

Oral Testimony

March 22 1999

Statement by Arnauld Nicogossian, Associate Administrator

Office of Life And Microgravity Sciences And Applications

National Aeronautics and Space Administration

Mr. Chairman and members of the Subcommittee, I am pleased to have this opportunity to discuss progress and plans for NASA's Office of Life and Microgravity Sciences and Applications.

FY 99 Overview:

We continue to expand our research community. In 1999 we supported 872 investigations, a nine- percent increase over 1998. Our researchers received forty patents in fields ranging from laser light scattering to tissue engineering. 1,500 articles were published in peer-reviewed journals. Commercial interest in microgravity research remained strong as cash and in-kind investments by the private sector increased by \$7.

FY 99 highlights

Our research community continues to produce important results: Researchers are uncovering intriguing evidence that the injured spinal cord can be taught to relearn walking or standing. Researchers supported by NASA and NIH are conducting a clinical trial in which people with spinal cord injuries are being trained to walk on a treadmill at five centers in the United States.

At MIT, researchers grew three-dimensional, beating heart tissue using the NASA-developed bioreactor. Engineered tissue could eventually be used to repair organs, test new drugs in vitro, and

study organ development and function. The bioreactor is scheduled to fly on STS-107.

Cambridge Heart of Massachusetts is commercializing an OLMSA-funded noninvasive technology for detecting dangerous heart rhythm disturbances. Originally developed for monitoring astronaut health, this technology will soon help doctors identify patients at risk of sudden cardiac death who could then be treated by implantable devices.

Physicists and engineers at Harvard, Stanford, and Princeton, are researching materials self-assembly processes for nanostructures. These materials may be the basis for ultra-fast optical computing and communications technologies.

Future Research:

Research will begin on the Space Station during assembly. We will conduct experiments to characterize the Space Station environment, monitor crew health changes, and evaluate countermeasures – and this before the Human Research Facility is deployed. Microgravity Sciences researchers will use flexible research equipment to conduct experiments in combustion science, fluid physics, and materials sciences.

STS-107, to be flown in early 2001, will supplement early ISS research opportunities. We are actively developing plans for an additional research mission, provisionally designated “R2.”

Bioastronautics Initiative

The 2001 President’s budget request for OLMSA includes a Bioastronautics Initiative. This initiative will enable us to focus our interdisciplinary research in biomedicine, technology, materials, and physics to improve health, safety, and performance of human space flight crews. The Bioastronautics initiative will develop protective measures, autonomous medical systems, and environmental biosensors.

We will integrate innovative technology and the best minds, in and out of NASA, in pursuit of these goals. A strengthened National Space Biomedical Research Institute will play a central role in the Bioastronautics initiative, as will an aggressive effort in Biologically Inspired Technology research.

Research on Mir has identified the need for breakthrough bioastronautics research. International Space Station creates new opportunities to answer question on how to protect the crew and how to create autonomy. It adds a new level of urgency to our quest to ensure and enhance health and safety in Space.

As the committee is aware, space flight exposes the human body to an environment unprecedented in the history of human evolution. We continue to face significant challenges controlling the physiological changes that result from space flight. Advances in biology and physics promise a new era of technological achievement. We are searching for new solutions to these challenges. The Bioastronautics initiative will develop and test these new solutions for application on Earth as well as in space.

Mr. Chairman, thank you again for the opportunity to present our accomplishments and the budget request to the committee here today.