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This is a recreation of an Air Force *Magazine article. Photos have been changed for online presentation. Some data has been updated for accuracy.*

Gallery of Classics

Compiled by Jeffrey P. Rhodes

Key	
FF	First flight
FFL	First flight location
FFM	First flight model
FFP	First flight pilot
USAF	Air Force and all predecessors
Models/variants	Quantity production models and major variants

Left: P-12 fighters

Bombers

MB-2/NBS-1
A derivative of the first US-designed bomber, the Martin MB-1, the MB-2 featured a number of improvements. Twenty MB-2s were ordered in June 1920, and the type was rushed into production so that Brig. Gen. William L. "Billy" Mitchell could use the aircraft in the planned strategic bombing tests off the Virginia Capes. From July 13–21, 1921, General Mitchell's 1st Provisional Air Brigade, based at Langley Field, Va., sank three ships, including the captured German battleship *Ostfriesland,* and demonstrated the vulnerability of naval vessels to aerial attack. The Air Service then ordered another 110 aircraft, which were designated NBS-1 for "Night Bombing, Short-Range." Curtiss underbid Martin (which had included development costs in its bid of $23,485 per aircraft) and received a contract for 50 aircraft (although Curtiss lost money on the program), while L.W.F. Engineering and Aeromarine received contracts for 35 and 25 aircraft, respectively. Martin then provided its competitors with drawings, parts lists, templates, and even jigs, so all the aircraft were essentially identical. The type was retired in 1928.
(Specifications for MB-2.)
Contractors: 1. Glenn L. Martin Co. 2. L.W.F. Engineering Co. 3. Curtiss Aeroplane and Motor Co. 4. Aeromarine Plane and Motor Co.
Locations built: 1. Cleveland, Ohio. 2. College Point, N.Y. 3. Garden City, N.Y. 4. Keyport, N.J.
Number built (USAF): 130 (130).
FF: 1921.
FFM: MB-2.
FFL: Cleveland, Ohio.
FFP: Unconfirmed.
Models/variants: MB-2. NBS-1.
Powerplant: Two Packard Liberty 12A liquid-cooled V-12s of 420 hp each.
Wingspan: 74 ft 2 in.
Length: 42 ft 8 in.
Height: 15 ft $6^3/4$ in.
Weight: 13,695 lb gross.
Armament: Five .30-cal. Lewis machine guns in nose and amidships; 1,800 lb of bombs internally and up to 2,000 lb of bombs externally.
Accommodation: Four (pilot, copilot/navigator, bombardier/gunner, and rear gunner).
Cost: $17,490 (Curtiss).
Max. speed: 101 mph.
Range: 560 mi.
Ceiling: 8,500 ft.

B-10
The B-10 was the first all-metal monoplane bomber to be produced in quantity. It also introduced such innovations as a monocoque fuselage, variable-pitch propellers, retractable landing gear, enclosed cockpits, and a rotating gun turret. A company-developed design, the prototype was found to have some deficiencies when testing began at Wright Field, Ohio, in the spring of 1932. It was modified to meet the Army's recommendations, and the XB-907A returned to Wright Field where it reached a speed of 207 mph with a full bomb load, which was considerably faster than any biplane bomber and as fast as most of the pursuit ships of the day. The Air Corps then bought the prototype (and redesignated it XB-10) along with 14 YB-10 service test aircraft. A total of 103 B-

10B aircraft were built, and the type served in every AAC bomb group in the 1930s. Lt. Col. Henry H. "Hap" Arnold led a mass flight of B-10 crews from Washington, D.C., to Alaska for a six-week mapping mission that covered 18,000 miles. In 1935, B-10s were used to test the Norden bombsight. Thirty-two YB-12/B-12A were built, which were essentially the same as the B-10, except for different engines, extra fuel, and flotation chambers for overwater flying as part of the AAC's coastal defense mission. Export versions (192 Martin Model 139s) were sold to the Soviet Union, the Netherlands, China, Siam, Argentina, and Turkey. Most of the B-10s were still in service in 1940, although relegated to target-towing duties. Only one B-10 exists today, a Model 139 on display at the US Air Force Museum at Wright-Patterson AFB, Ohio.

(Specifications for B-10B.)

Contractor: Glenn L. Martin Co.
Location built: Baltimore, Md.
Number built (USAF): 155 (155).
FF: February or March 1932.
FFM: Company Model XB-907.
FFL: Baltimore, Md.
FFP: Likely William K. "Ken" Ebel.
Models/variants: B-10B.
Powerplant: Two Wright R-1820-33 Cyclone nine-cylinder radials of 775 hp each.
Wingspan: 70 ft 6 in.
Length: 44 ft 9 in.
Height: 15 ft 5 in.
Weight: 14,700 lb gross.
Armament: Three .30-cal. machine guns (one each in nose turret, aft cockpit, and ventral tunnel) and 2,260 lb of bombs internally.
Accommodation: Four (pilot and copilot/radio operator in separate cockpits, bombardier/gunner, and gunner).
Cost: $50,840.
Max. speed: 215 mph.
Range: 1,240 mi.
Ceiling: 24,200 ft.

B-17 Flying Fortress

The B-17 was the first truly modern heavy bomber and one of the most recognized airplanes ever built. It was the first four-engine bomber put into production for the Army Air Corps but gained its greatest fame for daylight strategic bombings over Europe. On August 20, 1935, the prototype was flown to Wright Field for its official tests, flying 2,100 miles nonstop in nine hours, but the prototype crashed on October 30, when a gust lock was inadvertently left on the elevators and the airplane went out of control on takeoff. The first airplanes were delivered to the 2d Bomb Group at Langley Field, Va., in 1937. In December 1941, Maj. Truman H. Landon led a flight of unarmed B-17s to reinforce Hawaii. The planes were nearly out of gas as they landed at Wheeler Field in the middle of the Japanese attack on Pearl Harbor. Subsequently, B-17 production ramped up quickly, and the aircraft was used in great numbers in every theater of the war. On January 27, 1943, Eighth Air Force B-17 crews made the first American air raid on Germany. The B-17G, the most produced version, featured additional guns in an attempt to prevent some of the heavy losses that had been inflicted on the earlier models. One of the more unusual modifications was the conversion of at least 25 war-weary B-17s into BQ-7 Aphrodite radio-controlled missiles, which were loaded with 12,000 lbs of high explosives and used against the German U-boat pens. B-17s were used by the Navy and the Army Air Forces for sea-air rescue. While the B-17 was essential to winning the war, the type was obsolete by 1945 and disappeared almost overnight, although a few remained in service for several years.

(Specifications for B-17G.)

Contractors: 1. Boeing Aircraft Co. 2. Douglas Aircraft Co. 3. Vega Aircraft Corp.
Locations built: 1. Seattle, Wash. 2. Long Beach, Calif. 3. Burbank, Calif.
Number built (USAF): 12,731 (12,487).
FF: July 28, 1935.
FFM: Company Model 299.
FFL: Seattle, Wash.
FF Crew: Leslie Tower and crew.
Models/variants: Y1B-17, B-17B, C, D, E, F, G, H. TB-17H (later redesignated SB-17G). QB-17L, N. DB-17G, P. YB-40. BQ-7. F-9A, B, C.
Powerplant: Four Wright R-1820-97 Cyclone nine-cylinder radials of 1,200 hp each with exhaust-driven supercharger.
Wingspan: 103 ft 9 in.
Length: 74 ft 4 in.
Height: 19 ft 1 in.
Weight: 65,500 lb gross.
Armament: 13 .50-cal. machine guns (two each in chin, dorsal, ball, and tail turrets, two in nose, two waist positions, and one in radio operator's position) and 6,000 lb of bombs internally.
Accommodation: Crew of 10 (pilot, copilot, bombardier, navigator, radio operator, and five gunners).
Cost: $238,329.
Max. speed: 287 mph.
Range: 2,000 mi.
Ceiling: 35,600 ft.

B-24 Liberator

More B-24 heavy bombers were built than any other American airplane in history. The B-24 was used in every theater in World War II, and it had greater range and could carry a much larger bomb load than the B-17, but it never had the notoriety of the Flying Fortress. Probably the most famous B-24 was named *Lady Be Good.* On April 4, 1943, returning from a bombing mission, it overshot its base at Soluch, Libya, and was not heard from again. In 1959, the wreckage was found by an oil exploration party 440 miles into the Libyan desert. On August 1, 1943, staging from Benghazi, Libya, 177 Ninth

Air Force B-24 crews dropped 311 tons of bombs from low level on the oil refineries at Ploesti, Romania, during Operation Tidal Wave. This was the first large-scale, minimum-altitude attack by Army Air Forces heavy bombers on a strongly defended target. Five officers (Lt. Col. Addison E. Baker, Col. Leon W. Johnson, Col. John R. Kane, Maj. John L. Jerstad, and 2d Lt. Lloyd H. Hughes) were awarded the Medal of Honor for this mission. More Air Force Medals of Honor were awarded for this mission than any other in the service's history. The B-24 was also used extensively by Britain. Almost 1,000 were used by the US Navy as PB4Ys. A total of 6,678 B-24Js were built, starting in August 1943. One C-87, the widely used cargo version of the Liberator, named *Guess Where II,* was intended to be the first Presidential aircraft, although there is no evidence that Franklin D. Roosevelt ever flew in it. B-24 operations were concentrated in the Pacific, and the first Liberators went into action on November 16, 1943, at Bougainville in the Solomon Islands. There were 6,000 operational B-24s in use by the end of 1944, equipping 45 groups. A year later, the type was declared surplus and hundreds were scrapped virtually overnight. The lone XB-24N was a single-tail test version. Approximately a dozen Liberators remain today.

(Specifications for B-24J.)

