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## **In Memoriam**

Alexander H. Flax  
*Director, National Reconnaissance Office*  
*(18 January 1921–30 June 2014)*

*By Patrick Widlake and Courtney Homer*



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## In Memoriam

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### Alexander H. Flax

*Director, National Reconnaissance Office  
(18 January 1921 – 30 June 2014)*

Dr. Alexander H. Flax was a brilliant engineer, scientist, and innovator, who as the fourth Director of the National Reconnaissance Office (DNRO) from 1 October 1965 to 17 March 1969, approved the United States' last film-return system for development and deployment and laid the groundwork for the country's late Cold War-era satellite architectures. His leadership put the NRO on a path toward greater integration and collaboration and helped establish a lasting organizational foundation from which the NRO could evolve to meet the most difficult intelligence challenges. Flax was instrumental in bringing the NRO's second generation of reconnaissance satellite imaging systems into operation: the Hexagon (KH-9) and Gambit-3 (KH-8) film-return satellites. Both played pivotal roles in U.S. intelligence collection during the Cold War. He advocated significant growth in National Reconnaissance Program (NRP) funding and personnel. Under Flax's direction, the NRO developed a signals intelligence (Sigint) satellite architecture that increased dwell time and persistence over collection targets and initiated preliminary research and development on near-real-time imagery systems, paving the way for the NRO's electro-optical satellite capability that remained unmatched by U.S. adversaries for years. With all this, Flax's most important accomplishment as director in the NRO's early years was arguably his leadership in building consensus, collaboration, and trust among sometimes antagonistic, competing organizations in the Department of Defense (DoD) and Central Intelligence Agency (CIA), both of whom sought increased control over the direction of and funding for satellite reconnaissance programs. Dr. Flax died 30 June 2014 at the age of 93.



**Alexander H. Flax**

When Flax became the DNRO on 1 October 1965, concurrent with his tenure as the Assistant Secretary of the Air Force for Research and Development (1963 – 1969), he inherited an organization still grappling with how best to develop and manage the new national reconnaissance capability. The NRO had been established on a covert basis on 6 September 1961—its existence would remain classified until 1992—with a “hybrid” organizational structure bridging DoD and CIA organizational elements. Finding optimal management policies governing this unique arrangement proved elusive, as evidenced by

the three different NRO charters produced in the first 18 months of the organization's existence. Flax assumed directorship amidst the backdrop of a contentious relationship that had developed between the constituent programs and organizations. To ameliorate this situation, then Deputy Secretary of Defense (SecDef) Cyrus Vance and Director of Central Intelligence (DCI) William F. Raborn had signed a memorandum of agreement on 11 August 1965—the fourth NRO Charter—that created a three-member NRP Executive Committee (ExCom) to allocate resources more effectively. Comprised of the Deputy SecDef, the DCI, and the President's Special Assistant for Science and Technology, the ExCom provided ready access to key decision-makers that facilitated streamlined program approval and oversight, and swift, definitive resolution of problems. The 1965 agreement proved satisfactory enough to all parties that it remained largely in effect until the first decade of the 21<sup>st</sup> century. With that structure in place, Flax set about fostering more constructive communication among the program offices, parent organizations, and mission partners, in an effort to exploit emerging technologies and produce vastly improved national reconnaissance collection systems.

One of the first major system proposals Flax had to review upon arriving at the NRO was for a new, improved general search and surveillance satellite system to replace the reliable, but aging Corona (KH-4) photoreconnaissance satellite system. What became the Hexagon (KH-9) satellite system was in the system definition phase, with three competing camera designs and disagreement over operational requirements between the CIA and U.S. Air Force program offices vying to oversee the program. Flax eventually redirected the competition between the program offices and their respective contractors through a compromise on the management structure that assigned CIA responsibility for the sensor subsystem and the Air Force responsibility for the rest of the satellite basic assembly and overall system integration. The NRO went on to launch and operate 19 successful Hexagon missions, providing incalculable national security benefit.

Flax's technical expertise influenced NRO program development, and during his tenure, the organization established satellite architectures and system configurations that guided NRO satellite constellation planning and production for years afterward. He cancelled less-effective, low-earth-orbit Sigint systems in favor of higher-orbit systems with longer dwell times, in the process expanding the NRO's Sigint program from 5% to 30% of the overall NRP budget. Flax also recognized the value in pursuing near-real-time imagery and the potential for a revolutionary technological breakthrough. Under his direction, the NRO developed coherent architectures for multiple Sigint programs and began preliminary studies for the next-generation imagery satellites. Whenever asked to list his greatest accomplishments, Flax always included the growth in the Sigint program portfolio and the progress toward conceptualizing a near-real-time imaging capability.

