

Space Medicine Branch Report

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Intersociety Conference on Environmental Systems

In early July, I had the pleasure of attending a meeting of a small and little-known but extremely important organization whose members are devoted to the development of life support and environmental control systems. The organization is called the Intersociety Conference on Environmental Systems (ICES). It has been in existence only since 1971 and has close ties with the Aerospace Medical Association.

In 1968, members of the Society of Automotive Engineers SC-9 Committee and the American Society of Mechanical Engineers Crew Systems Committee began to plan a conference to replace several other annual meetings about environmental control systems and life support systems, which had been held under the auspices of the larger technical societies. Dr. Walton Jones, who was to become our most recent Past President of the Aerospace Medical Association, was then the President of the Life Sciences and Systems Committee of the American Institute of Aeronautics and Astronautics (AIAA). He heard of the plans and arranged for the Aerospace Medical Association and the AIAA to become participants in the congress as well. In fact, Walt Jones was selected to be the keynote speaker at the first meeting of the conference, which was held at the Jack Tarr Hotel in San Francisco in July, 1971. The fifth organization which participates in this intersociety conference is the American Institute of Chemical Engineers.

The ICES meets in early July each year. In odd numbered years, it meets in San Francisco, and in even numbered years in San Diego. The theme of this year's conference was "Aerospace Environmental Systems for the 80's."

Each conference is attended by somewhat more than 100 people, and session audiences may be as small as 10-12 people. However, to illustrate the stature of the organization, one has only to note that this year's keynote speaker was Dr. Robert A. Frosch, former NASA Administrator and now the President of the American Association of Engineering Societies. He said all the things those of us who are convinced that man has a role in space exploration really wanted to hear. His opening comment was, "Prediction of the future has a bad history"; nevertheless, he was brave enough to give us his own predictions. It is clear to Dr. Frosch that we are going to expand into the solar system. He predicted that, during the next 100 years, we will consider ourselves inhabitants of the solar system rather than inhabitants of just a sample body of that system. He predicted great advances in robotics leading to artificial intelligence. He said that what he calls "extensors" will permit a person to be in one place while his

sensors and effectors are in another place. The connection between where a person is and what a person is doing is being extended, and could conceivably permit the development of a system wherein a man could sit in an office in New York and operate a bulldozer on the moon.

Just as I was beginning to think Dr. Frosch was making a case for eliminating man from space exploration, he stated that it was his belief that the mechanics and economics of the situation require people to be there and, further, that people *want* to be there. Since they want to be there, they *will* be there. If one grants that people will be there, what will they be doing? Man will not be content to live in a submarine-like enclave on a planetary surface, said Dr. Frosch. He will want to convert the planet to an earth-like world. It may take him hundreds of years to do that, but he will accomplish it. I can assure you, we were all stimulated by Dr. Frosch's remarks.

Dr. Frosch's talk was followed by a most interesting paper on the Space Operations Center (SOC) by Clark Covington of the Johnson Space Center. He defined the SOC as being a shuttle-launched, shuttle-serviced, permanently manned facility in low earth orbit for operational support of NASA, commercial, and defense space activities. It is an integral part of a Space Operations System which includes the Shuttle, the SOC, Orbital Transfer Vehicles (OTV), and Manned OTVs.

The first afternoon's single session was devoted to five papers concerning the design and operation of the SOC. The last paper was a delightful presentation titled "Sociological Aspects of Permanent Manned Occupancy of Space," by Dr. B. J. Bluth, Professor of Sociology, California State University, Northridge. Dr. Bluth obviously knew what she was talking about. It was quite apparent that she has examined the lives of people living in such isolated communities as Antarctica and on ocean research vessels on prolonged voyages. One of her observations was that after about 28-30 days into a mission, the crews get into bitter arguments, but soon make up. Other observations included the development of a "we-they" phenomenon in which the remote group shows a great deal of antipathy towards the controlling group at home. One of her recommendations was that in situations where the ship's complement is divided into different duty sections, the change in duty cycle should permit approximately an hour of interaction between the on-coming shift and the off-going shift.

The following 2 days of the meeting were each divided into either two parallel sessions or, in one case, three parallel sessions. The titles of the sessions will give some idea

of the scope of the meeting: Regenerative Life Support Evaluation; Thermal Protection; Aircraft Thermal Control; Advanced Environmental Control/Life Support Systems; Spacecraft Thermal Control (two sessions); Personal Protective Systems; Controlled Ecological Life Support Systems (CELSS)—Systems Considerations; and CELSS-Waste Management. It is evident from these titles that the Conference is not devoted exclusively to space flight considerations.

It was my privilege to be a co-organizer and co-chairman of the session on Personal Protective Systems. Two of the authors were from the Bureau of Mines Pittsburgh Research Center and the other author was from Canyon Research Group, Inc. They described in detail the job of the underground miner and what he needs to protect himself from his hazardous and very uncomfortable environment. The methodology used to develop personal protective equipment for the miner is much the same as that used to develop equipment for the aviator—namely, the fabrication of a simulated environment which can be controlled, manipulated, and used in a safe manner. The investigator actually built a mine simulator which had a ceiling that could be altered in height to simulate coal seams of varying thickness. The experimental subject had to crawl up to a simulated mine face, shore-up the roof, use a pick while on his knees, and shovel-out "mined" material. The second paper in this session was "Firefighters Integrated Response Equipment Systems (FIRES)—Phase II," by Hy Kaplan from the Grumman Aerospace Corp. Mr. Kaplan described how his company evaluated selected items of personal protective equipment for firefighters. He showed some dramatic slides which served to reinforce what we all know—that the firefighter works in an environment as hazardous as that of the aviator or astronaut. The person who develops equipment for firefighters is concerned with personal helmets that will withstand impact and remain unaffected by high temperatures. He is concerned with providing breathing gases, and with the construction of protective clothing. The similarities with aviation are most evident. The last paper in my session was "Shuttle Extravehicular Mobility Unit (EMU): A Combination of New Technology and Proven Hardware," by A. O. Brouillet of the Hamilton Standard Division of United Technologies. Mr. Brouillet described in great detail the design and operation of the Shuttle EMU. His presentation gave us all a better insight into this complicated piece of equipment. Finally, we were delighted to have an extra item on our agenda. Mary Cleve, one of the recently selected NASA Mission Specialists trainees,

brought a film about the most recent Shuttle flight. Her film made a fitting closure to our session.