Contractors: 1. Consolidated Aircraft Co. 2. Douglas Aircraft Co. 3. Ford Motor Co. 4. North American Aviation, Inc.
Locations built: 1. San Diego, Calif., and Fort Worth, Tex. 2. Tulsa, Okla. 3. Willow Run, Mich. 4. Dallas, Tex.
Number built (USAF): 18,481 (approx 16,300).
FF: December 29, 1939.
FFM: XB-24.
FFL: San Diego, Calif.
FFP: Bill Wheatley.
Models/variants: B-24A, C, D, E, G, H, J, L, M. C-87, C-87A. C-109. F-7, F-7A, B. AT-22 (later redesignated TB-24D).
Powerplant: Four Pratt & Whitney R-1830-43 or -65 Twin Wasp 14-cylinder, twin-row radials of 1,200 hp each.
Wingspan: 110 ft 0 in.
Length: 67 ft 2 in.
Height: 18 ft 0 in.
Weight: 65,000 lb gross.
Armament: 10 .50-cal. machine guns—eight in four manned electric turrets (nose, dorsal, ball, and tail) and two single guns in the waist, plus 8,800 lb of bombs.
Accommodation: Crew of 10 normally (pilot, copilot, navigator, bombardier, radio operator/top gunner, plus five other gunners).
Cost: $366,000 (B-24D).
Max. speed: 290 mph.
Range: 2,100 mi.
Ceiling: 28,000 ft.

B-25 Mitchell

On January 25, 1939, the Army Air Corps announced a competition for a medium bomber design, but instead of waiting for the prototypes, the Army awarded production contracts to North American for the B-25 and Martin for the B-26. Named in honor of US airpower proponent Brig. Gen. William "Billy" Mitchell, the B-25 served in every theater of World War II and was made in larger quantities than any other American twin-engine combat airplane. The 17th Bomb Group at McChord Field, Wash., was the first unit to receive B-25s in 1941. On April 18, 1942, Lt. Col. James H. "Jimmy" Doolittle led the Doolittle Raid, in which 16 B-25B crews took off from the aircraft carrier USS *Hornet* (CV-8) and bombed Tokyo and other targets, the first time US aircraft had bombed Japan. The 75-mm cannon in the B-25G/H was used with mixed results, primarily against ships. Recoil from the cannon was 21 inches and momentarily stopped the plane in flight. The Marine Corps received 706 B-25Bs, Cs, and Ds, which were redesignated PBJ-1, and used for antisubmarine patrol duties. Mitchells were later relegated to support duties and did not see service in Korea. The last B-25s were used to train pilots assigned to fly bombers and tankers. Large numbers of B-25s were flown by the Soviet Union and Britain. It was also flown by the Netherlands, Taiwan, and Brazil. A number of surplus B-25s were used by civilian operators as aerial camera ships for Hollywood movies. On May 21, 1960, the last serving aircraft, a VB-25J staff transport, was retired from service at Eglin AFB, Fla.

(Specifications for B-25J.)

Contractor: North American Aviation, Inc.
Locations built: 1. Inglewood, Calif. 2. Kansas City, Mo.
Number built (USAF): 11,433 (9,816).
FF: January 1939.
FFM: NA-40.
FFL: Inglewood, Calif.
FFP: Paul Balfour.
Models/variants: B-25, B-25A, B, C, D, G, H, J. AT-24A, B, C, D (later redesignated TB-25D, G, C, J). F-10.
Powerplant: Two Wright R-2600-29 Cyclone 14-cylinder radials of 1,700 hp each.
Wingspan: 67 ft 7 in.
Length: 52 ft 11 in.
Height: 16 ft 4 in.
Weight: 35,000 lb gross.
Armament: 12 .50-cal. machine guns and 4,000 lb of bombs (Some H/J models were modified with a solid nose and an additional four to eight .50-cal. machine guns or two or four .50-cal. machine guns and a 75-mm M4 cannon).
Accommodation: Crew of six normally (pilot, copilot, bombardier, radio operator/top turret gunner, waist gunners, and tailgunner; some models required fewer people).
Cost: $96,000 (B-25B).
Max. speed: 272 mph.
Range: 1,350 mi.
Ceiling: 24,000 ft.

B-26 Marauder

The B-26 was ordered off the drawing board (no prototypes were built) at the same time as the B-25. With a troubled development history, it was called (among other things) the "Flying Prostitute"—with its high wing loading (51 lbs per square ft) and small wings, it was said to have had no visible means of support. Although most problems were caused by pilot unfamiliarity, there were some development problems. Eventually, the type's deficiencies were corrected and the B-26 went on to a stellar career. B-26 crews began flying combat missions in the South Pacific in the spring of 1942, but most of the aircraft were sent to England and the Mediterranean. The Marauder had the lowest loss rate of any Allied bomber, less than one-half of one percent. One B-26B, nicknamed *Flak Bait,* flew more missions in Europe (202) than any

other Allied airplane in World War II. A small number were used by the Navy as JM-1/-2 for target tug, reconnaissance, and utility duties. Most of the B-26s were retired by 1948. It was one of several American warplanes given its official nickname by the British. Production aircraft were ordered to Australia the day after Pearl Harbor was attacked to provide additional defense. The B-26 was the only Army bomber to drop torpedoes. Because of its reputation as a "widow-maker" early in its career, Lt. Col. Jimmy Doolittle was ordered to go to training airfields to personally demonstrate that the B-26 could stay aloft on one engine. Late in the war, Marauders were used to attack German rocket sites, airfields, and communications centers in France and the Low Countries. One airplane was modified in order to test the tandem landing gear arrangement for the Boeing B-47 after the war.

(Specifications for B-26B.)

Contractor: Glenn L. Martin Co.
Locations built: Middle River, Md., and Omaha, Neb.
Number built (USAF): 5,266 (4,440).
FF: November 25, 1940.
FFM: B-26.
FFL: Middle River, Md.
FFP: William K. "Ken" Ebel.
Models/variants: B-26, B-26A, B, C, F, G. AT-23A, B. TB-26B, C.
Powerplant: Two Pratt & Whitney R-2800-41 or -43 Double Wasp 18-cylinder, twin-row radials of 2,000 hp each.
Wingspan: 71 ft 0 in.
Length: 58 ft 3 in.
Height: 19 ft 10 in.
Weight: 38,200 lb gross.
Armament: 12 .50-cal. machine guns (two each in nose, dorsal turret, ventral, and tail positions; four package guns on fuselage sides) and 4,000 lb of bombs.
Accommodation: Crew of seven (pilot, copilot, bombardier, navigator, and turret, ventral, and tailgunners).
Cost: $227,000.
Max. speed: 317 mph.
Range: 1,150 mi.
Ceiling: 23,500 ft.

B-29 Superfortress

Designed as a replacement for the B-17 and B-24, the B-29 was considered the ultimate bomber of World War II. An extremely complex airplane, it introduced such concepts as pressurization and remotely controlled gun turrets, and its severe development troubles led to a delay in service introduction. In December 1943, the Air Force decided not to use the B-29 in Europe but to put its great range to use in the Pacific. The first B-29 unit, the 58th Bomb Wing (VH), was established in Marietta, Ga., on June 15, 1943. The first B-29 raid against Japan came on June 15, 1944. B-29s from the 509th Composite Group dropped the only nuclear weapons ever used in wartime. On August 6, 1945, the *Enola Gay,* piloted by Col. Paul W. Tibbets, dropped the "Little Boy" (uranium) bomb on Hiroshima. Three days later, *Bockscar,* commanded by Maj. Charles W. Sweeney, dropped the "Fat Man" (plutonium) bomb on Nagasaki. After the war, B-29s were modified as the first aerial tankers in quantity. The remaining B-29s were sent into combat during the Korean War. After World War II, B-29s were used as "mother ships" for several of the Air Force's and Navy's high-speed experimental aircraft, such as the X-1, X-2, and D-558. In the late 1940s, a significantly modified version of the B-29 was developed and was designated B-50. One of the B-50s, nicknamed *Lucky Lady II,* completed the first nonstop flight around the world. Eventually, 370 B-50s were built and served as late as 1964.

(Specifications for B-29.)

Contractors: 1. Boeing Aircraft Co. 2. Bell Aircraft Co. 3. Glenn L. Martin Co.
Locations built: 1. Wichita, Kan., and Renton, Wash. 2. Marietta, Ga. 3. Omaha, Neb.
Number built (USAF): 3,967 (3,967).
FF: September 21, 1942.
FFM: XB-29.
FFL: Seattle, Wash.
FF Crew: Edmund T. "Eddie" Allen and crew.
Models/variants: YB-29, B-29, B-29A, B, F. KB-29M, P. F-13.
Powerplant: Four Wright R-3350-23 Cyclone 18-cylinder twin-row radials of 2,200 hp each.
Wingspan: 141 ft 3 in.
Length: 99 ft 0 in.
Height: 29 ft 7 in.
Weight: 124,000 lb gross.
Armament: Usually eight (some with 10) .50-cal. machine guns in four remotely controlled turrets and two .50-cal. machine guns and one 20-mm cannon or two, three, or four .50-cal. machine guns in tail and up to 20,000 lb of bombs.
Accommodation: Crew of 10 (pilot, copilot, bombardier, navigator, flight engineer, radio operator, and four gunners).
Cost: $639,000.
Max. speed: 358 mph.
Range: 3,250 mi.
Ceiling: 31,850 ft.

