US media and was the beginning of a successful STEM engagement program via PBS and also under the "Live from...." tag, directed by Geoff Haynes Stiles. For interest's sake, the presentation will include a description of why the first such engagement was not allowed to be called "Live from...Antarctica!".