



William F. Schminner

HARRIS M. SCHURMEIER

1924–2013

Elected in 1983

“Imaginative and careful engineering leadership that assured success in bold explorations of the solar system.”

BY JOHN R. CASANI

HARRIS McINTOSH SCHURMEIER died November 23, 2013, after an exciting and distinguished life. He was one of the founders of American planetary exploration, contributing both his engineering and leadership skills to that enterprise. He was also a founder of the discipline of systems engineering.

Bud was born on July 4, 1924, in St. Paul, Minnesota. He became interested in flight at a young age and spent many hours designing and building model airplanes. His sister Betty Lu Christensen recalls that, in his efforts to have the lightest planes possible, he made a “skin” for them from a film floated on the water in the bathtub then dried on wire circles made of coat hangers. The rooms of their house were filled with these wire hangers. His brother Bob remembers that in his teens Bud built a wind tunnel out of cardboard to test his model planes.

His enthusiasm for flying led him to serve as a pilot in the US Navy during World War II and to pursue an aeronautical education. He earned his BS in mechanical engineering in 1945, MS in aeronautical engineering in 1948, and professional engineering degree in aeronautical engineering in 1949, all from the California Institute of Technology. His first job after graduation was with the Southern California Cooperative Wind Tunnel in Pasadena, operated for a consortium of aircraft manufacturers by Caltech.

He moved to the Jet Propulsion Laboratory (JPL) in 1949, where he served as an engineer in the laboratory's wind tunnel section. JPL had just begun operating a 12-inch supersonic tunnel, and Bud's job was calibrating it. The laboratory was also beginning to design a 20-inch hypersonic tunnel, which proved his first design challenge. The hypersonic tunnel's test section had to be cooled, and he had to figure out how to cool it while preserving flow quality.

In 1959 he was asked by Robert J. Parks to become the deputy manager for the Sergeant short-range ballistic missile JPL was developing for the US Army. But that task did not last long. JPL underwent a major reorganization that year in order to prepare itself for its movement out of the missile business and into space exploration, and Schurmeier was asked to create a new systems division in 1960.

He told an interviewer in 1970 that his intent for the division had been to have "all the trajectory work and analytical navigation work . . . preliminary design and the design integration of the spacecraft, the job of integration of the spacecraft to the launch vehicle, the responsibility for carrying out the system testing and launch operations and flight operations . . . all in the systems division." Unlike JPL's other technical divisions, the systems division had no hardware responsibility. Other parts of the laboratory remained responsible for manufacturing subsystems; the systems division was responsible for ensuring all the pieces would work together, and then proving that they did once delivered.

Creating the systems division was a complex undertaking that he had not finished when Parks asked him take over JPL's floundering Ranger project in 1964. Project Ranger was aimed at delivering a series of lunar impact spacecraft to the Moon, with early missions carrying scientific instruments such as a seismometer, while later ones carried high-resolution television cameras. But the first five missions had failed in one way or another, leading to great pressure from the National Aeronautics and Space Administration (NASA) to fix the project's problems.

"But man," Schurmeier recalled, "you couldn't stand any more [problems]. The atmosphere was such that it wouldn't

accept that. You were going to be much more rigorous with everything, and much more thorough in the testing and that kind of thing. And you were going to take it slower and be that much surer of every step before you went on. And that's what we did." Schurmeier's first Ranger, Ranger 6, was nearly successful—the spacecraft worked perfectly, but, unknown to his team, its camera system had shorted out during launch, and the flawless flight ended without the precious images.

Bud had brought a couple of cases of champagne on ice to JPL to celebrate Ranger 6's success, but after the failure and inevitable press conference quietly took them home, "took them out of the water, glued the labels back on, put them back into the cases, set them aside, went to bed for a couple of hours, came into work and we started up the problem of figuring out what happened."

He brought the champagne back for Ranger 7's encounter with the Moon on July 31, 1964. That mission was, finally, entirely successful. Both of the remaining Rangers in the program were also complete successes, and Schurmeier then became project manager for the Mariner Mars 1969 project, which launched two spacecraft to Mars in February and March 1969. Though one vehicle suffered a battery explosion just before its flyby, both completed their photographic missions, imaging about 20 percent of the red planet's surface.

Bud's next assignment was as project manager for the mission once known as Mariner-Jupiter-Saturn 1977 (or MJS77), but for most of its life as Voyager. Under his tenure, Voyager started out as a "Grand Tour," with four long-lived spacecraft to be launched in 1977 and 1979 to reach Jupiter, Saturn, Uranus, Neptune, and Pluto. But as a cost-cutting measure, it was reduced to two less-ambitious spacecraft launched in 1977 to visit only Jupiter and Saturn, with one to be retargeted at Saturn's giant moon, Titan, via a gravity assist at Saturn. Schurmeier's project team retained key elements of the design needed for the more distant planets though, enabling one of the vehicles to eventually visit Uranus and Neptune anyway. Both Voyagers were still operating in 2014.

Before the Voyagers' launch, he was again asked to take on a new challenge, heading JPL's civil technology branch, and later the laboratory's reentry into defense technologies. During the 1970s, a federal initiative known as Research Applied to National Needs (RANN) pursued technologies intended to benefit the general population. RANN was implemented by the National Science Foundation and run by another ex-NASA engineer, Alfred Eggers, but drew on the technical resources of several federal agencies, including NASA/JPL. The laboratory performed transportation, solar and geothermal energy, civilian telecommunications, medical, and even wastewater treatment research under RANN. Bud was promoted to assistant laboratory director for civil systems in April 1976 and ran this enterprise and its successor at JPL, Defense and Civil Programs, until his retirement on November 1, 1985.

Postretirement, Bud maintained his connections to aerospace engineering through service on the Galileo project standing review board and on the William M. Keck Observatory project review board. He also headed two projects for the Planetary Society, its Mars Balloon and Mars Rover efforts, and chaired the review board for the Society's "Cosmos 1" project, intended to fly a solar sail in space.

He was elected to the National Academy of Engineering in 1983, a fellow of the American Institute of Aeronautics and Astronautics in 1973, and a member of the Supersonic Tunnel Association, the American Association for the Advancement of Science, and Sigma Xi.

President Lyndon Johnson presented him with the NASA Exceptional Scientific Achievement Medal in 1965; he received the NASA Exceptional Service Medal in 1969 and the NASA Distinguished Service Medal in 1981; he was twice presented the Astronautics Engineering Award by the National Space Club, in 1965 and in 1981; and he delivered the American Institute of Aeronautics and Astronautics annual von Kármán Lecture in 1974.

Bud was a licensed pilot, flight instructor, and avid soaring/motor glider enthusiast throughout his life. He was also a surfer, a skier, and a sailor. He took up avocado farming after

retiring from JPL and served as a utilities commissioner for the City of Oceanside.

He was married to Bettye Jo, whom he met when he went to work for the wind tunnel project, in 1949. They were married for 60 years when she preceded him in death in 2009. He is survived by Ben (brother), Robert (brother), and Betty Lu (sister), and his children, Harris, Sydne, and Dennis. His seven grandchildren are Mac, Lindsey, Jenna, Bryce, Lauren, Jake, and Brenden. Bud's granddaughter Lauren is currently in a doctoral program for planetary geology at the University of Illinois at Chicago.