B-36 Peacemaker

Designed in 1941 to bomb targets in Europe from North America when it seemed Britain might fall to Germany. Development was slowed by shortages of critical materials and the need to devote effort to wartime production. The XB-36, the largest aircraft in the world, did not fly until almost five years after the development contract was let. The prototypes used a large single-wheel main landing gear, but the wheel broke up concrete runways. The B-36, with its intercontinental range and ability to carry nuclear weapons (primarily the Mk. 17 hydrogen bomb), served as the US's airborne nuclear deterrent through the 1950s. The type entered service in 1948, was politically controversial, and was partially responsible for the "Revolt of the Admirals" in

1949. Three separate projects were tried to provide the B-36s with long-range fighter escort in the early 1950s. The XF-85 parasite fighter was designed to fit in the bomb bay (which was never actually accomplished), while the YRF-84 FICON (Fighter-Conveyor) used a nose-mounted hook to latch on to a trapeze. Project Tom-Tom used wingtip-mounted hookups to carry two RF-84Fs. Aerial refueling of fighters proved much more practical. The NB-36 was a specially modified test-bed that carried an operating nuclear reactor in an effort to develop an atomic-powered aircraft. The lone XC-99 was the transport version of the B-36, and the XB-60 was the sweptwing, jet-powered experimental version. The last B-36 was retired on February 12, 1959, leaving the Air Force with an all-jet bomber force. The last flight came on April 30, 1959, when a B-36J was flown to the US Air Force Museum at Wright-Patterson AFB, Ohio, where it is now on display.

(Specifications for B-36H.)

Contractor: Consolidated-Vultee Aircraft Corp. (Co-n-vair).
Location built: Fort Worth, Tex.
Number built (USAF): 385 (385).
FF: August 8, 1946.
FFM: XB-36.
FFL: Fort Worth, Tex.
FF Crew: Beryl A. Erickson and G.S. "Gus" Green.
Models/variants: B-36A, B, C, D, F, H, J. RB-36D, E, F, H.
Powerplant: Six Pratt & Whitney R-4360-53 Wasp Major four-row radials of 3,800 hp each in a pusher arrangement and four General Electric J47-GE-19 turbojets of 5,010 lb static thrust each.
Wingspan: 230 ft 0 in.
Length: 162 ft 1 in.
Height: 46 ft 8 in.
Weight: 410,000 lb gross.
Armament: 16 M24A1 20-mm cannon in eight remotely controlled nose, tail, and retractable fuselage turrets and 72,000 lb of nuclear and/or conventional bombs.
Accommodation: 16 (pilot, copilot, radar bombardier, navigator, two flight engineers, two radio operators, and three gunners in the forward pressurized compartment and five gunners in the aft pressurized compartment).
Cost: $1.4 billion for the entire program (R&D, prototypes, and production); approx $3.6 million per aircraft.
Max. speed: 411 mph.
Range: 8,800 mi.
Ceiling: 33,000 ft.

B-45 Tornado

The B-45 was the first American four-engine jet bomber to fly and the first Air Force jet bomber to go into production. However, the B-45's career was only moderately successful. The type entered service in 1948 with the 47th Bomb Group at Barksdale AFB, La. Three RB-45Cs were sent to Korea for an operational evaluation and were pressed into service with the 91st Strategic Reconnaissance Squadron, but the type's wartime experience was short. Originally designed as conventional bombers, 40 B-45s were extensively modified to carry nuclear weapons under the Backbreaker program, starting in 1950. Nuclear-capable aircraft reached the United Kingdom by May 1, 1952. On July 29, 1952, an RB-45C crew made the first nonstop transpacific flight by a multiengine jet bomber with the help of a KB-29 tanker. In flying the 3,640 miles from Alaska to Japan in nine hours, 50 minutes, the crew of Maj. Louis H. Carrington, Jr., Maj. Frederick W. Shook, and Capt. Wallace D. Yancey won the Mackay Trophy. In the 1950s, two aircraft were used in the development of jet engines (the JB-45A was used by Westinghouse, and the JB-45C was used by both General Electric and Pratt & Whitney). Other aircraft were used as target tugs, conversion trainers, and drone director aircraft. The B-45 was phased out of service by 1959.

(Specifications for B-45C.)

Contractor: North American Aviation, Inc.
Location built: Long Beach, Calif. (in a former Douglas Aircraft Co. factory).
Number built (USAF): 142 (142).
FF: March 17, 1947.
FFM: XB-45.
FFL: Muroc AAF, Calif.
FFP: George Krebs.
Models/variants: B-45A, C. RB-45C.
Powerplant: Two General Electric J47-GE-13 and two General Electric J47-GE-15 turbojets of 5,200 lb static thrust each.
Wingspan: 89 ft 0 in (96 ft 0 in over wingtip tanks).
Length: 75 ft 4 in.
Height: 25 ft 2 in.
Weight: 112,952 lb gross.
Armament: Two Browning M7 .50-cal. machine guns in tail turret and 22,000 lb of conventional or nuclear bombs.
Accommodation: four (pilot and copilot in tandem, bombardier, and tailgunner).
Cost: $1.08 million.
Max. speed: 573 mph.
Range: 1,910 mi.
Ceiling: 43,250 ft.

B-47 Stratojet

The B-47 was the world's first sweptwing bomber and the first to use a bicycle arrangement for the landing gear, which was necessary because of the thin wing. At the time, the design was so advanced that some writers called it "futuristic." The advanced design was also a curse in that it led to a number of developmental troubles. The B-47A entered service at MacDill AFB, Fla., in 1951. The B-47B was the first model to enter wide-scale service, and by 1957, 28 bomb wings were flying 1,260 B-47s; another 600 reconnaissance or training versions were in use. Several versions of the B-47 were high-altitude photoreconnaissance aircraft, and a number of them were used for electronic reconnaissance. Spurred by the Suez Crisis of 1956, Strategic Air Command demonstrated its ability to launch a large strike force on short notice. Within a two-week period, more than 1,000 B-47 crews flew nonstop simulated combat missions, averaging 8,000 miles each, over North America and the Arctic. The last Air Force Stratojet, an RB-47H, was retired on December 29, 1969. The Navy had a specialized test version that was used until 1976.

(Specifications for B-47E.)

Contractors: 1. Boeing Aircraft Co. 2. Douglas Aircraft Co. 3. Lockheed-Georgia Co.
Locations built: 1. Seattle, Wash., and Wichita, Kan. 2. Tulsa, Okla. 3. Marietta, Ga.
Number built (USAF): 2,041 (2,041).
FF: December 17, 1947.

FFM: XB-47.
FFL: Seattle, Wash.
FF Crew: Bob Robbins (pilot) and Scott Osler (copilot).
Models/variants: B-47A, B, E. RB-47B, E, H. TB-47B. RB-47B. WB-47B, E. EB-47E, L. QB-47E.
Powerplant: Six General Electric J47-GE-25 or -25A turbojets of 7,200 lb thrust each with water injection.
Wingspan: 116 ft 0 in.
Length: 109 ft 10 in.
Height: 27 ft 11 in.
Weight: 206,700 lb gross.
Armament: Two M24A1 20-mm cannon in remotely controlled tail turret and up to 25,000 lb of bombs internally.
Accommodation: Crew of three (pilot, copilot, and navigator).
Cost: $1.9 million.
Max. speed: 606 mph.
Range: 4,000 mi.
Ceiling: 40,500 ft.

B-57 Canberra
The B-57 was the only airplane of non-US design adopted for operational service since World War II and was the first selected for US production since World War I. The B-57 was a version of the Royal Air Force's English Electric Canberra. The shortcomings of the obsolete Douglas B-26 (A-26) accounted for the urgent procurement of a light tactical bomber, and the Canberra was the only aircraft available. The B-57 entered service with the US Air Force in 1955. Development problems (resulting in several fatal crashes and groundings) early in the B-57's career were eventually overcome. In 1955, a major redesign was undertaken and produced the high-altitude RB-57D for electronic and photographic reconnaissance. The B-57E was the first aircraft built new for the Air Force for target towing. The Canberra (or "Cranberry," as it was sometimes called) was sent to Vietnam in early 1965 to be used for daylight bombing, night interdiction, and reconnaissance missions. The need for aircraft was so great that a number of early models were recalled from storage at Davis-Monthan AFB, Ariz., and refurbished. The General Dynamics–built RB-57F had even larger wings than the D model and required two additional engines. It was used for intelligence collection. The RB-57Fs were retired in 1974, and an Air National Guard unit flew the last EB-57s until 1982.
(Specifications for B-57B.)
Contractors: 1. Glenn L. Martin Co. 2. Fort Worth Division of General Dynamics Corp.
Locations built: 1. Middle River, Md. 2. Fort Worth, Tex.
Number built (USAF): 403 (403).
FF: July 20, 1953 (US-built aircraft).
FFM: B-57A.
FFL: Middle River, Md.
FFP: Unconfirmed.
Models/variants: B-57A, B, C, E. RB-57A, C, D, E. EB-57A, B, E. TB-57E. RB-57F; WB-57F.
Powerplant: Two Wright J65-W-5F turbojets of 7,220 lb of thrust each.
Wingspan: 64 ft 0 in (122 ft 5 in on RB-57F).
Length: 65 ft 6 in (68 ft 10 in on RB-57F).
Height: 15 ft 7 in (20 ft 6 in on RB-57F).
Weight: 56,956 lb gross (63,000 lb gross on RB-57F).
Armament: Eight .50-cal. machine guns or four 20-mm cannon in outer wings and up to 5,000 lb of bombs in internal rotary bay and two underwing hardpoints for up to 1,000 lb of ordnance.
Accommodation: Crew of two (pilot and navigator in tandem); (pilot and systems operator on RB/EB-57).
Cost: $1.26 million (EB-57B).
Max. speed: 582 mph.
Range: 2,300 mi.
Ceiling: 48,000 ft.

