BERNARD A. SCHRIEVER
1910–2005
Elected in 1967

“Ballistic missile development.”

BY GERRY DOYLE AND MICHAEL YARYMOVYCH

Like several notable Americans of the 20th century, BERNARD ADOLPH SCHRIEVER was an immigrant. He was born September 10, 1910, in Bremen, Germany, and came to live in the United States in 1917 after his father—a ship’s engineer on a German merchantman—was interned in New York in 1916.

The Schriever parents both had family connections in the United States, and when Mrs. Schriever and their sons Bernard (Bennie), the elder by about 2 years, and Gerhard (Gerry) managed to escape Europe to join her husband, the family moved to New Braunfels, Texas, where they had friends. Released from internment, Schriever père found work as an engineer, but died before the end of World War I in an industrial accident in nearby San Antonio. The nadir of the Schriever boys’ childhood came when their mother was forced to temporarily place them in an orphanage while she worked to support herself and establish a family home as a widow.

Bernard attended high school in San Antonio and in 1927 entered the Agricultural and Mechanical College of Texas (now known as Texas A&M University). He graduated in 1931 with a BS degree in engineering.

At graduation he faced an unusual career choice. On one hand, as an undergraduate he had shown exceptional talent as a golfer and was offered a position at a local course as
the golf professional, with a respectable salary. On the other hand, he had attended a military college: the Agricultural and Mechanical College was all-male and all who were medically fit were enrolled in the Reserve Officer Training Corps program. He had thus been in uniform throughout his undergraduate studies. He was not obligated to proceed into the Army, but he chose to do so, and was commissioned into the Army Reserve as a second lieutenant in the artillery.

San Antonio was then the home of US Army Aviation and Schriever applied to transfer to the Army Air Corps. He took flight training (1932–33) and then moved to March Field in Riverside, California, to join the 9th Bombardment Squadron. There he made an acquaintance who would have a significant influence on his future: Lieutenant Colonel (later General of the Army and of the Air Force) Henry “Hap” Arnold. Hap Arnold had been a career soldier since before World War I and had been one of the first US Army officers to learn to fly. He had risen to be assistant director of the Office of Military Aeronautics, with responsibility for overseeing the buildup of the US aircraft industry to support the military effort. By 1931 he was commanding officer at March Field.

Arnold and Schriever were both technical visionaries. Later in their careers, they were convinced of the close connection between the practical aspects of air and space power and the state of technological progress. Arnold’s remark to Schriever in 1946—that World War I was won by brawn, World War II by logistics, and World War III would be won by brains—summarized the growing connection the two men made between military aviation and its reliance on the “high technology” of the day.

Schriever gained a reserve appointment in the Panama Canal Zone, where he became acquainted with Dora Devol Brett, daughter of the Air Corps commander for the zone. When they became engaged, Schriever had to accept that a reserve lieutenant’s position was too tenuous to support a wife and family. He left active service with the reserves and took up employment with Northwest Airlines in Seattle as a copilot.
In 1938 Hap Arnold, by now a brigadier general, visited Seattle, partly to confer with the president of Boeing Aircraft but also, over a game of golf, to invite Schriever to apply for a regular commission in the Air Corps in the forthcoming competitive exam.

Schriever returned to duty as a bomber pilot, but soon transferred to test-flying duty at Wright Field in Dayton, Ohio. It provided him with an opportunity not only to broaden his flying experience as a test pilot but also to enter the Air Corps Engineering School for its one-year course in general aeronautical engineering, which he did in July 1940. He was then selected to undertake a master’s degree in aeronautical engineering.

He entered Stanford University in September 1941 and was studying there when the Japanese attack on Pearl Harbor on December 7, 1941, brought the United States into World War II. Despite his expectation that he would be recalled to active duty immediately, he was ordered not to proceed until he had completed his studies; consequently, it was June 1942 before he left for Australia and wartime assignments, first with the 19th Bombardment Group and then at the headquarters of the Army Air Services, Southwest Pacific Area, the maintenance and engineering headquarters for the region.

For the duration of the war Schriever combined the role of combat pilot with that of maintenance officer, capitalizing on the training he had received at the engineering school. He flew combat missions regularly in B-17 bombers with the 19th Bombardment Group, and then rose in rank and responsibility in the Headquarters Far East Air Service Command. At the end of the war he was commander of the Advanced Headquarters of that command on Okinawa. He remained in service in the Pacific Theatre until after the Japanese surrender, returning to the United States in September 1945 as a full colonel in the US Army Air Forces. He had flown 38 combat missions and received a Distinguished Service Medal, Legion of Merit Award, and Purple Heart. His erstwhile patron had also advanced. Hap Arnold was now a general and chief of
Army Air Forces, and Schriever’s first appointment after the war was at headquarters, Army Air Forces in the Pentagon.

By 1944 Arnold was convinced of two things: the war would soon be over, with America among the victorious allies, and the development and exploitation of military aviation would depend on close cooperation with civilian scientists on topics of research interest.

