Space Medicine Branch Report

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Message from 1978 President

(The following report to the annual meeting of the Space Medicine Branch by its President, Heinz Fuchs, has been abstracted).

Your Space Medicine Branch completed a successful year as indicated by:

(1) The increasing membership up to 225, from among the U.S. and eight other countries, representing disciplines ranging from pure aerospace medicine through physiology and psychology, to life support and technical equipment specialists,

(2) The SMB cosponsored a joint ASMA/AIAA session devoted to "Future of Biological Engineering in Space," held today,

(3) The Branch also cooperated closely with the American Astronautical Society (AAS) in order to cosponsor a joint session on "Space Medicine" at that Society's Annual Meeting at Houston 30 Oct. - 4 Nov., 1978,

(4) A President's Newsletter, all members have been informed on current activities in space medicine, with special regard to the forthcoming European Spacelab and Minutes of the Las Vegas Business Meeting/Luncheon,

(5) You all saw and, I hope, recognized the new permanent poster which drew attention to your SMB and its annual luncheon, announcing the guest speaker,

(6) The SMB members were provided new membership certificates,

(7) We updated the membership directory and,

(8) Last but not least, I wish to reemphasize the healthy state of our financial affairs.

In conclusion: The Space Medicine Branch is an ASMA Constituent in good standing and I would like to thank Col. Meader for his devoted, busy, and successful work for the Branch!

The Space Medicine Branch, founded in 1950, now enters its 29th year of existence. Since it has only been 17 years since the first manned space flight took place, it is quite obvious that the founders of our organization were men of vision, individuals who were able to foresee the days of Apollo, Skylab, and the forthcoming Space Shuttle as well as to imagine space colonies.

As I survey the past year's activities in space—and space-related events on earth, too—I do note several significant events. Let me stress only a few of them:

1. Without any doubt, the Soviet Saljut 6 mission in 1977/78 was the most spectacular one: launched with Sojus 26 and supported by Sojus 27 and 28 space ships and crews, the cosmonauts Romanenko and Gretschko spent 96 days in orbit. During this mission they performed scientific, experimental, and operational tasks and were joined for 5 days by two other cosmonauts who performed a second docking. Then an unmanned spacecraft—Progress 1—resupplied the orbital station with technical equipment, fuel, compressed air, oxygen, food, etc. Having completed its mission, Progress 1 took away the useless "space junk" to be abandoned and burned with the supply ferry during its reentry into the earth atmosphere.

This Progress 1 mission has to be considered an excellent example for supplying future space stations and colonies, and performing orbital rescue missions should they be necessary.

Of equal importance, however, has to be evaluated the "internationalizing" of the Saljut 6 mission: one Czech cosmonaut joined his soviet colleagues during the 5 days visit.

In August, 1977, a Soviet biological earth satellite Kosmos 936 was launched and successfully recovered. This event is particularly important for the international cooperation in space, too, in that biological experiments and scientific equipment from the USSR, the USA, France, Czechoslovakia, Romania, Bulgaria, Hungary, and Poland etc. were carried aboard. Of particular note was again the fact that 2 centrifuges were carried aboard providing 1 G for the experiments.

The preliminary results of these important physiological studies and investigations in space are available so far as the US experiments are concerned—the final results will be exchanged in June 1978.

Another milestone of Soviet activities: the Soviet Union launched her 1,000th Kosmos satellite in April, 1978.

2. In the U.S.A.:

(a) the National Academy of Sciences, on behalf of NASA, examined the potential biomedical experiment opportunities and the extent to which continued space-related biomedical research would be justified from a scientific point of view.

b) the Space Shuttle Orbiter—the workhorse of the Space Shuttle Program—has been tested by both several piggyback flights atop its 747 carrier aircraft and unpowered aerial flights and landings.

c) In the life sciences area, NASA's planning for Spacelab missions, following Spacelab 1, envisages two dedicated Spacelab modules, two mini-labs, and two carry-on (CON) packages per year. The mini-labs would share Spacelab facilities with other scientific disciplines. The CON packages would be composed of small experiment units which could be stowed either in the Orbiter or in Spacelab. Life sciences dedicated missions are planned to be flown twice a year in the period 1981-83—the first of these missions in November 1981.