B-58 Hustler
The B-58 was the first supersonic bomber put into production and the first bomber to reach Mach 2. The Hustler had no internal weapons stowage and made use of stainless-steel honeycomb construction for lower weight and greater strength. Crew members had individual escape capsules rather than individual ejection seats. The B-58 used sophisticated inertial and star-tracking navigation methods. On October 15, 1959, one of the first B-58s built was flown 1,680 miles in 80 minutes with one refueling, maintaining a speed of more than Mach 2 for more than an hour. The 43d Bomb Wing at Carswell AFB, Tex., was the first B-58 unit, and the only other unit was the 305th Bomb Wing at Bunker Hill AFB, Ind. Aircraft were withdrawn from service in January 1970 primarily because of the high cost of operation. B-58s were used to set more world records than any other type of combat airplane. On March 5, 1962, Maj. Robert G. Sowers and Capts. Robert McDonald and John T. Walton were the only entry in the twenty-first and last Bendix Trophy transcontinental race. Called Operation Heatrise, the crew completed the Los Angeles to New York course with an average speed of 1,214.71 mph and total elapsed time of two hours, 56 seconds. The crew was also awarded the 1962 Mackay Trophy. On October 16, 1963, in Operation Greased Lightning, a B-58 crew led by Maj. Sidney J. Kubesch took off from Okinawa, flew to Alaska, over Canada to London to set a world speed record by flying 8,028 miles in eight hours, 35 minutes, 20.4 seconds, averaging 938 mph. Out of 116 aircraft built, 26 crashed, although most of the accidents occurred early in the plane's career. Eight B-58s survive today in various states of repair.
Contractor: Convair Division of General Dynamics Corp.
Location built: Fort Worth, Tex.
Number built (USAF): 116 (116).
FF: November 11, 1956.
FFM: XB-58.
FFL: Fort Worth, Tex.
FF Crew: Beryl A. Erickson, pilot; J.D. McEachern, flight-test observer; and Charles Harrison, flight-test engineer.
Models/variants: YB-58. B-58A. RB-58A. TB-58A.
Powerplant: Four General Electric J79-GE-5A, -5B, or -5C turbojets of 15,600 lb of thrust each in afterburner.

Wingspan: 56 ft 10 in.
Length: 96 ft 9 in.
Height: 31 ft 5 in.
Weight: 163,000 lb gross.
Armament: One General Electric T171 (later designated M61) Vulcan 20-mm cannon in tail, plus one MA-1C, MB-1C, or Two-Component Pod (TCP) ventral pod containing fuel and a variety of nuclear weapons; aircraft later modified to carry up to four Mk. 43 free-fall nuclear weapons with a yield of approx one megaton each.
Accommodation: Crew of three (pilot, navigator/bombardier, and defensive systems operator) in tandem.
Cost: $12.44 million.
Max. speed: 1,385 mph.
Range: 1,750 mi (combat) on internal fuel only; approx 4,000 mi (ferry) on internal fuel only.
Ceiling: 64,800 ft.

B-66 Destroyer
Utilitarian aircraft developed from the Navy's A3D Skywarrior to provide the Air Force with a tactical light bomber and reconnaissance aircraft. The Destroyer was almost canceled due to early developmental problems, but it overcame them. Deliveries began in 1956. In the fall of 1957, only 17 hours after being put on alert in the US, several B-66B crews, after crossing the Pacific as elements of a Composite Air Strike Force, were flying simulated bombing missions over the Philippines. The RB-66C was designed for electronic reconnaissance and had a pressurized compartment for electronic warfare officers, rather than a bomb bay. The B-66B was the only pure bomber version, and even those were subsequently modified. The WB-66D, the final production version, was designed for weather data collection in combat areas. The EB-66Cs were used to locate North Vietnamese radar sites, determine their function, and identify their frequency to develop an enemy electronic order of battle. The type was retired in the mid-1970s, primarily because they had been used so extensively that fatigue was a problem. B-66s also had excessive maintenance requirements. The EB-66 models were eventually replaced by the EF-111. The X-21A was an extensively modified WB-66D and was a test-bed for wing laminar flow control system.
(Specifications for RB-66B, except as noted.)
Contractor: Douglas Aircraft Co.
Locations built: Long Beach, Calif., and Tulsa, Okla.
Number built (USAF): 294 (294).
FF: June 28, 1954.
FFM: RB-66A.
FFL: Long Beach, Calif.
FFP: George Jansen.
Models/variants: RB-66A, B, C. B-66B. WB-66D; EB-66C, E. NB-66B, X-21A.
Powerplant: Two Allison J71-A-11 or -13s nonafter-burning turbojets of 10,200 lb of thrust each.
Wingspan: 72 ft 6 in.
Length: 75 ft 2 in.
Height: 23 ft 7 in.
Weight: 83,000 lb gross.
Armament: Two 20-mm cannon in a remotely controlled tail turret (15,000 lb of bombs internally on B-66B only).
Accommodation: Crew of three (pilot, navigator, and gunner/camera operator); crew of seven (pilot, navigator, and five electronic warfare officers) on RB/EB-66C.
Cost: $2.55 million.
Max. speed: Approx 600 mph.
Range: Approx 1,800 mi.
Ceiling: 43,000 ft.

Fighters

Nieuport 28C.1
The Nieuport 28 was the first airplane flown in combat by pilots of the American Expeditionary Force in World War I. Pilots from the 94th Aero Squadron (the "Hat-in-the-Ring" Squadron) made the first US operational flights across the front lines in France on March 19, 1918. On April 14, 1918, Lts. Alan Winslow and Douglas Campbell downed two German Albatros fighters in a 10-minute battle. Lieutenant Winslow was the first American pilot in the American sector of the front to down an airplane; Lieutenant Campbell was the first US-trained pilot to score a victory. The AEF obtained all of their Nieuport 28s directly from the factory. Although more maneuverable than the Spad XIII that replaced it, the Nieuport 28 had a reputation for being somewhat fragile, and it had a tendency to shed its upper wing fabric when the pilot put the aircraft into a dive. Both of the aircraft's machine guns were located on the left side of the fuselage. Capt. Edward V. "Eddie" Ricken-backer, the leading American ace of the war and the commander of the 94th AS, began his combat career flying the Nieuport 28, and he recorded his first solo victory on May 7, 1918. The Nieuport 28 was also flown by the 27th, 95th, and 103d Aero Squadrons. The Lafayette Escadrille, the group of American volunteer pilots flying for France, began operations in 1916 flying the Nieuport 11. When the AEF arrived in France, the US obtained more than 850 examples of the Nieuport 17, 21, 23, 24, and 27 as training aircraft, which was fortunate, as all of these were underpowered and would not have fared well in combat. The Nieuport 28 was also flown by Switzerland and Greece.
Contractor: Société Anonyme des Etablissements Nieuport.
Location built: Issy-les-Moulineaux, France.
Number built (USAF): Unconfirmed (298).
FF: June 14, 1917.
FFM: Nieuport 28C.1.
FFL: Unconfirmed but most likely Paris.
FFP: Unconfirmed.
Models/variants: Nieuport 28C.1.
Powerplant: One Gnome 9-N seven-cylinder rotary of 160 hp.
Wingspan: 26 ft 3 in.
Length: 21 ft 3^{1}/4 in.
Height: 8 ft 0 in.
Weight: 1,625 lb gross.
Armament: Two Vickers .303-cal. machine guns.
Accommodation: Pilot only.
Cost: Unconfirmed.
Max. speed: 122 mph.
Range: 248 mi.
Ceiling: 19,685 ft.

S.P.A.D. XIIIC.1

The Spad was the ultimate model of the top-of-the-line French fighter in World War I and the most prevalent fighter type flown by the American Expeditionary Force. Fifteen of the 16 AEF pursuit squadrons flew Spad XIIIs by the Armistice on November 11, 1918. Deliveries to the Americans began in March 1918, almost nine months after French units started receiving their aircraft. By the time the Americans began flying this Spad, the German Fokker D.VII had been introduced, and once more, as had happened throughout the war, the balance of power in the air tipped to the Central Powers. The Spad XIII offered a number of evolutionary improvements over the Spad VII (such as a more powerful engine and stronger structure), but its major improvement over the earlier version was the fact it carried two machine guns. The AEF obtained 189 of these earlier aircraft, and the Lafayette Escadrille, the group of volunteer American pilots flying for France, was flying this type when the unit was absorbed by the AEF in early 1918 and became the 103d Aero Squadron. Capt. Eddie Rickenbacker, the commander of the 94th Aero Squadron and America's "Ace of Aces," recorded most of his victories in the Spad XIII, and 2d Lt. Frank Luke, Jr. (27th Aero Squadron), scored all of his "kills" (13 of which came in one week) in this biplane fighter. The last solo American aerial victory in World War I came on November 10, 1918, when Maj. Maxwell Kirby recorded his first and only "kill." The Bolling Commission chose the Spad XIII as one of the foreign-designed aircraft for production in the US, but orders for 2,000 aircraft to be built by Curtiss were canceled. Almost half of the Spad XIIIs for the US were delivered after the Armistice, and the Army Air Service used them into the mid-1920s. In addition to the Spad VII and XIII, the AEF also obtained 35 Spad XIs and six examples of the two-seat Spad XVI, one of which was used by Brig. Gen. Billy Mitchell, commander of the American air forces on the Western Front.

Contractor: Société Anonyme pour l'Aviation et ses Dérivés (SPAD).
Location built: Surenes, France.
Number built (USAF): Approx 8,400 (893).
FF: On or about March 22, 1917.
FFM: Spad XIIIC.1.
FFL: Unconfirmed but most likely Villacoubly, France.
FFP: Lieutenant Salze.
Models/variants: Spad XIIIC.1.
Powerplant: One Hispano-Suiza 8 Be liquid-cooled V-8 of 220 hp.
Wingspan: 26 ft 6 in.
Length: 20 ft $4^1/4$ in.
Height: 7 ft $8^1/2$ in.
Weight: 1,862 lb gross.
Armament: Two Vickers or Marlin .303-cal. machine guns.
Accommodation: Pilot only.
Cost: Approx $10,000.
Max. speed: 139 mph.
Range: Approx 200 mi.
Ceiling: 22,300 ft.