Perhaps the highest national security priority during Flax's time as DNRO was obtaining intelligence on the Soviet Union's weapons systems and reconnaissance capabilities. President Lyndon Johnson demanded 24-hour-a-day coverage of Sary Shagan, a Soviet anti-ballistic missile test range in Kazakhstan. Although somewhat skeptical of Soviet advancements and capabilities, Flax evaluated several options to fill the Sary Shagan

requirement, eventually deciding to collaborate with the National Security Agency (NSA), an organization looking to stake its own claim within the emerging field of national reconnaissance. The NSA sought greater control over this critical mission, asserting its authority as the organization with responsibility for Sigint operations, while the NRO maintained it had responsibility for satellite systems and operations, whether Sigint or otherwise. Through Flax's determined efforts, the NRO and NSA forged a partnership, in which, in his view, both organizations were responsible for the function that they were best suited to perform.

Flax's career prior to and concurrent with his NRO experience included two Air Force positions that broadened his introduction to space and national reconnaissance programs and paved the way for a lifetime of championing cutting-edge technology. Flax served as the Chief Scientist of the Air Force from 1959 to 1961, a position in which he succeeded his friend and colleague, Joseph Charyk, who, along with Richard Bissell of the CIA, became the first co-director of the NRO. Flax and Charyk had met years earlier and worked closely together in 1958 on a six-week Air Force summer study of space, part of which involved the groundbreaking Weapons System-117L (WS-117L) program, the forerunner of Corona and other future satellite programs. When Charyk accepted the position of Assistant Secretary of the Air Force for Research and Development in 1959, he recommended Flax to be his replacement. While chief scientist, Flax first became aware of the Corona mission, though further, more substantive involvement with U.S. national reconnaissance came after Flax served as Vice President and Technical Director for the Cornell Aeronautical Laboratory from 1961 to 1963, and in another Air Force position.

Flax's second high-level Air Force appointment was to Assistant Secretary for the Air Force for Research and Development, to which he was sworn in on 8 July 1963. He would serve in that position until 1969, for more than three years concurrently with his DNRO role. As assistant secretary, Flax advocated for advanced aircraft engine development that he argued was essential for military and civilian aeronautics. He backed the Lightweight Engine Gas Generator Program and Advanced Turbine Engine Gas Generator Program, with both reaching fruition the following decade. Supported by his experience in the development of fiberglass helicopter blades, Flax became a champion in the new field of fiber composite materials. Flax also supported programs developing precision-guided weapons and designing the necessary corresponding aircraft targeting systems and sensors.

Still only mid-way through his career in 1969, Flax left the NRO and became President of the Institute for Defense Analyses (IDA). He remained in that capacity for 14 years, among other things overseeing development of analytical and computer models to evaluate strategic nuclear and conventional forces as well as innovating and improving operational test methodology and instrumentation for air-ground combat. In 1967, Flax's peers elected him a member of the National Academy of Engineering (NAE). When Flax retired from IDA in 1982, he remained active in the NAE, working part time as home secretary until 1992. Flax also served on a variety of boards, most notably as a member and senior consultant on the Defense Science Board from 1970 to 1994 and on the advisory board

of the Defense Intelligence Agency from 1970 to 1995. He later joined the Washington Advisory Group as a partner and retired in 2002.

Alexander Henry Flax was born in Brooklyn, New York on January 18, 1921. He was a bright, industrious child, who knew by age 11 that he wanted to be an engineer. At age 16, Flax graduated from high school and began studying Aeronautical Engineering at New York University (NYU). He graduated with his Bachelor's degree in 1940 and secured a position as a Structural and Vibration engineer with the Curtiss-Wright Corporation. In 1944, Flax joined the Piasecki Helicopter Corporation as the Chief of Aerodynamics and Structure, and in 1946, at the age of 25, Flax left Piasecki and transitioned to the new Cornell Aeronautical Lab for his first assignment there as Assistant head of the Aeromechanics Department. The lab promoted him to head of the Aerodynamics Research department in 1949, the same year Flax received the Lawrence Sperry Award of the Institute of Aerospace Sciences for his contribution to the advancement of aeronautics. Further promotion to Assistant Director for technical affairs followed in 1955. From 1956 to 1958, Flax pursued a Ph.D. in physics, attending classes at night and on weekends at the nearby University of Buffalo, writing his thesis in 1957, and graduating in 1958.

Flax's numerous awards and honors included the Air Force Exceptional Civilian Service Award in 1961 and 1969, the NASA Distinguished Service Medal in 1968, the Civilian Service Medal from the Defense Intelligence Agency in 1974, and the Elder Statesmen Award from the National Aeronautics Association in 1992. Remaining active through retirement, Flax continued to be involved in intelligence events and retained his sharp wit and memory to the end of his life. Although his presence in the intelligence and aerospace worlds will be missed, his legacy will not be forgotten. Leading the NRO at a turbulent and pivotal time, Flax proved to have a near-optimal combination of technical expertise, managerial acumen, and easy-going personality to mitigate the challenges and be successful. In addition to being remembered as a brilliant and dedicated engineer, Alexander Flax will forever be known as a leader who helped forge a new level of cooperation and integration at the NRO that allowed it to evolve technically and organizationally to meet the national security challenges of the Cold War and beyond.

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