He discussed a way ahead on the latter challenge with the physicist and engineer Theodore von Kármán in a conversation that took place at New York’s LaGuardia airport early in August 1944. Arnold proposed to von Kármán that he lead an investigation into the technical steps required to ensure US air supremacy into the future. This was to be a far-reaching study, with little regarded as off-limits. Arnold wanted the scientists assembled at the Pentagon to “forget the past; regard the equipment now available only as the basis for the boldest predictions....” Forced for four years to think in incremental terms, he now sought the best people in the scientific community to spur air power technology far beyond present limitations.

This opened up the opportunity for Schriever to become involved in the follow-on to the program. He arrived in Washington in December 1945, just in time to witness and participate in three initiatives championed by Arnold: the establishment of the Scientific Advisory Board (SAB), for which Schriever assumed responsibilities as scientific liaison officer; the creation of links with Project RAND, an Arnold endeavor to develop scientific capability (in 1948 it became the RAND Corporation); and involvement with the work of the DoD Joint Research and Development Board (JRDB).

The first task assigned to the Project RAND team was a study of the potential of Earth-orbiting satellites, and through his involvement with this early work Schriever learned about the military potential of spaceflight. He also had to reconcile these responsibilities with the JRDB activities. His duties involved preparing briefing material for the board members, and a significant Schriever initiative from this period was the introduction of development planning objectives (DPOs),
which sought to match military requirements with R&D activity. Schriever became a strong proponent of the efficacy of “technology push,” an approach that allowed free rein to technological R&D as the means for solving complex operational needs.

In 1949 he was selected to attend the National War College (NWC). When he returned to HQ USAF the following year, he found that the USAF had created the Air Research and Development Command (ARDC), in an attempt to separate R&D activity from the procurement and support of combat equipment.

Upon graduation from the NWC, Schriever’s new appointment was as assistant for development planning on the Air Staff. His responsibility was to try to move weapons development planning forward to incorporate technologies not in service. Once again, his precise duties were loosely defined—he described them as “ad-hockery.” He rose in the Development Planning Office from assistant for evaluation to assistant for development planning to office director. But his days of “ad-hockery” were coming to an end, as technological developments in atomic weapons were about to force a period of massive reequipment for the US armed forces.

After the initial breakthrough in developing atomic weapons during World War II, the United States had to contemplate other countries doing likewise. The Soviet Union duly achieved nuclear parity in 1949. At that point, both countries could only usefully deliver such weapons by air, as bombs dropped from aircraft; the yield of early fission weapons was still sufficiently limited that they required relatively accurate delivery, which at that time could be achieved only by aiming them from an aircraft near the target. The potential of missiles as a delivery system had obvious advantages from the standpoint of speed and reduced vulnerability, but limits on the accuracy of missiles meant they were impractical. Solving this conundrum would require either more accurate missiles or more powerful nuclear warheads.

Under the direction of John von Neumann, an SAB subcommittee confirmed the feasibility of a thermonuclear-tipped
intercontinental ballistic missile (ICBM), and the USAF reasessed priorities and established an organization specifically to deliver an operational version.

Schriever thus became the first (and only) commander of the Western Development Division (WDD), a component of ARDC established in Inglewood, California, on July 1, 1954. He directed the WDD with the prime aim of delivering an operational ICBM as quickly as possible. The resulting weapon system, known as the Atlas, achieved operational status in September 1959.

Schriever accomplished this by developing a variety of program management techniques, collectively known as “concurrency.” Concurrency circumvented the limitations of sequential development, where one component of a complex system was developed essentially to completion before the next stage was commenced. During the five-year development of Atlas, Schriever coordinated the design, testing, and production of the complete missile airframe and propulsion system, its integration with the warhead, the construction of infrastructure at the operational bases for the missile, and the training of personnel to operate it. He also had to cope with shifting budget priorities and changing perceptions of American preparedness compared to that of the Soviet Union, particularly after the Soviets’ 1957 launch of Sputnik 1, the first artificial Earth-orbiting satellite.

It was during this period that Schriever also became directly involved in exploring the utility of military space systems. On February 15, 1956, responsibility for the USAF satellite program, previously vested in the Wright Air Development Center at Wright-Patterson AFB in Dayton, Ohio, was transferred to WDD. The principal focus of this work was the launch of a reconnaissance satellite as soon as possible.

Presented to the public as a series of scientific satellites to characterize the upper atmosphere and perform other aspects of basic research, the Discoverer program traced its origins to the DPO for reconnaissance that Schriever had promoted while working at the Pentagon. When Discoverer at last achieved the most challenging part of its rather tortuous development—the
safe recovery of a capsule ejected by the orbiting reconnaissance system—the payload exposed to public view was a US flag that had been successfully launched and recovered. With some fanfare (as part of the public explanation of the mission), the flag was taken to the White House and presented to President Dwight Eisenhower.

