

Hermann J. Oberth: father of space flight

After a brief illness, Professor Hermann Julius Oberth, the world-recognized "Father of Space Flight," passed away on Thursday, Dec. 28, at the age of 95 in Feucht, West Germany.

In 1923, Oberth gained early fame and recognition by authoring *The Rocket into Interplanetary Space*, and later, *Ways to Space Travel*. He pioneered in rocket research and design, along with American-born Robert H. Goddard and Konstantin E. Tsiolkovsky of Russia.

Prior to World War II, Oberth began a work research program at the Institute of Technology, and during the war, he worked with Dr. Wernher von Braun (who had studied under Oberth previously). Von Braun said of Oberth, "Not only do I owe him my first introduction to the technology of rockets and space flight; he gave me the guiding star for my whole life." Always a visionary, Oberth maintained that his goal was not the launching of rockets, but "travel through space, and the exploration of the unknown."

In 1955 Professor Oberth was asked to join the rocket

development center in Huntsville, Alabama where he remained for three years. During this time, he was instrumental in helping launch America's first satellite, the Explorer I, in January 1958. In July 1969, he was invited to Cape Canaveral where he viewed the launching of the Saturn-Apollo rocket taking Armstrong, Aldrin, and Collins to the Moon. This event capped the realization of his 70-year dream.

Oberth is credited with being the first to explore concepts of inertial guidance systems, life support systems, zero-gravity effects, orbiting space stations, and space mirrors. For his lifelong work as a prophet and pioneer of space flight, he is recognized in the International Space Hall of Fame in Alamogordo, New Mexico.

A most prolific writer all his life, Hermann Oberth wrote numerous books, articles, scientific, and philosophical papers and studies.

The occasion of Professor Oberth's 95th birthday on June 25, 1989 saw the opening of a traveling exhibition, "Hermann Oberth: The Father of Space Flight," at the Alabama Space and Rocket Center in Huntsville, Alabama.

Professor Oberth is survived by his daughter, Dr. Erna Roth-Oberth, who lives in Feucht near Nuremberg, which is also the location of the Hermann Oberth Museum, and by his son Adolf Oberth, who lives in California.—*John Zavrel*

Electronic and optical components

Holograms in space? One LDEF experiment, designed by researchers at the Georgia Institute of Technology, will determine the effect of long-term exposure to the space radiation environment on four iron-doped lithium niobate crystal holograms. These systems, if they can withstand the space environment, would have applications in ultra-high-capacity space data storage and retrieval systems.

Filters and detectors used for various wavelengths of the electromagnetic spectrum were tested on the Long Duration Exposure Facility. Multilayer filters used for sensing atmospheric temperature and composition were tested, since understanding their optical behavior is critical to their long-term performance.

Detectors placed on spacecraft last for years. But it has not been known how the degradation of the detector materials affects their performance. This is crucial, because readings may reflect changes in the material more than changes in the phenomena the detector is supposed to be measuring. Questions of this kind have arisen, for example, in the detectors analyzing the supposed "hole" in the ozone layer, which may be the result of faulty measurements.

Pyroelectric infrared detectors, used to monitor air pollu-

tion and used in the thermal mapping of the Earth, were exposed on LDEF so that space effects could be understood and factored in to ensure the validity of measurements.

In order to qualify new ultraviolet optical components, it is useful to know the effects the space environment has on components such as thin films, gas filters, photocathodes, and crystal filters. French researchers carried out such an experiment on LDEF.

In the future, fiber optics will be used in space and aboard space facilities, just as this technology is replacing standard communications transmission systems on Earth today. Scientists from France exposed fiber optic waveguides to space on LDEF. The results will allow the researchers to design laboratory tests that simulate space radiation effects for further study.

Scientists from the University of California's Jet Propulsion Laboratory tested fiber optic data transmission equipment for degradation, and a researcher from the Air Force Weapons Laboratory at Kirtland Air Force Base, New Mexico, carried out an experiment to assess the survivability of radiation hardened fiber optic data link designs. These test results will allow the design of new systems which have already benefited from being "tested" in space.