F-4 Phantom II

The F-4 was the dominant Air Force fighter of the 1960s and early 1970s and was also the tactical workhorse in Vietnam. It was another Air Force aircraft that began its life as a Navy fighter. The Air Force made the decision to adopt the F-4 in March 1962—at the time an unprecedented action. The Phantom II was originally designated F-110 under the 1948 designation system. The first Air Force Phantom flew on May 27, 1963, and the type became operational in early 1964 with the 12th Tactical Fighter Wing. On July 10, 1965, Capts. Thomas S. Roberts and Ronald C. Anderson, along with Capts. Kenneth Holcombe and Arthur C. Clarke, in F-4Cs, shot down two MiG-17s, the first Air Force air-to-air victories of the Vietnam War. On January 2, 1967, Col. Robin Olds shot down a MiG-21, becoming the first and only Air Force ace with victories in World War II and Vietnam. The RF-4C photoreconnaissance variant was designed to replace the RF-101. The RF-4C was deployed to Vietnam at the end of 1965. The F-4D was the Air Force's first true ground-attack version and could carry twice the normal bomb load of a World War II–era B-17. The F-4E addressed a serious pilot concern with the addition of an M61A1 20-mm cannon. All of the Air Force aces (Capts. Charles B. DeBellevue, Jeffrey S. Feinstein, and Richard "Steve" Ritchie) and Navy aces of the Vietnam War flew F-4s. The F-4G was modified for the "Wild Weasel" radar site–suppression role, first flew in December 1975, and saw action in Operation Desert Storm. In March 1996, the "Wild Weasels" were the last Air Force F-4s to be retired. The RF-4Cs also saw action in Desert Storm and were retired from the Air National Guard in 1995. The F-4 family picked up the nicknames "Rhino" and the "Double Ugly."

(Specifications for F-4E.)
Contractor: McDonnell Aircraft Corp. (later McDonnell Aircraft Division of McDonnell Douglas Corp.).
Location built: St. Louis, Mo.
Number built (USAF): 5,201, incl license-built aircraft (2,742).
FF: May 27, 1958.
FFM: XF4H-1.
FFL: St. Louis, Mo.
FFP: Robert Little.
Models/variants: F-110A. F-4C, D, E, G. RF-4C. QF-4.
Powerplant: Two General Electric J79-GE-17 turbojets of 17,900 lb of thrust in afterburner.
Wingspan: 38 ft 5 in.
Length: 63 ft 0 in.
Height: 16 ft 6 in.
Weight: 61,651 lb gross.
Armament: One General Electric M61A1 Vulcan 20-mm cannon and up to four AIM-7 Sparrow radar-guided missiles and up to four AIM-9 Sidewinder heat-seeking missiles or up to 16,000 lb of assorted external stores.
Accommodation: Crew of two (pilot and weapon system officer in tandem).
Cost: $2.48 million.
Max. speed: 1,500 mph.
Range: 1,050 mi.
Ceiling: 57,200 ft.

P-12

The P-12 was one of the most successful American fighters produced between the world wars. More P-12s

were ordered than any other type until 1940. This type was used by both the Army and the Navy (as the F4B). This was the last biplane fighter flown by the Air Corps. The P-12 program began as a Boeing-funded venture. The first two aircraft, both company demonstrators, were eventually purchased by the Navy. The first P-12 was flown on April 11, 1929. The P-12 was one of the very first Air Corps pursuit ships (and the first purchased in quantity) powered by an air-cooled engine. The P-12 and P-12B, C, and D aircraft had a bolted aluminum frame with fabric covering. The fuselages of the P-12E and F were all metal, semimonocoque construction. The aircraft made an auspicious debut, on February 26, 1929, when Capt. Ira C. Eaker flew the first P-12 accepted by the Air Corps from Boeing Field, Wash., to the Panama Canal and back. The trip took several weeks. The P-12 entered service with the 95th Pursuit Squadron at Rockwell Field, Calif., in April 1929. P-12s were in operational service from 1929 to 1936. A number of P-12s were pressed into service delivering mail during the air mail crisis of 1934. Navy F4Bs served until 1938. In 1940, the last 23 P-12s were transferred to the Navy and converted for use as radio-controlled targets. These aircraft were designated F4B-4As.

(Specifications for P-12E.)

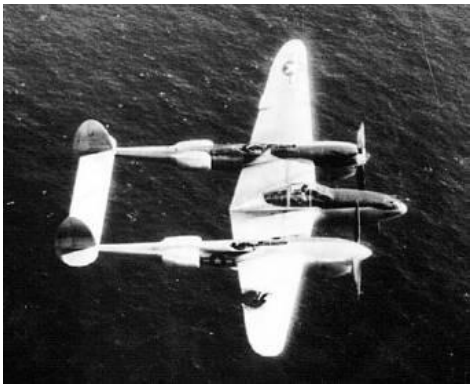
Contractor: Boeing Airplane Co.
Location built: Seattle, Wash.
Number built (USAF): 586 (366).
FF: June 25, 1928.
FFM: Company Model 83.
FFL: King County Airport (Boeing Field), Wash.
FFP: Unknown.
Models/variants: P-12, P-12B, C, D, E, F.
Powerplant: One Pratt & Whitney R-1340-17 Wasp nine-cylinder radial of 500 hp.
Wingspan: 30 ft 0 in.
Length: 20 ft 3 in.
Height: 9 ft 0 in.
Weight: 2,690 lb gross.
Armament: Two .30-cal. or one .30-cal. and one .50-cal. machine guns; 244 lb of bombs on external racks.
Accommodation: Pilot only.
Cost: $15,000.
Max. speed: 189 mph.
Range: 570 mi.
Ceiling: 26,300 ft.

P-26 "Peashooter"

This was the first monoplane fighter produced for the Army Air Corps, the first all-metal production fighter, and the last front-line AAC fighter with an open cockpit. It was also the last Boeing-designed fighter and the last fighter program the company was involved with until the current F-22. The P-26 was a joint development between Boeing and the Air Corps. The company financed building the first three prototypes, which after testing, were purchased by the service. The aircraft had a relatively high landing speed (82 mph), and pilots referred to it as "landing a high-speed rock." Deliveries began in 1933, and the P-26 equipped three units (20th Pursuit Group at Barksdale Field, La., 1st PG at Selfridge Field, Mich., and 17th PG at March Field, Calif.). By 1937, the aircraft were relegated to the Philippines, the Panama Canal Zone, and Hawaii. At least 13 aircraft were at Wheeler Field, Hawaii, at the time of the Japanese attack on December 7, 1941. In the Philippines, Capt. Jesus Villamor was credited with destruction of a Japanese bomber while flying a P-26 on December 12, 1941. Many aircraft in the Philippines were burned to prevent capture. A number of aircraft stationed in the Canal Zone were sold to Panama and Guatemala, and, in fact, two P-26s were in use as trainers in Guatemala as late as 1957.

(Specifications for P-26A.)

Contractor: Boeing Airplane Co.
Location built: Seattle, Wash.
Number built (USAF): 151 (136).
FF: March 20, 1932.
FFM: Company Model XP-936 (later redesignated XP-26).
FFL: King County Airport (Boeing Field), Wash.
FFP: Les Tower.
Models/variants: P-26A, B, C.
Powerplant: One Pratt & Whitney R-1340-27 Wasp nine-cylinder radial of 550 hp.
Wingspan: 27 ft $11^1/2$ in.
Length: 23 ft $7^1/4$ in.
Height: 10 ft $0^1/2$ in.
Weight: 2,955 lb gross.
Armament: Two .30-cal. or one .30-cal. and one .50-cal. or two .50-cal. machine guns; 200 lb of bombs on external racks.
Accommodation: Pilot only.
Cost: $9,999, less engine and GFE.
Max. speed: 234 mph.
Range: 360 mi.
Ceiling: 27,400 ft.



P-38 Lightning

Originally designed as a high-altitude interceptor, the P-38 proved very versatile and went on to become one of the most famous aircraft of all time. The Air Corps was so impressed with the XP-38 in its early trials that on February 11, 1939, even though the prototype had less than five hours of flight time, 1st Lt. Benjamin S. Kelsey tried to break the transcontinental speed record, but he crashed on approach to Mitchel Field, N.Y. Despite this setback, ground speeds of 420 mph and an elapsed time of only seven hours convinced the Air Corps to order the type into production. Britain ordered 667 P-38s, which it nicknamed "Lightning," but only three P-38s were delivered. The rest (and the nickname) were absorbed by the US. After some developmental troubles, the P-38 entered US service in 1941 and served in every theater of the war. 2d Lt. Elza Shahan, flying a P-38F, recorded the first American victory in the European theater of operations when he and a P-40 pilot downed a Focke-Wulf FW-200 near Iceland on August 14, 1942. The P-38 saw extensive service in North Africa, where the

Germans called the aircraft the “Fork-Tailed Devil.” On April 18, 1943, P-38 pilots from the 339th Fighter Squadron, using external tanks, flew from Guadalcanal to Bougainville and shot down Japanese Adm. Isoroku Yamamoto. The top two American aces of all time, Maj. Richard I. Bong (40 confirmed victories) and Maj. Thomas B. McGuire, Jr. (38), both flew P-38s in the southwest Pacific. P-38s also were used for photoreconnaissance (these dedicated aircraft were designated F-4 and F-5), bomber, and night fighter. Consolidated-Vultee built 113 P-38Ls in Nashville, Tenn., to meet wartime needs. The last P-38 was delivered in September 1945, and the type was phased out of service in 1949.
(Specifications for P-38L.)
Contractors: 1. Lockheed Aircraft Co. 2. Consolidated-Vultee Aircraft Corp.
Locations built: 1. Burbank, Calif. 2. Nashville, Tenn.
Number built (USAF): 10,038 (10,035).
FF: January 27, 1939.
FFM: XP-38.
FFL: March Field, Calif.
FFP: 1st Lt. Benjamin S. Kelsey.
Models/variants: P-38, P-38D, E, F, G, H, J, L, M. F-4, F-4A. F-5A, B, C, E, F, G.
Powerplant: One Allison V-1710-111 and one Allison V-1710-113 (the different engine submodels turned the P-38’s propellers in opposite directions) liquid-cooled V-12s of 1,600 hp each.
Wingspan: 52 ft 0 in.
Length: 37 ft 10 in.
Height: 9 ft 10 in (wheels to tip of fin); 12 ft 10 in (wheels to tip of propeller).
Weight: 21,600 lb gross.
Armament: Four .50-cal. machine guns and one 20-mm cannon, plus two 2,000-lb bombs or 10 5-in. High-Velocity Aerial Rockets (HVARs) on underwing hard-points.
Accommodation: Pilot only on most models (crew of pilot and bombardier on some P-38J/Ls; pilot and radar operator on P-38M).
Cost: $95,150.
Max. speed: 414 mph.
Range: 500 mi (up to 2,000 mi with external tanks).
Ceiling: 44,000 ft.