d) To involve the life sciences community in space related research, NASA issued an Invitation to Planning (ITP) for Spacelab 1 about 1 year ago, and 2,000 world scientists responded; NASA and ESA selected proposals representing 222 investigators from among 15 countries and the U.S.; and NASA published an Announcement of Opportunities (AO) (AO NO. OSS-1-78) again in February 1978, soliciting proposals for life sciences investigations on Space Shuttle/Spacelab missions in 1981-83.

e) in January 1978, NASA selected 35 new astronaut candidates (6 ladies—the very first ever in the U.S. astronaut corps—and 29 gentlemen) for the Space Shuttle Program which will launch 128 missions from 1980-91 with 512 experimenters in orbit.

f) ASSESS I and II were NASA-ESA missions desiguated to simulate European-American Spacelab missions and train payload specialists—airborne and on the ground.

g) NASA continued its systematic planetary exploration program and launched two Voyager spacecraft successfully in 1977 to examine Saturn and its huge satellite Titan—the only one in the solar system known to have an atmosphere.

3. In Western Europe, a consortium of 10 European nations, working through the European Space Agency (ESA), is responsible for the reusable Space Laboratory, the Spacelab built by Erno at Bremen, Germany. No secret—Germany is bearing most of the financial burden, too.

This European designed and manufactured Spacelab is the next generation of manned space laboratories, will support single or multi-disciplined earth orbital missions of 7-30 days, carried as a payload in the Orbiter's cargo bay, manned by mixed crews of seven, male and female, from the U.S. and Europe during the period 1980-91. As these Spacelab crews are to be scientists of various specialties and not highly trained astronauts, the habitability of this small laboratory became a significant design factor, perhaps more so than in previous manned spacecraft.

The Orbiter will provide support accomodations for as many as seven crew

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members, including food, waste management, sleeping and personal hygiene. This permits Spacelab to be optimally designed for performing its primary function of a Zero-G manned space laboratory. Due to the missions anticipated, Spacelab can operate in several configuration modes, i.e. a module plus pallets mode, a module-only mode, and a pallet-only mode.

The Life Sciences experiments for the first Spacelab payload have been selected —among them the "Space Sled Facility" for the study of certain vestibular functions, three-dimensional ballistocardiographic investigations in weightlessness, and experiments on plants and tissues, etc.

Skylab has provided a bounty of data of man's ability to live and operate in space. This data, however, was gathered upon healthy, normal individuals. This data base must now be expanded to include various ages and various health states. The need for collecting this data sets one focus for the research program on the early Shuttle flight missions.

The most recent medical selection of payload specialists for the Spacelab 1 mission in 1980, has already demonstrated that many of the excellent candidates who meet all criteria of technical and scientific proficiency and psychological aptitude, are showing some physical borderline conditions: from among more than 2,000 European applicants, only 53 were pre-selected as candidates—only four, however, met the physical/medical standards. It is quite obvious, that we have to define those pathophysiological conditions compatible with space flight—at least for a payload specialist.

In contrast to the approaches to the first Spacelab mission, a careful granting of waivers for well-defined conditions could be considered for future missions which don't bear the same high technical requirements as the first spacelab mission.

What of the future of space medicine?

No medical specialty can remain viable unless there is a clearly demonstrated need and demand for its services.

The Skylab program demonstrated unequivocally the need for man-in-space systems. Without man's intervention, the Skylab vehicle would have been uninhabitable because of the acute power shortage caused by the failure of solar panel deployment.

The Skylab and Saljut missions have demonstrated the physiological and psychological adaptability of man to relatively long duration space flight. They have further demonstrated that man's participation in the conduct of scientific experiments in an orbital space laboratory and in maintenance operations is both feasible and highly productive.

Space medicine's primary concern, therefore, is the human in space—for whatever purpose and to whatever destination he chooses.

However, with the emphasis now on scientific studies in space, we should be able to establish more concise, clearly identified research efforts, designed to use the unique environment for studies on common disease processes and in testing newer concepts of therapy as well as for solving problems in space habitability.

One major breakthrough in the understanding or treatment of cardiovascular disease or even cancer resulting from this research will accomplish more to assure continued funding for the space—and space medicine—program than the greatest technological achievements!

From these key points it is quite obvious that Space Medical Research has to be done and continued, as with the Shuttle a Space Program is preparing for a new style of operations—one which will have far-reaching implications for the future.