WHILE SOME may believe that World War II marked the début of airplanes in battle, it was actually World War I that saw the initial use of aircraft in combat. And it was at Brooks Field in San Antonio—one of the country’s oldest airfields—where the possibilities of American military aviation first took off—along with the crucial research that later helped send American astronauts into space. Of the more than 60 buildings constructed at Brooks during its founding at the start of World War I, only Hangar 9 survives; it is the oldest aircraft hangar on any military base in the United States, and it was designated an ASCE Historic Civil Engineering Landmark in 1998.

While the United States did not enter World War I until April 1917, Congress had passed an appropriations bill for aeronautics in 1916, signaling a strong commitment by the nation to create a military aviation program, according to a Historic American Building Survey report on Brooks (HABS TX-3521).

Most of the country’s first flying fields were located in the South, prized for its sunny, warm weather. Brooks, situated on the southeast end of San Antonio, helped establish the city as the country’s first center for military aviation, along with nearby Kelly Field Annex (now known as Kelly Field) and, later, Randolph Air Field (now Randolph Air Force Base [AFB]).

The War Department selected an 873-acre tract of land and hired industrial architect Albert Kahn to design the site plan and buildings. Kahn designed most of the two dozen or so military flying fields built during World War I but was principally known for his legendary industrial architecture for the Ford Motor Co. in and around Detroit, including Ford’s massive River Rouge automobile plant.

One of Kahn’s first ideas was to change the orientation of Brooks Field. In the late 1910s and early 1920s, pilots flew by dead reckoning, charting their location by visual references to such terrestrial landmarks as roads, railways, and waterways. Thus, airfields were designed in a linear fashion. But Kahn “decided to make Brooks more distinctive, with a crescent shape,” says Rudy Purificato, the senior air force historian with the History Office of the Air Education and Training Command at Randolph AFB. The idea was that the curving form of the layout would be more visible from the air than a linear one.

Kahn’s industrial design was “characterized by the use of complex truss systems to span vast spaces, as well as the adaption of modular architecture to production processes,” according to an article on the website of Joint Base Langley–Eustis in Virginia, for which Kahn also designed structures. According to the description of the project on ASCE’s History and Heritage website (asce.org/project/brooks-afb-old-hangar-9), the hangars were built with “65-foot bolted wooden trusses of modified gambrel form and large sliding wooden doors that opened the full width of the building.” The hangars were meant to be temporary but were so well engineered that they lasted for decades. The hangars weren’t as large as the next

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generation of hangars, which were steel, but they were robust, and their speedy construction "laid the groundwork for fast-track construction methods, many of which are still used today," the site states.

The sides of the hangars were framed with stacked double-sash windows with exterior braces or buttresses, according to an article on the project on the website of the National Park Service (NPS) (nps.gov/articles/hangar-9-brooks-air-force-base.htm). The building looked like a cross between a schoolhouse and a barn.

Brooks was named for Cadet Sidney Johnson Brooks Jr., who died in a training accident. In all, 16 hangars were built there—Hangar 9 between December 1917 and January 1918. Each was large enough to house eight Curtiss JN-4 biplanes. Nicknamed the Jenny, the JN-4s were, according to the NPS, "the basic training plane for thousands of American pilots during World War I."

Learning to fly was a spirited and unpredictable affair in the 1920s. Flying instructors at Brooks were trained in the "Gosport System," a method developed by the Royal Air Force, by which "an instructor spoke to a student pilot through a tube and corrected the trainee in flight," according to Edward B. Alcott, in an article he authored for the Texas State Historical Association (The Handbook of Texas Online, June 12, 2010).

Pilots flew only during the day, in good weather, and away from clouds. Half the pilots who trained at Brooks during the 1920s washed out. According to LiveBrooks.com, a website dedicated to the community that has since been developed at the site of the base, the pilots gauged their speed for takeoff by chasing jack-rabbits through a field of grass. "When they reached the same speed as the rabbit," the site notes, "they knew they were going fast enough to pull the stick back to go airborne."

According to Aviation in the U.S. Army 1919–1939 (Washington, D.C., United States Air Force Historical Research Center, 1987), a book authored by air force historian Maurer, forced landings were a common and accepted fact of flying. Planes did damage when this happened—Maurer wrote of one farmer who asked for $25 when a plane crashed into his cotton patch, blowing out roughly 400 lb of cotton and a bushel of peas. But the farms, it turned out, damaged the planes, as well. Pilots had to make sure passersby didn’t carry off souvenirs from crashed planes. (Maurer wrote that folks did not even seem to understand the danger of a turning propeller.) Maurer relayed one remarkable anecdote in which a pilot named Robert Wimsatt made a forced landing near Fort Worth. He contacted the officer in
charge of flight operations at Brooks with this terse account: “Delayed due to cow eating wing. Home tomorrow.” Indeed, when Wimsatt returned to Brooks, his plane showed signs that “some unprincipled bovine with a low sense of humor and depraved appetite had eaten large hunks out of the lower wing panels and stabilizer.”

In the 1920s Brooks’s Primary Flying School graduated many fliers important to American aviation history, including future Air Force chief of staff Nathan F. Twining; Curtis LeMay, who conceptualized the strategic bombing of Japan in World War II; Jimmy Doolittle, who led the retaliatory air strike against Japan a few months after the attack on Pearl Harbor; and Claire Chennault, who led the American Flying Tigers, a squadron that flew on behalf of China in the early days of World War II. A young barnstormer named Charles Lindbergh trained at Brooks. And there were other pioneers, including instructors Elwood Quesada, who developed air combat tactics, and Russell Maughan, who made the first dawn-to-dusk transcontinental flight across the United States in a single day.