P-39 Airacobra
One of the first “modern” Air Corps fighter designs and the first fighter designed by Bell, Airacobras were used primarily for ground attack. The XP-39 prototypes featured an engine supercharger, but the Army’s decision to eliminate it on production aircraft greatly limited the type’s effectiveness, and, in fact, the aircraft performed best below 17,000 ft. The P-39 had a unique automobile-type cockpit door, tricycle landing gear (another first for an AAC fighter), and a center-fuselage-mounted engine. The Airacobra entered Air Corps service in 1941. At the time of the Japanese attack on Pearl Harbor, 179 British Airacobras were still in the US waiting to be delivered, and these aircraft were commandeered by the AAC, redesignated P-400, and sent to the southwest Pacific. US P-39s were used extensively in operations in North Africa (most particularly Operation Torch), Italy, and the Pacific. The type achieved the lowest loss rate per sortie of any Army Air Forces fighter used in the European theater of operations, although it was mostly used in areas where Bf-109s and FW-190s were scarce. Numerous P-39s remained in the US during the war, where they were used for training units. Almost half of the production run was sent to the Soviet Union, where its tank-killing capability was used to great advantage. Most of these aircraft were ferried to Russia via Alaska. P-39s were also flown in numbers by the RAF and the Free French. Production ended in August 1944. Several aircraft were used by NACA as research aircraft at the Ames Flight Research Center in California, and a number were flown as racers after the war, but only a handful of P-39s are still in existence. The larger, better-performing P-63 Kingcobra was a direct descendent of the P-39.
(Specifications for P-39Q.)
Contractor: Bell Aircraft Corp.
Location built: Buffalo, N.Y.
Number built (USAF): 9,558 (approx 3,675).
FF: April 6, 1938.
FFM: XP-39.
FFL: Dayton, Ohio.
FFP: James Taylor.
Models/variants: P-39C, D, F, J, K, L, M, N, Q.
Powerplant: One Allison V-1710-85 liquid-cooled V-12 of 1,200 hp.
Wingspan: 34 ft 0 in.
Length: 30 ft 2 in.
Height: 12 ft 5 in.
Weight: 7,651 lb gross.
Armament: One 37-mm T9 cannon firing through the propeller hub; four (two nose- and two underwing-mounted) .50-cal. machine guns; 500 lb of bombs.
Accommodation: Pilot only.
Cost: $46,000.
Max. speed: 382 mph.
Range: 650 mi.
Ceiling: 34,790 ft.

P-40 Warhawk
One of the most rugged fighters ever built, the P-40 was the Army Air Forces’ front-line fighter at the start of World War II. The P-40 is among the top five aircraft in US history in terms of number of aircraft produced and was eventually flown by 28 countries. The lone XP-40 was a modified P-36 airframe with the V-1710 engine installed. Not an advanced design (nonsealing fuel tanks, no cockpit armor), the P-40 was actually obsolescent when production began, but its straightforward design allowed for a rapid ramp up to quantity production. Pilots with the 46th and 47th Pursuit Squadrons (both units flying P-40s) scored the first American victories of World War II when they downed 10 Japanese aircraft over Hawaii during the Pearl Harbor attack on December 7, 1941. Lt. Boyd “Buzz” Wagner, based in the Philippines and also flying a P-40, became the first American ace of the war when he downed his fifth Japanese aircraft on December 16. The P-40’s greatest notoriety, though, came with the American Volunteer Group in China. Organized under the command of Claire Chennault, the AVG, better known as the Flying Tigers, entered combat on December 21, 1941. In existence only until July 6, 1942 (when it was absorbed in the Army Air Forces and became the 23d Fighter Group), the AVG shot down approximately 300 Japanese aircraft. The P-40 was also used extensively in North Africa and was flown off escort carriers during the initial stages of the invasion. As late as April 1944, nearly 2,500 P-40s were in AAF service. P-40 production ran until November 1944. After the war, the decision to keep

the P-40 in production for so long, even after more modern aircraft became available, was severely criticized in the Truman Report. A majority of P-40 production went to Britain, where the RAF called them Tomahawks and Kittyhawks. Large numbers of aircraft were also used by Russia, Australia, New Zealand, and Canada. The Brazilian Air Force flew P-40s into the mid-1950s.
(Specifications for P-40N.)
Contractor: Curtiss-Wright Corp.
Location built: Buffalo, N.Y.
Number built (USAF): 13,738 (5,380).
FF: October 14, 1938.
FFM: XP-40.
FFL: Buffalo, N.Y.
FFP: Edward Elliott.
Models/variants: P-40, P-40B, C, D, E, F, G, K, L, M, N.
Powerplant: One Allison V-1710-81, -99 or -115 liquid-cooled V-12 of 1,360 hp.
Wingspan: 37 ft 4 in.
Length: 33 ft 4 in.
Height: 12 ft 4 in.
Weight: 8,850 lb.
Armament: six .50-cal. machine guns and up to 1,500 lb of bombs (one 500-lb bomb on each wing and centerline).
Accommodation: Pilot only.
Cost: $52,869.
Max. speed: 350 mph.
Range: 360 mi.
Ceiling: 31,000 ft.

P-47 Thunderbolt
Originally conceived as a lightweight fighter, the P-47 ended up as the heaviest single-engine fighter flown by the Army Air Forces. The P-47 was used as both a high-altitude escort fighter and a low-level fighter-bomber. More P-47s were produced than any other US fighter before or since. More P-47Ds were produced—12,603—than the total production run of P-38s and nearly as many as the entire run of P-40s. Production began in 1942, and on September 20, 1944, the 10,000th P-47 rolled off the line to much fanfare, including aviatrix Jackie Cochran, the head of the Women's Airforce Service Pilots, dubbing the aircraft "10 Grand." Just 10 months later, the 15,000th P-47 came off the line. The P-47 entered service with the 56th and 78th Fighter Groups in late 1942 and saw its first combat on April 8, 1943, escorting B-17s over Europe. The P-47 picked up the nickname "Jug," because it was something of a juggernaut—heavy, extremely sturdy, and well armed. The early models (and the first blocks of P-47Ds) featured a humpback fuselage that blended into the tail via a "razorback" spine. Later blocks of P-47Ds and all subsequent models (including the 354 Curtiss-built aircraft) had a "bubble" canopy that offered the pilot near 360° visi-bility. The only theater of operations where the P-47 was not used in quantity was the Aleutians. By the end of 1944, 31 AAF fighter groups flew P-47s. The third- and fourth-ranked AAF aces of World War II, Lt. Col. Francis S. "Gabby" Gabreski (28 victories) and Capt. Robert S. Johnson (27), both flew P-47s in Europe. P-47s were also flown by Britain (830 aircraft), the Soviet Union, and Brazil during the war, and a number of countries flew the P-47 after the war. The P-47D and N models served until the formation of the US Air Force, and the F-47 (as it was later redesignated) served with the Air National Guard until 1955.
(Specifications for P-47D.)
Contractors: 1. Republic Aviation Corp. 2. Curtiss-Wright Corp.
Locations built: 1. Farmingdale, N.Y., and Evansville, Ind. 2. Buffalo, N.Y.
Number built (USAF): 15,683 (14,562).
FF: May 6, 1941.
FFM: XP-47B.
FFL: Farmingdale, N.Y.
FFP: Lowery Brabham.
Models/variants: P-47B, C, D, G, M, N.
Powerplant: One Pratt & Whitney R-2800-59 Double Wasp 18-cylinder, two-row radial of 2,300 hp.
Wingspan: 40 ft 9 in.
Length: 36 ft 1 in.
Height: 14 ft 8 in.
Weight: 19,400 lb gross.
Armament: Eight .50-cal. machine guns and up to 2,500 lb of bombs on two underwing and one centerline rack or 10 5-in High-Velocity Aerial Rockets (HVARs).
Accommodation: Pilot only.
Cost: Approx $54,600.
Max. speed: 428 mph.
Range: 800 mi (more than 1,200 mi with external tanks).
Ceiling: 42,000 ft.

