

Presidential Profile:

Frederick Dowswell Smith

John N. Howard

F. Dow Smith, an American physicist by way of Canada, made a name for himself as one of the lead developers of spy satellite technology during the height of the Cold War between the United States and the Soviet Union.



F. Dow Smith

Courtesy of OSA

Frederick Dowswell (F. Dow) Smith was born in Winnipeg, Manitoba, Canada, on 2 Jan 1921. He graduated from Vaughan Road Collegiate Institute in 1939. He served six years in the Royal Canadian Air Force as an airplane mechanic during World War II. After his mili-



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tary service, he completed his bachelor's degree in 1947 and his master's degree in physics in 1948 at Queens University in Kingston, Ontario.

I recall that Smith attended a colloquium by Edwin Land on polarized light when he was in college. Smith said that his mind was “nearly blown away” at seeing Land use page-sized sheets of Polaroid film instead of the typical tiny crystals of calcite or Iceland spar to obtain polarized light. That lecture inspired Smith to specialize in optics for his graduate study; he chose the Institute of Optics at the University of Rochester, U.S.A., for his doctoral degree. His research advisor was A. Francis Turner, OSA's 1968 President.

Smith was an assistant in optics at the University of Rochester from 1948 to 1951, and then he joined Boston University's (BU) physical research laboratory (PRL) in 1951. His research specialty at BU was optical image evaluation. He held appointments as assistant and associate professor from 1952 to 1955, and he served as chairman of the physics department from 1953 to 1958.

Duncan Macdonald, one of Smith's colleagues and a dean and former head of the physics department at BU, obtained substantial funding from the U.S. Air Force in 1946 (with additional support from the intelligence community) to produce a high-resolution aerial camera with a 40-ft. focal length and a 40-in. lens in clear focus throughout its surface.

This camera was to be used for secret surveillance of the Soviet Union to locate missile silos that might be aimed at the United States. The camera was mounted on a U2 spy plane and could record detailed images from an altitude of 65,000 feet. The U2 escaped Soviet countermeasures until it was shot down over Ukraine in 1960—the day before Khrushchev and Eisenhower were to hold a summit.

As a result of this program, PRL became so large that in 1951 the University bought a separate building to house it. BU split the efforts between two groups: the physics department, headed by Smith, and PRL, headed by Macdonald. Members of PRL taught courses in the physics department without a departmental appointment or salary, and the physics department—which at that time also taught astronomy—made use of adjunct faculty as well. PRL also influenced the composition of the physics department since its mission was to develop surveillance cameras for the U.S. government, and thus, most of its physicists specialized in optics.

In 1961, Macdonald became involved in the formation of Itek Corporation, a commercial research laboratory in Bedford, Mass. Smith and several others at PRL left BU and joined Itek, where Smith was named technical director. The immediate research goal at Itek was to design a camera system for the then top-secret Corona program, which was pushed forward following the U2 spy plane shoot-down.

Corona was funded by the U.S. Central Intelligence Agency and Air Force and led to the creation of the first U.S. spy satellite. Corona revolutionized U.S.

intelligence-gathering at a time when estimates of Soviet and Chinese military capabilities ranged widely and were unreliable. It consisted of a series of satellites that began collecting photographic surveillance in June 1959 until May 1972. During this time span, 144 Corona satellites were launched, of which 102 returned useable images.

In its maiden orbit, the Corona program's first satellite yielded more images of the Soviet Union in one day than the number collected during the entire U2 spy plane program, which had been the United States' primary information gatherer on its Cold War adversary. The photos revealed that there was no disparity between the number and strength of nuclear weapons in the Soviet Union and United States (i.e., "missile gap"), as many in Washington had feared.

At Itek, Smith's research also expanded into areas such as the optics

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of the human eye, the properties of optical films, ophthalmic optics and the formation of images in precision optical systems. In 1980, he was named president of the New England College of Optometry, a post he held until his retirement in 1986. Smith served on the National Research Council Vision

Committee in 1957, and he was named chair in 1978. He was a Fellow of the American Association for the Advancement of Science, the American Academy of Optometry and OSA.

Smith was very active in the International Commission for Optics (ICO) and OSA. In ICO, he served as treasurer and vice president from 1975 until 1981. He held many titles with OSA, including treasurer, member of the committee that purchased a new building for the Society in Washington, D.C., and president in 1974. In 1994, Smith was awarded the OSA Distinguished Service Award in recognition of his outstanding service to the Society. Smith died on 22 May 2002 from complications of a stroke at his home in Rumney, N.H. He was 81. ▲

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