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SPACE MEDICINE BRANCH REPORT

MANNED MARS MISSION BEFORE THE YEAR 2000?

The following article was provided by John Mason. The advanced planning for a Mars mission has captured the attention and interest of most, if not all, of the NASA life scientists.

Increased activity in the United States Space Program, particularly in the Earth-orbiting Space Station, has also spurred interest in a manned Mars mission to take place around the year 2000. With a kick-off meeting at the Lyndon B. Johnson Space Center (JSC) in December 1984, Senator Harrison Schmitt, a former Apollo astronaut; Mike Duke, Chief of Solar System Exploration Division (JSC); and Paul Keaton, Los Alamos National Laboratory (LANL) physicist, brought together some 30 individuals from NASA centers and the LANL in various needed disciplines to begin updating concepts for a manned Mars mission. Follow-up meetings of the study group took place at the Los Alamos National Laboratory in January, at the Marshall Space Flight Center in March, at the Kennedy Space Center in April, and again at the Marshall Space Flight Center in June.

The "strawman" guidelines include the following: The mission will last 22-24 months, with 60 days on the Martian surface. The crew will be composed of six people; four will go to the Mars surface. A lunar rover-type vehicle will be used for travel on the surface. The spacecraft will be launched from and will return to an Earth-orbiting Space Station. The mission will be the start of a continuing program which will lead to the establishment of a shelter for up to 10 people on the surface of Mars as an "outpost", rather than just an abbreviated program of several spot landings on the Mars surface. It must be remembered that these and other guidelines are tentative and subject to change as the concepts develop.

The Mars trip will be a challenging one from the life sciences standpoint, particularly when considering the long duration, the gravity changes, and the potential radiation exposure of the crew.

The life sciences portion of the planning is being led by Joseph Sharp, of the Ames Research Center, and John Mason, of the Johnson Space Center. They, and others, have participated in the development of the life sciences portion of this early, informal planning.

Within the next 6 months, a 50-page manned Mars mission summary report will be published. Already some 70 supporting detailed papers have been written. In the summary paper, 10 pages will be devoted to describing life sciences concerns. Of the 70 papers, at least 14 are on life-sciences related subjects.

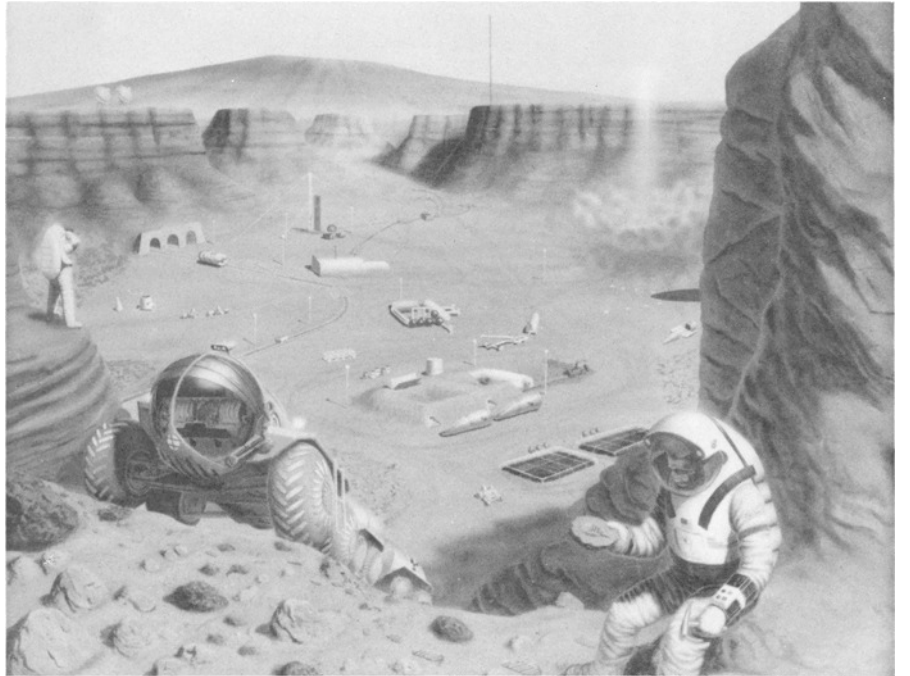
These include titles such as: Radiation Environment and Radiation Biology, D.

Stuart Nachtwey (JSC); Need for Artificial Gravity on a Manned Mars Mission, Joseph Sharp (ARC); Manned Mars Mission Crew Factors, Patricia Santy (JSC); Soviet Experience with Mars Program or Missions, Nicholas Timacheff (JSC); Health Maintenance, Joseph Degioanni (JSC); Psychological Issues, B.J. Bluth (NASA Hqs); Manned Mars Mission Psychological Issues, Patricia Santy (JSC); Human Adaptation and Readaptation Medical Concerns of Mars Trip, Philip Johnson (JSC); Toxicological Safeguard in the Manned Mars Mission, Martin Coleman (JSC); Physiological and Technological Considerations for Mars mission Extravehicular Activity, James Waligora and Melaine Sedej (JSC); Human Adaptation and Readaptation for Mars Mission, Harrison Schmitt (LANL); and Natural Radiation Hazards on the Manned Mars Mission, John Letaw (Naval Research Laboratory).

In early April 1985, the JSC Medical Sciences Division, established the Medical Sciences Lunar and Planetary Planning Group. The group was charged with support of the NASA/Los Alamos Manned Mars Planning Group and the exchange of planning information. There are approximately 30 members in the group, mainly from the Medical Sciences Division with some representatives from other JSC organizations, including Crew Systems, Systems Engineering, Life Sciences Projects,

Solar System Exploration, and Manned-Systems Divisions, as well as the Space Biomedical Research Institute. The group has sponsored seminars relating to life sciences advanced missions subjects.

The seminars have included the following presentations: "Miscellaneous Notions on Life Sciences Aspects of Manned Mars Exploration" by James Oberg, "Implication of Antarctica Experience for a Manned Mars Mission" by Harold Muchmore, "Living in Isolated Environments—The Polar Experience" by John Annexstad, "Plant Research Needed for Mars Missions" by William Scheld, "Low Pressure Effects on Agricultural Plants" by Charles Walkinshaw, "Organic Contaminants of Submarine Air-Predictor for Extended Patrols" by Douglas Knight, "Prescription for Maintaining Muscle Mass on Long-Duration Missions" by Gerald Herbison, "Life in Harsh Environments" by Chester Pierce, "Mars Overview" by Harrison Schmitt, "Exercise Prescriptions for Long-Duration Space Flights: How Much? How Long? How Often?" by Victor Convertino, and "Life Support on Mars" by Penelope Boston. The seminars have served well to introduce different perspectives for the Planning Group members and to assist in support of the NASA/Los Alamos Manned Mars Planning Group.



An artist's concept of a manned Mars outpost.