P-51 Mustang
The P-51 was designed (as the NA-73) in 1940 at Britain's request. An in-line engine, the British preference, was specified as well as the British standard of eight machine guns. The prototype was constructed within a 120-day limit. It was one of the few aircraft types that were conceived after the start of World War II yet saw large-scale service in the war. In permitting North American to design a fighter for a foreign buyer, the US Army Air Corps stipulated that two examples of the production model should be supplied free of charge for evaluation. It was the Royal Air Force that bestowed the nickname "Mustang" on the type. The first version for the US was the A-36 Apache dive bomber that first flew in 1942. About 500 of these "near-Mustangs" were built and saw action in the Italian campaign and in India. In December 1943, P-51Bs first entered combat over Europe, powered by Packard-built Rolls-Royce Merlin engines. They provided high-altitude escort to B-17s and B-24s, and by war's end, P-51 pilots had destroyed 4,950 enemy aircraft in the air (nearly half of the US total destroyed) and an additional 4,131 on the ground, more than any other US fighter in Europe. Despite this showing, none of the top four Army Air Forces aces flew Mustangs. P-51s saw service in nearly every combat zone in the war; in the Pacific, they escorted B-29s to Japan from Iwo Jima. At war's end, 5,541 Mustangs were on hand. Surplus machines were sold or given to

Australia, Canada, China, Cuba, Denmark, the Dominican Republic, France, Indonesia, Israel, Sweden, Korea, Switzerland, and Italy. During the Korean War, F-51Ds (as they were redesignated in 1948) were used primarily for close support of ground forces until the type was withdrawn from combat in 1953. Mustangs have been popular for many years on the unlimited racing circuit. In 1984, the Piper Enforcer, a turboprop design based on the P-51, was marketed to smaller air forces as a light attack aircraft although none was bought.
(Specifications for P-51D.)
Contractor: North American Aviation, Inc.
Locations built: 1. Inglewood, Calif. 2. Dallas, Tex.
Number built (USAF): 15,621, incl 500 A-36As (13,722).
FF: October 26, 1940.
FFM: NA-73 (also referred to as NA-73X).
FFL: Inglewood, Calif.
FFP: Vance Breese.
Models/variants: P-51, P-51A, B, C, D, H, K. F-6A, B, C, D, K. A-36A Apache.
Powerplant: One Packard V-1650-7 (license-built Rolls-Royce Merlin) liquid-cooled V-12 of 1,490 hp.
Wingspan: 37 ft 0 in.
Length: 32 ft 3 in.
Height: 13 ft 8 in.
Weight: 11,600 lb gross.
Armament: Six .50-cal. machine guns and up to 2,000 lb of bombs or 10 5-in. High-Velocity Aerial Rockets (HVARs).
Accommodation: Pilot only.
Cost: $50,985.
Max. speed: 437 mph.
Range: 950 mi.
Ceiling: 41,900 ft.

P-59 Airacomet
The P-59 was the first US jet aircraft. Developed in secrecy, its genesis came at the personal direction of Gen. "Hap" Arnold. Bell Aircraft was chosen for the project in part because of its location near the General Electric engine plants in New York and Massachusetts. Aircraft flew almost exactly a year after development began. To ensure secrecy, the XP-59 was fitted with a dummy propeller whenever it was towed on the ground. Col. Laurence C. "Bill" Craigie became the first USAAF pilot to fly a jet when he made the type's "official" first flight on October 2, 1942. First jet flight made by a USN aviator came on April 21, 1943, when Capt. Frederick M. Trapnell flew the XP-59 at Muroc AAF, Calif. The 412th Fighter Group became the first USAAF jet fighter unit when it was formed in 1943 and stationed at Bakersfield, Calif., and then later at March Field, Calif. This unit primarily served as a jet pilot training unit. The P-59 was never a great performer and was quickly overtaken by development of other jet aircraft, mainly the P-80. Only in operational service for about a year, the type was phased out of service by 1949.
(Specifications for P-59A, except as noted.)
Contractor: Bell Aircraft Corp.
Location built: Buffalo, N.Y.
Number built (USAF): 66 (66).
FF: October 1, 1942.
FFM: XP-59A.
FFL: Rogers Dry Lake, Calif.
FFP: Robert Stanley.
Models/variants: P-59A, B.
Powerplant: Two General Electric I-16 turbojets of 1,600 lb thrust each. (P-59B: two General Electric J31-GE-5 turbojets of 2,000 lb thrust each).
Wingspan: 45 ft 6 in.
Length: 38 ft 10 in.
Height: 12 ft 0 in.
Weight: 13,700 lb.
Armament: One 37-mm cannon and three .50-cal machine guns.
Accommodation: Pilot only.
Cost: Unconfirmed.
Max. speed: 413 mph.
Range: Approx 400 mi.
Ceiling: 46,200 ft.

P-61 Black Widow
The P-61 was the first US aircraft specifically designed as a night fighter. As large as a medium bomber, it was actually very maneuverable. The P-61 was first fielded in Europe but found greater use in the Pacific. The Black Widow replaced the interim Douglas P-70 and eventually equipped all 14 USAAF night-fighter units. The key to the P-61's success was the Western Electric SCR-720 airborne intercept radar. The first recorded "kill" came on July 6, 1944, when 1st Lt. Francis Eaton (pilot), 2d Lt. James E. Ketchum (radar operator), and SSgt. Gary Anderson (gunner) intercepted and shot down a Japanese "Betty" bomber. P-61 crews accounted for 127 confirmed victories, including 18 V-1 "buzz bombs" in Europe. Four Black Widow crews became aces. The last aerial battle of World War II came on August 14, 1945, when Lt. Robert W. Clyde (pilot) and Lt. Bruce K. Ledford (radar operator), flying the P-61 *Lady in the Dark* got behind a Nakajima "Oscar," and in an attempt to escape from its pursuer, the Japanese fighter crashed into the Pacific without a shot being fired. In 1946, 36 aircraft of a slightly modified design were built as the F-15 Reporter photoreconnaissance aircraft. P-61s were also used for ejection-seat tests and for a research program that studied the effects of thunderstorms on aircraft structures after the war. In 1946, a dozen P-61Cs were transferred to the Marines as trainers and were designated F2Ts. The P-61 was phased out of USAF service in 1952, and the last F-15 was retired in 1955. Only three P-61s are thought to exist today.
(Specifications for P-61B.)
Contractor: Northrop Aircraft Corp.
Location built: Hawthorne, Calif.
Number built (USAF): 742 (742).
FF: May 26, 1942.
FFM: XP-61.
FFL: Northrop Field, Calif.
FFP: Vance Breese.
Models/variants: P-61A, B, C. F-15 Reporter.
Powerplant: Two Pratt & Whitney R-2800-65 Double Wasp 18-cylinder, twin-row radials of 2,000 hp each.
Wingspan: 66 ft 0 in.
Length: 49 ft 7 in.
Height: 14 ft 8 in.
Weight: 38,000 lb gross.
Armament: Four .50-cal. machine guns in a remote-control ventral turret, four M2 20-mm cannon in the fuselage belly; 6,400 lb of bombs on underwing racks.
Accommodation: Three (pilot and gunner in forward cockpit; radar operator in rear cockpit).
Cost: $170,000.

Max. speed: 366 mph.
Range: 1,200 mi.
Ceiling: 33,100 ft.

P-80 (F-80) Shooting Star
The Shooting Star recorded a number of firsts: It was the first Air Force aircraft to exceed 500 mph in level flight, the first American jet airplane to be manufactured in large quantities, and the first Air Force jet to be used in combat. In June 1943, Lockheed was invited to design an aircraft around the de Havilland H-1 turbojet newly developed in Britain. Lockheed's design team led by Clarence L. "Kelly" Johnson completed the project details in a week, and the first prototype was flown 143 days later. On that first flight, pilot Milo Burcham was so pleased with the performance of the aircraft that he presented a display of low-level aerobatics prior to landing. Several early P-80s were sent to Europe for a demonstration tour, but World War II ended before the aircraft could be employed in combat. The aircraft was redesignated in 1948 when "P" for pursuit was changed to "F" for fighter. Although it was originally conceived as a high-altitude interceptor, the F-80C was used extensively as a fighter-bomber in the Korean War, primarily for low-level rocket, bomb, and napalm attacks against ground targets. F-80C pilots flew more than 15,000 sorties in the first four months of the war. On November 8, 1950, 1st Lt. Russell J. Brown, flying a 16th Fighter-Interceptor Squadron F-80C, shot down a Soviet-built MiG-15 in the world's first all-jet air battle. The early success was short lived, however, and soon F-80 pilots required help from F-86 pilots in the form of top cover. Only 14 F-80s were shot down by enemy aircraft in Korea, but 113 were downed by ground fire. Many Shooting Stars were converted into FP-80 (later RF-80) reconnaissance and QF-80 drone versions. The T-33, for many years the world's most widely used jet trainer, and the radar-equipped F-94C all-weather interceptor were both developed from the F-80.
(Specifications for F-80C.)
Contractor: Lockheed Aircraft Co.
Location built: Burbank, Calif.
Number built (USAF): 1,731 (1,678).
FF: January 8, 1944.
FFM: XP-80.
FFL: Muroc AAF, Calif.
FFP: Milo Burcham.
Models/variants: YP-80. P-80A, B, C (later redesignated F-80A, B, C). FP-80A, C (later redesignated RF-80A, C). F-14A. QF-80A, C.
Powerplant: One Allison J33 of 5,400 lb thrust (with water/alcohol injection).
Wingspan: 38 ft 10^{1}/2 in.
Length: 34 ft 6 in.
Height: 11 ft 4 in.
Weight: 16,856 lb.
Armament: Six .50-cal. machine guns and eight 5-in rockets or 2,000 lb of bombs.
Accommodation: Pilot only.
Cost: $93,456.
Max. speed: 580 mph.
Range: 1,380 mi.
Ceiling: 48,000 ft.