In 1959, with Atlas entering service and with two more missile systems initiated by Schriever—Titan and Minuteman—in development, he was promoted to lieutenant general and given command of WDD’s parent organization, the Air Force Ballistic Missile Division. He initiated and led a major reorganization and was rewarded by his final promotion to the rank of four-star general to command one of its fruits, Air Force Systems Command (AFSC). After eight years of almost exclusive involvement in space and missile systems, he now took responsibility for the management of aircraft procurement for the USAF too. From 1961 to 1966, the bumpy path into service of the C-5A transport aircraft and F-111 multi-role fast-jet aircraft fell under his remit, even as he remained involved in space and missile systems development.

The USAF had for some time been lobbying and manoeuvring for a coherent military manned spaceflight program, and Schriever had been involved throughout. Early proposals for an overtly military manned spaceflight program, referred to variously as Military Man in Space (MMIS) and Man in Space Soonest (MISS), had come to naught. NASA still relied heavily on all the services for its Mercury, Gemini, and Apollo programs. Mercury capsules were launched atop Army Redstone and Air Force Atlas launchers, each derived from the equivalent missile. Gemini capsules similarly relied on Air Force Titan-derived launchers, and the four services supplied the bulk of the astronaut corps, most of whom were former military test pilots.

With Schriever commanding AFSC, three further attempts at a military manned spaceflight program were undertaken. First, the USAF proposed a series of military manned missions using Air Force–procured Gemini capsules (these were sometimes referred to as “Blue Gemini” missions). Next, the
USAF pursued an experimental single-seat recoverable prototype known alternately as the X-20 and the Dyna-Soar. X-20 would have been launched atop an Atlas booster and would have had unique (at the time) abilities to maneuver in orbit, but this too was cancelled before flight.

Finally, as a substitute for the cancelled X-20, the USAF was allowed to proceed with the Manned Orbiting Laboratory (MOL) program. This envisaged the launch of a large experimental module, sandwiched between a developed Titan booster and a Gemini capsule, carrying a crew of two Air Force astronauts. Capable of a 30-day mission, and providing a "shirt-sleeve" environment in which the astronauts could conduct a variety of experiments to determine the limits of human capability in orbit, this ambitious mission would have given the USAF a true long-endurance spaceflight capability.

Schriever was himself the project director in the last two years of his service career. But the program was bedevilled by conflicts between its research origins and an emerging National Reconnaissance Office requirement for an operational manned reconnaissance platform, and Schriever struggled to reconcile these conflicting demands.

He retired from the USAF in 1966, with the MOL still a program of record but hampered by cost overruns and development delays. The program continued with the selection of 17 astronauts, the development of facilities in Huntington Beach, design of the seven-segment Titan 3M program, and construction of the necessary launch facilities at Vandenberg AFB, the so-called SLIC 6. The MOL program was cancelled by President Nixon in 1969.

General Schriever’s retirement from Air Force service did not mark the end of his working life. He established a Washington-based consultancy firm and advised the Department of Transportation on the regulation of civil air transport, served on Nixon’s Presidential Advisory Council on Management Improvement in the early 1970s, was involved in Ronald Reagan’s election campaign and then his transition to the presidency, and, under President Reagan, served on various advisory bodies relating to foreign intelligence
and defense management as well as the Strategic Defense Initiative.

Schriever garnered a number of honors during his career. He received an honorary degree from Rider University in New Jersey in 1958, while still serving in the USAF, and an honorary doctorate from Utah State University in 1995. He was elected a member of the National Academy of Engineering in 1967 and an honorary fellow of the American Institute of Astronautics and Aeronautics in 1989, and inducted into the National Aviation Hall of Fame in 1980. He was selected for the Air Force Space and Missile Pioneers Award (1989) and a Lifetime Achievement Award from the Air Force Association (2003), and the USAF Academy at Colorado Springs endowed a chair in space systems engineering in his honor in 2005. He was honored three times by the Air University at Maxwell AFB, Alabama, in its Gathering of Eagles program. In 1998 Falcon AFB, Colorado, was renamed Schriever AFB—the first (and only, as of 2017) time that a USAF base has been named for a living serviceman, and Schriever had the unique experience of attending its dedication ceremony.

He maintained close links with his former USAF colleagues; “Schriever’s Old-Timers” met regularly, with support and encouragement from the senior leadership of the USAF. Its last formal gathering appears to have been its 15th anniversary reunion at Bolling AFB in Washington, April 23–27, 2003. Among those present to honor Schriever and his colleagues were the chair of the joint chiefs, the Air Force chief of staff, and the commanders of Air Force Space Command and Materiel Command and of US Strategic Command.

He died June 20, 2005, aged 94, and is interred at Arlington National Cemetery. His first marriage had ended at about the time he retired from the USAF; he remarried in 1997, to the popular singer Joni James. She survived him, as did the children of his first marriage, son Brett (Colorado Springs) and daughters Dodie Moeller (Stevensville, Maryland) and Barbara Allan (Washington); stepchildren Michelangelo Acquaviva (Joppa, Alabama) and Angela Mia Acquaviva (Melbourne, Florida); and 11 grandchildren.