Even after the Army demobilized wartime airfields following the end of World War I, Brooks remained open for business. Between 1919 and 1922 it was the site of a balloon and airship school at which cadets studied aeronautics, meteorology, and artillery adjustments, according to the NPS. A series of explosions of hydrogen-lifted airships led to the closure of the school in 1922.

Between 1922 and 1931, the airfield became the country’s primary flight training center; more than 1,400 pilots were trained there. The base pioneered both the use of gauges to guide pilots (rather than just their visual lines of sight) and the use of parachutes. This “research” included strapping men to the wings of planes and having them jump off midflight to demonstrate that the parachutes worked. In fall 1929, Brooks hosted the first mass parachute drop in the United States. “The experiments at Brooks confirmed the practicability of tactical paratrooper warfare, which was used on many occasions during World War II,” wrote Alcott. (In an unfortunate irony, Purificato points out, the attending dignitaries who were most impressed that day were the Nazis.)

In 1931, the Army relocated primary training to nearby Randolph. But in 1941 an advanced flying school devoted to “single-engine aircraft aerial observation skills” was established at Brooks, according to Alcott, and a few years later, Brooks began training B-25 pilots. By 1947, the Air Force had been established as an independent military branch, and the base was formally renamed Brooks AFB. Flight groups continued training at the base until 1960.

But the real legacy of Brooks lies less in aviation itself and more in aviation-related medical research, and the foundation for that was laid right from the start. According to Maurer, by June 1921, 46 flight surgeons had graduated from Brooks and were assigned to air stations around the country. Their job was to prevent “loss of life and property through accidents attributable directly or indirectly to the physical condition of pilots.” This they did by physical examination and close personal observation of the fliers and by investigating airplane accidents from a medical point of view.

In 1926 the School of Aviation Medicine moved to Brooks from New York. The school continued to study the psychological and physical effects of flying, including, according to Maurer, “the effects of cold on respiration, circulation, and body temperature; the amount of oxygen needed for altitude flights; and lenses for goggles.

“One study probed the temporary deafness of [fliers] from aircraft engine noise,” he wrote. “Many [fliers] wore earplugs, but plugs of hard rubber, paraffin, or wax were unsanitary and hard to keep clean. Cotton left fibers in the ear canal, causing irritation.” The school’s recommendation? A woman’s powder puff was sewn into the ear flaps of every helmet.

The school was moved to Randolph in 1931 but returned to Brooks in 1959, reconstituted as the Air Force School of Aerospace Medicine and dedicated to consolidating “aerospace medical research, education, training, and a clinical facility at one location,” according to the NPS.

Brooks was essential in restoring American pride after the Soviets launched Sputnik 1 in 1957. This was almost a year before the National Aeronautics and Space Administration (NASA) was founded. Once NASA was established, the aerospace medical research facilities at Brooks remained the center of space-based research. According to the HABS report, Brooks pioneered research on the medical effects of “weightlessness, pressure, altitude, temperature, and acceleration,” as well as the space suits used in the Gemini and Apollo programs.

On November 21, 1963, John F. Kennedy traveled to Texas to dedicate four new buildings at the Air Force School.
of Aerospace Medicine. During his dedication speech—which is archived at the John F. Kennedy Presidential Library and Museum in Boston, among other places—the president declared that the country had “tossed its cap over the wall of space—and we have no choice but to follow it. Whatever the difficulties, they will be overcome; whatever the hazards, they must be guarded against.” His speech went on to praise the medical center as a place that would enable Americans to “climb this wall with safety and with speed—and we shall then explore the wonders on the other side.”

After the speech, Kennedy toured an ongoing experiment being conducted for NASA. A horizontal steel chamber, originally designed as a low-pressure chamber, had been renovated to serve as a prototypical “space cabin,” according to 50 Years of Aerospace Medicine, a book authored by Air Force chief historian Green Peyton (Air Force Systems Command Historical Publications Series No. 67-180, 1968). “Inside its stout walls,” Peyton wrote, “four young airmen were undergoing a month-long test in an atmosphere of almost pure oxygen, at a pressure equivalent to an altitude of more than 5.2 miles, comparable to the thin air on the upper slopes of Mount Everest.

“It was NASA’s plan to provide essentially the same cabin atmosphere for the [fliers] in Gemini and Apollo that had sustained the Mercury astronauts,” Peyton continued. “But the medical effects of breathing pure oxygen at this pressure, over periods of several weeks or longer, still were not fully known. Because the School had carried on similar studies for more than a decade, it had been asked by NASA to conduct these tests.” Kennedy reportedly spoke briefly with the young men, who were between the ages of 17 and 19. They were to be in the chamber for 30 days, and at that point still had 20 to go. Kennedy wished them good luck. The dedication was his last official act as president. Less than 24 hours later, he made his fateful trip to Dallas, where he was assassinated.

While all the hangars at Brooks had proved remarkably resilient over the years, by the 1960s, the wood structures had begun to rot, the result of Texas’s unforgivingly humid climate. The U.S. Air Force originally planned to save Hangar 11, but it was destroyed when a fire rampaged the base in 1967, says Purificato. So they restored Hangar 9 instead. “They had to do a lot of work to get it up to snuff,” says Purificato, but nothing was altered and nothing new was added. (In more recent years the hangar was renovated again.)

According to the Air Force Civil Engineer Center, Brooks was renamed Brooks City-Base in 2002, recommended for closure in 2005, and shut down in 2011. The base has since been redeveloped into a master-planned community run by a public–private partnership and is intended, according to its website, “to promote and develop a vibrant, sustainable community that serves as a catalyst for progressive economic development and regional prosperity.”

Purificato describes the base’s legacy as one of “innovation and cutting-edge aviation and aerospace technology. The base was ‘ground zero’ for many of the great advances in science in the history of the Air Force.” —T.R. Witcher

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