

**HONORABLE HARRISON HAGAN SCHMITT
NASA APOLLO 17 ASTRONAUT
U. S. SENATOR (R-NM) (FORMER)**

PERSONAL DATA: Harrison Hagan Schmitt was born July 3, 1935, in Santa Rita, New Mexico and grew up in the nearby community of Silver City, New Mexico. He currently resides in the Intermountain West and works as a consultant in aerospace and earth and planetary science.

EDUCATION: Graduated from Western High School, Silver City, New Mexico in 1953; received a bachelor of science degree in science from the California Institute of Technology in 1957; studied as a Fulbright Fellow at the University of Oslo in Norway from 1957 to 1958; received a doctorate in geology from Harvard University in 1964 based on geological work in western Norway; and was a National Science Foundation Post-Doctoral Fellow in 1963-1964. Schmitt received his Air Force jet pilot wings in 1966 and Navy helicopter wings in 1967. In addition to his Doctorate of Philosophy in Geology from Harvard University, Dr. Schmitt has been privileged to receive honorary doctorate degrees from Rensselaer Polytechnic Institute, University of New Brunswick, Colorado School of Mines, University of New Mexico, New Mexico State University, University of Alabama-Huntsville, Salem College, Franklin and Marshall College, and South Dakota Institute of Technology.

EXPERIENCE: Schmitt began his geological career as a field assistant to his father, noted economic geologist Dr. Harrison Ashley Schmitt, followed by extensive instruction at Caltech by several of the top field geologists in the world. He also worked for two summers as an exploration geologist investigating the ultramafic rocks of Duke Island in southeastern Alaska (1955 and 1956). He was a teaching fellow at Harvard in 1961 under Professor Hugh McKinstry during which time he assisted in teaching a course in the geology and economics of precious metal deposits. In 1957, he did geological work on the west coast of Norway, returning in 1960 to work in that region for the Norwegian Geological Survey. He also worked in the field for the U.S. Geological Survey in 1953 and 1959 in New Mexico (surveying) and Montana (mapping of the Butte Batholith). Before joining NASA, he was with the U.S. Geological Survey's Astrogeology Center at Flagstaff, Arizona in 1964-1965. At that time, he was project chief for Lunar Field Geological Methods, participated in photographic and telescopic mapping of the Moon and was among USGS astrogeologists instructing NASA Apollo astronauts during their initial geological familiarization field trips. During this period, Schmitt mapped the geology of the Buell Park kimberlite pipe in northeastern Arizona.

Dr. Schmitt was selected as a NASA scientist-astronaut in June 1965, as a member of the 4th group of Apollo astronauts. He then completed a 53-week course in jet aircraft training at Williams Air Force Base, Arizona and a two-week course in helicopter flying at the Pensacola Naval Air Station, Florida. He has logged more than 2,100 hours flying time including 1,600 hours in jet aircraft (primarily T-38 Talons) and 210 hours in helicopters (H-13s).

In addition to training for future manned space flights, Schmitt was instrumental in providing Apollo flight crews with detailed instruction in lunar navigation, geology, and feature recognition. Schmitt assisted in the integration of scientific activities and equipment into the Apollo lunar missions, including the design and deployment of the Apollo Lunar Surface Experiments Packages. Deeply involved in the lunar orbit and surface operations planning for Apollo missions 8-13, he functioned specifically as the Mission Scientist in support of Apollo 11 in 1969. Schmitt also designed and oversaw the implementation of the geological training program for Apollo missions 13-17. Early in 1970, he was assigned as the backup Lunar Module Pilot for Apollo 15 that flew to the Moon in July 1971.

In August 1971, Dr. Schmitt was assigned as Lunar Module Pilot for the Apollo 17 mission, the last manned Apollo mission to the Moon. Apollo 17 launched at 11:33 p.m. (CST), December 6, 1972, and concluded on December 19, 1972. At 301 hours and 51 minutes, the voyage of the Command Module "America", piloted by Ronald Evans, and the Lunar Module "Challenger" constituted the longest manned lunar landing flight. After maneuvering "Challenger" to a landing in the valley of Taurus-Littrow, located on the southeast edge of Mare Serenitatis, the Apollo 17 crew activated a base of operations facilitating their completion of 3 days of geological and geophysical exploration. On the first day of his exploration activities, Schmitt deployed and activated the fifth and last Apollo Lunar Surface Experiments Package.