In a few months, the call for papers of the 1982 conference will be issued. This, the 12th Intersociety Conference, will be held at the Town and Country Hotel in San Diego. I encourage you to respond to this call and submit a paper. I can assure you that it will be heard by dedicated people.

William K. Douglas, M.D.
President, Space Medicine Branch

NASA combines Dryden and Ames

Dryden Flight Research Center, Edwards, CA, has become a directorate of NASA's Ames Research Center, Mountain View, CA. The consolidation was planned to integrate the research and staff under a single management.

While there will be no forced relocations and no layoffs, NASA says some of the aircraft at Ames will be moved to Dryden for continuation of research. These include the Quiet Short-Haul Research Aircraft and one of the Tilt Rotor Research Aircraft. The other Tilt Rotor aircraft will remain at Ames along with the Kuiper Airborne Observatory and the two Earth Resources Survey Aircraft.

Blind can keep canes in flight

The Federal Aviation Administration has changed its rules. It now permits blind passengers to keep their flexible travel canes with them at their seats, instead of having to turn them over to a flight attendant.

The new rules allow a blind passenger seated next to a window to either wedge his cane on the floor between his seat and the plane's fuselage or to place his cane flat on the floor running fore and aft from his seat to the seat directly in front of him. Blind passengers in other seats can stow their canes flat on the floor athwart the seats in front of them.

The FAA is also calling for comment on two new proposed rules.

One would forbid flying if the pilot's blood level contains 40 milligrams percent or more alcohol by weight. This is much stricter than the 0.1% standard used by most states for determining if drivers are drunk. The new FAA rule would also include an implied consent provision in which the pilot would be required to take the test or be considered unfit.

The second proposed rule would require licensure by powered ultralight vehicles weighing 155 pounds or more and having a fuel capacity of 15 gallons (about 2.5 gallons) or more. Hang gliders and ultralights beneath the licensure minimums would be subject to certain operating requirements to ensure safety for themselves and other aircraft. These would include prohibiting them from operating at night or in poor visibility; requiring that they yield to all other traffic; requiring them to maintain separation from other aircraft on a "see and avoid" basis; and prohibiting operations in some controlled airspace.

5 from AsMA receive WSU M.S. degrees

Five AsMA members, physicians in residency training in aerospace medicine at Wright State University, Dayton, OH, received Master of Science degrees in Aerospace Medicine, June 13. They are: Robin E. Dodge, M.D.; LTC Eric Donaldson, RAA, MC; Pat Harsha, M.B., B.S.; James S. Logan, M.D.; and Irene Long, M.D.

As part of the program, the residents conduct original research in aerospace medicine and complete the required academic courses for certification by the American Board of Preventive Medicine. In the conduct of their research, assistance was provided the residents by aeromedical personnel of Wright-Patterson AFB, OH. Dr. Dodge concentrated on distinguishing circadian effects from other fatiguing effects on aircrew in flight; Dr. Donaldson studied dark adaptation capacities relevant to helicopter aircrew selection; Dr. Harsha investigated auditory evoked potential variations secondary to vestibular coriolis stimulation; Dr. Logan investigated noninvasive methods of determining cardiac output during varying gravitational vectors, with and without G suit protection; and Dr. Long studied certain hemoglobinopathies in relation to aircrew flight status.

The Wright State University program is the only civilian residency in aerospace medicine in the U.S. and is conducted in cooperation with the National Aeronautics and Space Administration. It was initiated under Dr. John R. Beljan, Vice President for Health Affairs, Wright State University and is conducted within the School of Med-

Call for Audio Visual Products Films/TV Tapes

The Scientific Program Committee for the AsMA 1982 Annual Scientific Meeting in Bal Harbour, FL, May 10-13, is seeking candidate motion pictures and 3/4 inch TV tapes in cassettes for the meeting's A/V program. Recently released A/V products regarding teaching aviation medicine, physiology, psychology, nursing, bioengineering, and other topics are solicited. Candidate films and tapes for free loan to the Aerospace Medical Association should be mailed for review as soon as possible to:

Col. Donald C. Choisser, USAF, BSC
Box 35416
Brooks AFB, TX 78235

Films and TV tapes will be returned immediately following review. Individuals who know of films of interest to professionals in the fields of aerospace medicine, physiology, psychology, nursing or bioengineering, please telephone Col. Choisser, autovan 240-2033; commercial (512) 536-2033.

icine, Department of Community Medicine, Dr. Joseph D. Alter, Chairman. The program is currently under the direction of Stanley R. Mohler, M.D.



EMERGENCY PRESSURE JERKIN—Canadian pilots have successfully tested a lightweight jerkin with an inflatable bladder for use in emergency decompression. In a test to 60,000 ft., the jerkin—a sleeveless vest—allowed positive pressure breathing above the ambient pressure until a safe altitude was reached. Leaving a CF 104 Starfighter after the test is test pilot Capt. John MacNamara, left, wearing the jerkin, and safety pilot Capt. Jerry Nicks, wearing a full pressure suit.