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SPACE MEDICINE BRANCH REPORT

President's Message:

Joe Allen, Luncheon Speaker

The annual scientific meeting of the Aerospace Medical Association is now just one month away, and I wanted to highlight some of the activities of the Space Medicine Branch over the past year.

First, I am very pleased to announce that Dr. Joseph P. Allen will be the luncheon speaker for the Space Medicine Branch. Dr. Allen is a former NASA astronaut, current president of Space Industries, Inc., and a recent member of the Advisory Committee on the Future of the U.S. Space Program, popularly known as the Augustine Committee. Dr. Allen and Dr. William Lenoir were the first two mission specialists to fly on the Space Shuttle on mission number five. They were scheduled to perform the first Shuttle EVA with the new EVA suits, but suit problems forced a postponement to the next mission. Dr. Allen did get to perform an EVA in a spectacular way on flight STS-51A in November of 1984. On that flight, Joe Allen and Dale Gardner performed two EVAs using the manned maneuvering units to rescue two malfunctioning satellites and return them to Earth. I have asked Dr. Allen to share his spaceflight experiences with us, as well as his perspectives on the civil space program based on the deliberations of the Augustine Committee.

The Space Medicine Branch executive committee has had a very active year with some notable accomplishments. Volunteers were requested from the membership to serve on several committees with a very good response. The program committee developed two excellent panels for the annual scientific meeting on the need for artificial gravity for a Mars mission, and radiation and spaceflight. The executive committee also decided to invite all of the students eligible for the Young Investigator Award to the luncheon and pay for their luncheon tickets as a way to encourage young investigators in space medicine. The awards committee has already identified those eligible students so that we could invite them well in advance of the meeting. To increase the level of participation in the Space Medicine Branch, the nominating committee was charged with developing a slate of officers representing the diverse backgrounds in the branch. They selected an outstanding slate of candidates which branch members received in the Spring newsletter and ballot. Finally, the corporate sponsor committee recruited a corporate sponsor to provide an honorarium for the Young Investigator Award, and to support the luncheon tickets for the other eligible students who attend the meeting.

The remainder of 1991 should prove to be as dynamic as the past year. By the time of the annual meeting, NASA will be finishing a detailed response to the recommendations of the Augustine Committee. In addition, the restructuring of the Space Station Freedom program will be complete, and will have been presented to the Congress and to the National Space Council. Budget negotiations on the President's 1992 budget should be underway. The 1992 budget request contained $15.7 billion for NASA, a 13.6% increase over fiscal year 1991. This budget request represented significant increases for space science, and for the Mission to Planet Earth which includes Space Exploration Initiative funding. Finally, in May of 1991, NASA should fly the first spacelab mission dedicated to the life sciences with a seven-person crew.

I want to once again thank the executive committee members for all of their hard work over the past year, and all of the branch members who volunteered to help on committees. I have enjoyed my year as President of the Space Medicine Branch, and I hope many of you will be able to attend the luncheon this May and hear what will be a very exciting presentation by Dr. Joe Allen.

Jeffrey R. Davis, M.D.

Joint NASA/NSF Antarctic Research

The National Science Foundation (NSF) and NASA have signed a Memorandum of Agreement which will allow NASA to take advantage of the NSF's operations in Antarctica and enable NASA to prepare for future missions to the Moon and Mars by conducting scientific research and testing technologies and systems to support human life. These activities will build on NSF's 33 years of experience in scientific research in the severe Antarctic environment.

Scientists believe that Antarctica's climate, terrain, temperature, and isolation provide the ideal environment to parallel the conditions of long duration missions for humans in space. Under the agreement, NASA and NSF will attempt a broad range of research in areas such as life support, environmental control, energy generation and storage, automation and robotics, telescience, and human behavior and performance.

The research will benefit NSF's ongoing Antarctic activities and NASA will gain from NSF's long-term research in the Antarctic region. NASA and NSF have cooperated previously on experiments in the Antarctica, developing programs ranging from meteorite recovery to cosmic microwave background observations, and studying the origin of microbial ecosystems in the ice-covered lakes of Antarctica's dry valleys.

Underwater tests may help spacesuit design

Scientists at NASA's Ames Research Center, Mountain View, CA, are working on providing astronauts with better spacesuits. Six scuba divers are participating in the tests conducted on a treadmill underwater where scientists hope some basic questions may be answered, including at what speed do humans change from walking to running and how much do the joints move during various gaits. Another objective is to determine what kind of gait is most effective in different gravity fields and what energy expenditures are associated with those gaits.

Each experiment is made up of six 30-min sessions. The first session is a control experiment conducted outside the Neutral Buoyancy Test Facility (NBTF). The NBTF, a water-filled cylindrical tank 9 ft deep and 11 ft in diameter, is used because of water's effectiveness in simulating reduced gravity. By using different ballast weights on various parts of the divers' bodies, buoyancy is changed to simulate various gravitational conditions. During each session, the diver keeps pace on a treadmill, exercising to 10%, 40%, and 70% of the maximum work he or she is able to perform. The treadmill is equipped with a platform that measures the force of each step, from which vertical speed and duration of each step can be calculated. The degree and amount of leg, arm, and torso movements are recorded on video.

Researchers believe that the information gained from these experiments will help them design advanced spacesuits and portable life support systems. The study may also lead to improved spacesuit thermal control systems and help future astronauts experience microgravity prior to spaceflight.

FAA unveils ATC simulator

The Federal Aviation Administration (FAA) displayed its new $100 million air traffic control (ATC) tower cab simulator in January at the FAA Academy in Oklahoma City, OK. The simulator, which gives air traffic control students almost true-to-life control tower scenarios, features realistic situations in which students will learn to direct aircraft images moving along runway scenes on a dome screen 210° in azimuth, and 60° in elevation. Students will talk to the aircraft images through microphones and the images will respond through a voice recognition system. Design of the on-screen aircraft is so realistic students will be able to recognize the type of aircraft and its performance statistics. Simulated aircraft images will bank, approach, land and take off if properly controlled. The simulator, the first of its kind, was built by Logicon, San Diego, CA.