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SPACE MEDICINE BRANCH REPORT

Corporate Aspects of Space Medicine

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The private medical and industrial sector has a history of involvement in space medicine dating back over 30 years. As early as 1959, the private medical community was directly involved in astronaut candidate evaluation when the Lovelace Clinic in Albuquerque, NM, conducted extensive medical examinations on the first group of astronaut candidates. Subsequently, physicians, research scientists, biomedical engineers, and human factors specialists from private medical clinics, academic institutions, and industrial companies have been continuously involved in supporting the NASA life sciences programs. As research and development needs evolved, NASA chose to augment its own staff capabilities with scientists and engineers from support contractors. The government-contractor team continues to work together to support all aspects of manned spaceflight.

Today's corporate involvement in space medicine encompasses a broad range of disciplines and activities including support of NASA's life sciences research programs, development of medical and research instrumentation, support of medical operations programs for the Space Shuttle and Space Station Freedom, and provision of educational programs.

NASA's life sciences research activities are primarily conducted at four NASA centers—Ames Research Center, Johnson Space Center, Kennedy Space Center, and Marshall Space Flight Center. Several corporate members such as KRUG Life Sciences, Inc., The Bionetics Corporation, Lockheed Corporation, and McDonnell Douglas Corporation, are under contract to provide research and development support services to NASA at these centers. This support ranges from providing senior research scientists functioning as principle or co-investigators on specific research projects to technicians working in various laboratories. Virtually every life sciences discipline is represented in NASA's research programs. Plant biology, cellular physiology, human physiological responses of each organ system to microgravity, and psychological research are all being addressed by NASA. In addition, NASA funds research which is conducted in academic institutions across the country.

The development of ground and space-flight research equipment and instrumentation is an area in which corporate entities play a key role. A wide assortment of research and medical instruments are utilized in conducting ground and flight research, as well as in the clinical medical support of astronauts in space. Many of these instruments are commercial "off-the-shelf" units which are modified to meet certification requirements for spaceflight. Others are designed and built by contractor engineers

and certified for spaceflight. In some cases, the "off-the-shelf" hardware items are instruments with a history of having been developed for NASA in the 1960's and 1970's, evolving into commercial units, and now are being recycled back into the space program.

NASA flight surgeons provide medical operations support for Space Shuttle preflight, inflight, and postflight. This support includes emergency rescue preparations at the launch site and all nominal and contingency landing sites; inflight monitoring of flight support systems and crewmember status, monitoring of medical investigations, and evaluation of any illness which might occur inflight; and postflight medical examination of crewmembers. The "behind the scene" support of NASA flight surgeons is provided by contractor biomedical engineers, laboratory technicians, and research support scientists. The spaceflight environment leaves very little margin for error, and the companies involved in providing the support personnel must assure that their employees are appropriately trained and qualified for these highly specialized tasks.

The corporate sector is also involved in support of NASA educational programs in space medicine. Visiting scientist programs, seminars, workshops, and summer educational programs are provided by several NASA centers through their support contractors. Examples include the space and Life Sciences Training Program offered at the Kennedy Space Center, the Aerospace Medicine Residency Program at Wright State University, Dayton, OH, medical student rotations at the Johnson Space Center, and multiple workshops and seminars at NASA centers and in conjunction with specialty society scientific meetings throughout the country. This educational outreach is targeted at both NASA and contractor personnel, as well as to the general public and academic institutions. By stimulating interest in today's students, NASA and their corporate partners are seeking to ensure the continued availability of tomorrow's scientists, engineers, and technologists to carry the space program forward into the next century.

The future looks bright for continued involvement of the corporate sector in space medicine activities. The construction and occupation of Space Station Freedom, a return to and colonization of the Moon, and the eventual exploration of Mars will offer multiple opportunities for companies and academic institutions to play key roles in research, development, implementation, and ongoing operational support of the exploration and inhabitation of space. Meeting the ultimate goal of space medicine of assuring the safety, health, and productivity of astronauts, and those who follow them, both in space and upon return to Earth, will take the combined effort of NASA and its sup-

port contractor team.

Corporations not only participate in direct support to NASA through contracts, but also lead the way in taking the technology developed through the space program and using it to enhance the quality of life on Earth. The commercial spin-offs from the technological advances of the space program will continue to depend on the corporate sector's initiative in meeting the needs of society for improved health care systems.

NASA's Outreach Program seeks ideas

Recently, NASA announced the next step in its Space Exploration Initiative (SEI) Outreach Program to seek new ideas on how to return to the Moon permanently and to begin human exploration of Mars. In his announcement, NASA Administrator Richard H. Truly said he has directed his office to conduct a mass mailing to institutions and individuals asking for ideas on mission concepts and also for ideas on the technology needed to travel and live on the Moon and Mars. Truly has targeted U.S. colleges and universities, deans of engineering schools, and presidents of science and engineering professional associations, among others.

A response packet will be sent to anyone who requests it and the results will be forwarded to the RAND Corporation in Santa Monica, CA, where an analysis and evaluation will be conducted. RAND has installed a toll-free telephone number for requesting an SEI Outreach program survey. It is 1-800-677-7796.

Certification in Aerospace Physiology

The Aerospace Physiology Certification Board will administer the certification examination at the 62nd Annual Scientific Meeting of the Aerospace Medical Association in Cincinnati, Ohio on Sunday, May 5, 1991.

Individuals interested in certification should refer to the November, 1990, Aerospace Physiology Report in this journal for more information. To obtain an application form and complete information about certification requirements, contact:

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