STANLEY D. SHAWHAN

Stanley D. Shawhan, director of the Space Physics Division at NASA Headquarters died on June 21, 1990.

Stan was born on February 7, 1941, in Minneapolis, Minnesota. He received his B.A. degree in physics from Ohio Wesleyan University in 1963. He then moved to the University of Iowa to continue his studies as a graduate student in the Department of Physics and Astronomy. His arrival at Iowa occurred during a period when a new area of research, space plasma physics, was developing under the leadership of Prof. J. A. Van Allen, who only a few years earlier had discovered the Earth's radiation belts with Explorer 1, the first U.S. spacecraft. Stan soon became deeply involved in the rapidly growing space research program at Iowa. This early involvement was to set the direction of his career, first as a researcher, then as a teacher, and finally as a NASA administrator.

Stan's interests as a graduate student focused on studies of very-low-frequency (VLF) radio wave phenomena, now known as plasma wave research. Using data from the Injun III satellite which carried the first U.S. plasma wave instrument, he performed an investigation of a newly-discovered phenomenon called a proton whistler. This work led to the development of a new method for making very accurate measurements of the relative concentration of ions in the Earth's ionosphere, a method which at the time was superior to any other known technique. This work was summarized in his M.S. thesis in 1965. After completing his M.S. degree, Stan went on to develop a computer ray tracing program

for studying the ray path of whistlers and other VLF radio phenomena in the Earth's magnetosphere. This work resulted in a Ph.D. thesis which he completed in 1966. The ray tracing code that he developed was further refined by a long line of researchers and can be directly linked to ray tracing codes currently being used by several groups more than 20 years later.

After completing his Ph.D. degree, Stan continued as a research scientist at the University of Iowa for a period of two years. He then moved to Sweden as a visiting scientist at the Royal Institute of Technology, where he worked on a variety of problems, including advanced methods for analyzing signals from multi-axis plasma wave receivers. In 1969 he returned to the University of Iowa as an Assistant Professor. This marked the start of his new role as a teacher. Stan was an instant success with students. His intense enthusiasm for science, and his well-organized, thoughtful lectures made him one of the most popular instructors in the department. He enjoyed teaching the entire range of courses, from basic introductory courses to advanced courses in electronics and space science. He also developed a dedicated following of graduate students who worked with him on a variety of research projects, including studies of solar flares, interplanetary radio scintillations, magnetospheric electric fields, and numerous other topics. A total of 14 graduate students received advanced degrees under his supervision.

After returning from Sweden, Stan shifted his research interests briefly to radio astronomy. His primary effort in this area was the construction of a large, low-frequency radio antenna array in Borrego Springs, California, which was used to study interplanetary radio

scintillations and to search for planetary radio emission. This work was performed in collaboration with Willard M. Cronyn. After several years of radio astronomy research, Stan's interests gradually drifted back to space plasma waves. His first project as a NASA Principal Investigator was the development of a plasma wave instrument for the Dynamics Explorer 1 spacecraft, which was launched in 1981 and proved to be a great success. During this same period, he also conceived and carried out the development of a spacecraft called the Plasma Diagnostics Package (PDP) which flew on the space shuttle in 1982 and again in 1985. His work on the PDP proved not only to be scientifically rewarding, but also gave him valuable first-hand experience in dealing with the many complex scientific and technical problems associated with a large NASA spacecraft project. This experience no doubt proved to be of great value in preparing Stan for his next and probably most important role.

In 1983 Stan accepted a position in the Earth Science and Applications Division at NASA Headquarters. His move to NASA Headquarters came at a crucial time for space plasma physics. The Solar-Terrestrial Physics Division at NASA had been dissolved in 1980 and its constituent pieces spread through four other divisions within the Office of Space Science. There was no central focus to the program and the International Solar Terrestrial Physics (ISTP) program was languishing without any real hope for "new start" authorization. The Space Science Board of the National Research Council had concluded that the discipline was in disarray, and that an implementation study, similar to the one just concluded by NASA on the planetary program, must be done.

Stan's assumption of the position of Branch Chief of Space Plasma Physics was the enabling step in the drive by the space physics community to re-establish a division. He tackled the task with tremendous vigor and energy, and was soon viewed by both his supervisors in the agency and his colleagues in the science community as a true leader and as the focus of activities for the drive for a new division. He worked closely with the Space Science Board's Committee on Solar and Space Physics in putting together the implementation plan, published by the Academy in 1985, that provided the basic rationale and planning document for the establishment of the Space Physics Division. By this time, Stan was more or less treated as a division director within NASA, and was furiously maneuvering to obtain a new start for ISTP. When it did not appear possible to start the entire ISTP program, which comprised an international and a national component, he renamed the international part COSTR (Cooperative Solar Terrestrial Research), the national part GGS (Global Geoscience), and argued for a new start of the former in fiscal year 1987 and the latter in 1988. He was successful in both efforts and the ISTP program is now into full development, with the first launch scheduled in late 1992.

The implementation of the ISTP program was crucial to the justification for the establishment of the Space Physics Division, for it provided a high visibility project around which the rest of the program could be assembled. Stan understood this very well and was willing to make several compromises to get the program started. His strategy was obviously successful, for a reorganization of OSSA was announced in the fall of 1987 that established the Space Physics

Division and named Stan as Director. The reorganization came about six months after Len Fisk assumed the position of Associate Administrator.

Over the past three years, Stan set out to flesh out the nascent division with staff, facilities, advisory structure, programs, and, most importantly, a long-range plan that would serve the purpose of coalescing the several disciplines represented in the division's science community and providing a vision for the future. He organized a study, with broad representation from each discipline, that culminated in a final workshop on June 18-21, 1990. The result was a well-thought-out, coherent, and ambitious plan with exciting scientific content and programs that would carry the division's activities into the 21st century. Stan was exceedingly pleased with the outcome when the meeting broke up around 3 p.m. on Thursday, June 21. He went home, called his secretary to discuss the next morning's schedule and then decided to cut the grass. He passed away that evening.

Stan Shawhan was an exceptionally able teacher, a gifted researcher, an able administrator, and an enthusiastic leader of the science community. He also was one of the kindest, most considerate, decent, imaginative, and trustworthy human beings we have ever known. His family, his friends and colleagues, the science community and the world at-large are all the poorer because he departed so soon.

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