Schmitt is the first scientist and twelfth and last person to step on the Moon. This last Apollo mission to the Moon for the United States broke several other records, including: longest lunar surface extravehicular activities (22 hours, 4 minutes); longest distance traveled in the Lunar Roving Vehicle (35 km); largest lunar sample return (an estimated 115 kg or 249 lb); and longest time in lunar orbit (147 hours, 48 minutes). Apollo 17 ended with a splashdown in the Pacific Ocean approximately 0.4 miles from the target point and 4.3 miles from the prime recovery ship, USS TICONDEROGA.

Dr. Schmitt remains the only professional geologist and scientist to explore the Moon. Through 44 years of research on the Apollo 17 samples, photographs and observations, Schmitt and hundreds of investigators throughout the world have helped to uncover much of the geological history of the Taurus-Littrow area and its relationships to the early history to the Earth. These findings include further definition of the violent impact history of the Earth during the period when life began; the potential role of the largest impact basin in the evolution of the Moon; identification of samples of the lunar mantle; the definition of the sequence of formation of three large lunar basins; identification of a large igneous body ejected from a basin about a 1000 km distant; the crystallization history and thickness of titanium-rich basalt lavas; the sources and detailed nature of volcanic ash deposits and their implications to understanding the origin of the Moon; the structure and dynamics of young lunar thrust faults; the dynamics and origin of a young lunar debris avalanche; details of lunar regolith formation; and identification of potential samples to help define the history of the lunar magnetic field.

During 1973, Dr. Schmitt and the Apollo 17 crew toured the United States and many

parts of the world, sharing their experiences with thousands. In February 1973, Schmitt assumed additional duties as Chief of Scientist-Astronauts, assisting in the definition of crew responsibilities for space operations during future Space Shuttle missions. In July of 1973, Dr. Schmitt was appointed as one of the first Sherman Fairchild Distinguished Scholars at the California Institute of Technology. His appointment was extended to run through July 1975. This appointment ran concurrently with his other activities at NASA.

Dr. Schmitt was appointed NASA Assistant Administrator for Energy Programs in January 1974. This office had the responsibility for coordinating NASA support to other Federal Agencies conducting energy research and development and for managing NASA programs applying aeronautics and space technology to the generation, transmission, storage, conservation, utilization and management of energy for terrestrial applications.

In 1975, after 2 years managing NASA's Energy Program Office, Schmitt fulfilled a long-standing personal commitment to public service by entering politics. Elected in 1976, he served a 6-year term in the United States Senate beginning in 1977. Senator Schmitt, the only "natural scientist" in the Senate since Thomas Jefferson was Vice-President of the United States and President of the Senate. Senator Schmitt worked as a member of the Senate Commerce, Banking, Appropriations, and Intelligence Committees, and as Vice-Chairman of the Senate Ethics Committee. In his last 2 years in the Senate, Schmitt held the position of chairman of the Commerce Subcommittee on Science, Technology, and Space and of the Appropriations Subcommittee on Labor, Health and Human Services, and Education. He was active legislatively on policy issues related to strategic defense, military air transport, intelligence, immigration, energy, communications, space and science, patents, ethics, and the Panama Canal Treaty.

After leaving the Senate, Schmitt served on the President Ronald Reagan's Foreign Intelligence Advisory Board, the President George H. W. Bush's Commission on Ethics Law Reform, the Army Science Board, Advisory Board of the Smithsonian Air and Space Museum, as co-chairman of the International Observer Group for the 1992 Romanian elections, and as vice chairman of the U.S. delegation to the 1992 World Administrative Radio Conference in Spain. Schmitt also has served as a member of the Energy Department's Laboratory Operations Board. He was co-chair of NASA's Human Planetary Landing Systems Capabilities Road-mapping effort from 2004 to 2005. Since 2008, Schmitt has authored of numerous essays on public policy that can be accessed at <http://americasuncommonsense.com/blog/>.

Harrison Schmitt became chairman of the NASA Advisory Council in November 2005 and served until October 2008. He led the Council's deliberations on issues related to Aeronautics, Audit and Finance, Biomedicine, Exploration (human flight systems development), Human Capital, Science and Space Operations. He also instigated the Council's 2007 Workshop on Science Associated with the Lunar Exploration Architecture of NASA's Constellation Program.

Schmitt became a consultant to the Fusion Technology Institute at the University of Wisconsin in 1986, advising on the economic geology of lunar resources and the

engineering, operational, and financial aspects of returning to the Moon. He remains an Associate Fellow of Engineering at the University of Wisconsin - Madison, having taught "Resources from Space" from 1996-2004. He also has served on the staff of the Institute for Human and Machine Cognition of Pensacola, Florida. Related to his work at Wisconsin, Schmitt is the author of "Return to the Moon" (Springer-Praxis, 2006) that describes a private enterprise approach to providing lunar Helium-3 fusion energy resources for use on Earth.

Schmitt's became a Director of Orbital Sciences Corporation in 1983, serving as Lead Director in 2014 before that company's merger with the ATK Corporation. He is chairman of the Governance Committee of the merged company, Orbital ATK Corporation. Schmitt has served as a director of several public, private and non-profit corporations in the fields of mining, medical research and technology, banking, and laser systems. As a retired Director, he continues as an emeritus member of the Corporation of the Charles Stark Draper Laboratory. He also is a member of Southern Methodist University's Maguire Energy Institute's Board of Advisors.

Dr. Schmitt continues to consult, speak, and write on policy issues of the future; the science of the Moon and planets; and the history of space flight and geology, space exploration, space law, climate change and the American Southwest. In particular, he participates in research activities requiring geologic, petrographic, and stratigraphic synthesis of observations, photographs and samples returned from the Moon by Apollo missions and subsequent orbital remote sensing missions. He publishes regularly on lunar and planetary science research and aerospace and defense issues.

ORGANIZATIONS: The Geological Society of America (Honorary Fellow); The American Geophysical Union (Fellow); The American Association for the Advancement of Science (Fellow); The American Institute of Aeronautics and Astronautics (Fellow); Sigma XI; American Association of Petroleum Geologists (Fellow); The American Institute of Mining, Metallurgical and Petroleum Engineers (Honorary Member); New Mexico Geological Society (Honorary Member); The American Astronautical Society.

SPECIAL HONORS: Fulbright Fellowship in Norway (1957 to 1958); Kennecott Fellowship in Geology at Harvard University (1958 to 1959); Harvard Fellowship (1959 to 1969); Parker Traveling Fellowship at Harvard University (1961 to 1962); National Science Foundation Postdoctoral Fellowship, Department of Geological Sciences, Harvard University, (1963 to 1964); Johnson Space Center Superior Achievement Award (1970); NASA Distinguished Service Medal (1973); Fairchild Fellow, Caltech (1973 to 1974); California Institute of Technology, Distinguished Graduate (1973); Honorary Fellow of the Geological Society of America (1973); Arthur S. Fleming Award (1973); Republic of Senegal's National Order of the Lion (1973); Honorary Life Membership of New Mexico Geological Society (1973); Honorary Member of Norwegian Geographical Society (1973); Honorary Fellow American Institute of Mining, Metallurgical and Petroleum Engineers (1973); Honorary Fellow of The Geological Society, London (1974); International Space Hall of Fame (1977); Fellow American Institute of Aeronautics and Astronautics (1977); Engineer of the Year Award, National Society of

Professional Engineers, Legislative Recognition Award (1981); National Security Award, highest Civil Defense Award (1981); Nine Honorary Doctorates from United States and Canadian Universities; NASA Distinguished Public Service Medal (1982); Lovelace Award, Society of NASA Flight Surgeons (1989); G.K. Gilbert Award, Planetary Geology Division, Geological Society of America (1989); Award for Excellence, Presbyterian Healthcare Foundation (1990); Aviation Week Legend Award (2002); American Association of State Geologists Pick and Gavel Award (2008).. In recognition of past service, the U.S. Department of State in July 2003 established the Harrison H. Schmitt Leadership Award for U.S. Fulbright Fellowship awardees. He also traveled in Europe in 2009 as a speaker and specialist for the State Department. In 2007, Schmitt was awarded the first Eugene M. Shoemaker Memorial Award by Arizona State University and became the first recipient of the National Space Society's Gerard K. O'Neill Memorial Space Settlement Award. He has been awarded the 2010 inaugural Columbia Medal by the Aerospace Division of the American Society of Civil Engineers; the 2011 American Geological Institute's Medal in Memory of Ian Campbell for Superlative Service to the Geosciences; and the 2015 Lief Ericson Exploration Award by the Islandic Exploration Museum.

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