F-82 Twin Mustang
The F-82 was the last propeller-driven fighter acquired in quantity by the Air Force and, with the exception of the A-1 Skyraider attack aircraft, was the last tail-dragger. Development began in 1944 to provide a twin-engine, long-range bomber escort with ac-commoda-tions for a relief pilot who could aid in navigation. The F-82 appears to be two Mustang fuselages on one wing, but in reality it was a totally new design. Delivery from production did not begin until early 1946. After World War II, radar-equipped F-82s were used extensively by Air Defense Command as replacements for the P-61 night fighter. Nine F-82Fs and five F-82Gs were converted as F-82H winterized interceptors for Alaska. During the Korean War, Japan-based F-82s were among the first Air Force aircraft to operate over Korea. Lts. William G. Hudson and Charles B. Moran recorded the first "kill" in Korea on June 27, 1950, when they shot down a North Korean Yak-11. Two other F-82 crews recorded air-to-air victories, and a total of 16 aircraft were destroyed on the ground by Twin Mustang crews. The type flew 1,868 sorties in the Korean War before being withdrawn in February 1952. The Tennessee ANG flew F-82s for a brief time. The type was retired by June 1953.
(Specifications for F-82E.)
Contractor: North American Aviation, Inc.
Location built: Inglewood, Calif.
umber built (USAF): 272 (272).
FF: July 6, 1945.
FFM: XP-82.
FFL: Unconfirmed but likely Inglewood, Calif.
FFP: Unconfirmed but possibly Vance Breese.
Models/variants: F-82B, E, F, G, H.
Powerplant: One Allison V-1710-143 and one Allison V-1710-145 (the different engine submodels turned the F-82's propellers in opposite directions) liquid-cooled V-12s of 1,600 hp each.
Wingspan: 51 ft 3 in.
Length: 31 ft 1 in.
Height: 13 ft 10 in.
Weight: 24,864 lb gross.
Armament: Six .50-cal. machine guns and 4,000 lb of bombs or 25 5-in rockets.
Accommodation: Crew of two (pilot and copilot; pilot and radar operator on F-82G only).
Cost: $215,154.
Max. speed: 465 mph.
Range: 2,500 mi.
Ceiling: 38,900 ft.

F-84 Thunderjet
The F-84, USAF's first post–World War II fighter, began rolling off the production lines in June 1947. It was the first Air Force jet fighter capable of carrying a tactical nuclear weapon and the last subsonic straight-wing fighter-bomber. The F-84 pioneered the use of aerial refueling for fighters. The Thunderjets entered service in Korea in December 1950, were assigned to escort B-29s, and later were increasingly used for ground operations. F-84s were used on two significant raids on dams, on May 13 and 16, 1953, causing the loss of all electrical power to North Korea. In Korea, F-84 pilots flew 86,408 missions, dropped 50,427 tons of bombs, and managed to shoot down or damage 105 MiG-15s. On August 20, 1953, 17 F-84Gs, refueling from KC-97s, were flown nonstop 4,485 miles from Turner AFB, Ga., to RAF Lakenheath, UK, in the longest nonstop mass movement of fighter-bombers in history to that point and the greatest distance ever flown nonstop by single-engine jet fighters.

The first sweptwing model, the F-84F, originally designated YF-96A, was first flown on June 3, 1950. Four Air National Guard F-84F units were recalled to active duty during the Berlin crisis of 1961–62. The straight-wing F-84G was the first airplane used by the Air Force's aerial demonstration team, the Thunder-birds. F-84s were used in two different programs to provide protection for B-36 Peacemakers. One aircraft, the YRF-84F, was designed with a nose-mounted hook to attach to a trapeze suspended from the bomb bay of a B-36; another version featured a wingtip-to-wingtip attachment. Both of these programs were discontinued when aerial refueling was found to be much more practical. In addition to being used by the US Air Force, many were supplied to Allied nations participating in the Mutual Defense Assistance Program. The last straight-wing F-84s were retired from the Air National Guard in 1957. The last Guard F-84Fs were retired in 1971.

(Specifications for F-84F.)

Contractors: 1. Republic Aviation Corp. 2. General Motors Fisher Body Division.
Locations built: 1. Farming-dale, N.Y. 2. Kansas City, Mo.
Number built (USAF): 7,524 (4,009).
FF: February 28, 1946.
FFM: XP-84.
FFL: Muroc AAF, Calif.
FFP: Maj. Bill Lien.
Models/variants: F-84B, C, D, E, G. F-84F Thunderstreak. RF-84F Thunderflash.
Powerplant: One Wright J65-W-3 nonafterburning turbojet of 7,220 lb thrust.
Wingspan: 33 ft 7 in.
Length: 43 ft 5 in.
Height: 15 ft 0 in.
Weight: 28,000 lb gross.
Armament: Six .50-cal. machine guns and up to 6,000 lb of bombs (incl nuclear) or rockets underwing.
Accommodation: Pilot only.
Cost: $667,608.
Max. speed: 685 mph.
Range: 1,650 mi.
Ceiling: 44,300 ft.

F-86 Sabre

The Air Force's first sweptwing jet fighter, the F-86 was flown by 20 other countries. In spring 1948, the prototype become the first US fighter to go faster than the speed of sound when it exceeded Mach 1 in a shallow dive. On September 15, 1948, Maj. Richard L. Johnson recaptured the world speed record for the US, flying an F-86 over a three-km course at Muroc AFB, Calif., at 670.981 mph. In the Korean War, Sabre pilots shot down 792 Soviet-built MiG-15s at a loss of only 76 F-86s, a victory ratio of 10 to one. On December 17, 1950, Lt. Col. Bruce Hinton won the first combat between sweptwing fighters when he shot down a MiG-15. On July 27, 1953, Capt. Ralph S. Parr, while flying an F-86, recorded the last aerial victory in the Korean War when he shot down an Il-2. Air Force requirements for Korea precipitated the need for a second Sabre line, which was opened in Columbus, Ohio. The F-86D was designed as an all-weather interceptor and featured a redesigned nose to carry the radar. Pilots referred to this version as a "Sabre Dog." The F-86D was also the first Air Force fighter to have an all-rocket armament and the first all-weather interceptor to have only one person operating the radar fire-control system and flying the aircraft. It was one of the first airplanes to succeed itself in setting new world speed records, with pilots reaching 698.505 mph on November 19, 1952, and 715.697 mph on July 16, 1953. Lt. Col. William Barnes, the pilot on the latter flight, was also the first person to pass the 700 mph barrier. The F-86 was the mount for all 36 allied jet aces during the Korean War. F-86s were built under license in Canada, Japan, Australia, and Italy. More F-86Ds were produced than any other model: 2,504. The last F-86L (a modified D) left Air Defense Command service in June 1960, and the type served with the Air National Guard until mid-1965. Some aircraft (mostly foreign-built) were modified into remotely controlled full-scale targets and were used primarily by the Navy into the 1980s.

(Specifications for F-86H.)

Contractor: North American Aviation, Inc.
Locations built: Inglewood, Calif., and Columbus, Ohio.
Number built (USAF): 6,353 (5,893).
FF: October 1, 1947.
FFM: XP-86.
FFL: Muroc AFB, Calif.
FFP: George S. "Wheaties" Welch.
Models/variants: F-86A, D, E, F, H, L. RF-86A, F.
Powerplant: One General Electric J47-GE-27 turbojet of 5,970 lb thrust.
Wingspan: 37 ft 1 in.
Length: 37 ft 6 in.
Height: 14 ft 8 in.
Weight: 17,000 lb gross.
Armament: Six .50-cal. machine guns and 2,000 lb of bombs or 16 5-in. rockets.
Accommodation: Pilot only.
Cost: $211,111.
Max. speed: 690 mph.
Range: Approx 1,200 mi with external tanks.
Ceiling: 50,000 ft.

F-89 Scorpion

The F-89 was an all-weather fighter-interceptor designed to replace the P-61 and the interim F-82. Fairly conventional in design, the F-89's less than stellar career can be attributed primarily to the fact that it was underpowered. The Scorpion did have an unusual (for the time) design feature called decelerons, a control surface that could operate in one piece as an aileron or could be split open to serve as a speed break to allow crews to get into firing position behind a target. The first unit to be equipped with F-89s was the 84th Fighter-Interceptor Squadron at Hamilton AFB, Calif. The F-89 picked up the unofficial nickname "Stanley Steamer" because of the oversize main landing gear wheels that appeared to have

come off of a locomotive. Unique wingtip tanks on the F-89D carried folding-fin aerial rockets in the front half and fuel in the rear half. Because the engines sat so low to the ground, F-89C and later models featured a retractable inlet screen designed to prevent foreign-object ingestion. A total of 350 F-89Ds were converted to F-89Js under Project Ding Dong. These modifications were done to enable the Scorpion to carry the AIR-2A Genie, which allowed the F-89 to become Air Defense Command's first interceptor to carry nuclear weapons. On July 19, 1957, a Genie was launched from an F-89J, marking the first and only time in history that an air-to-air rocket with a nuclear warhead was launched and detonated. Called Operation Plumb Bob, this test took place at 20,000 ft over Yucca Flats, Nev. The rocket was fired at a point approximately 14,000 ft from the F-89, and the Genie covered this distance in 4.5 seconds. The warhead was detonated by ground command. The F-89 was removed from active-duty Air Force service in 1959. The last of the Air National Guard F-89s were retired in July 1969.

(Specifications for F-89D.)

Contractor: Northrop Aircraft, Inc.
Location built: Hawthorne, Calif.
Number built (USAF): 1,052 (1,052).
FF: August 16, 1948.
FFM: XF-89.
FFL: Muroc AFB, Calif.
FFP: Fred Bretcher.
Models/variants: F-89A, B, C, D, H, J.
Powerplant: Two Allison J35-A-35 (or -33A, -41, or -47) turbojets of 7,200 lb of thrust in afterburner.
Wingspan: 59 ft 8 in (over tiptanks).
Length: 53 ft 10 in.
Height: 17 ft 6 in.
Weight: 42,241 lb gross.
Armament: 52 Mighty Mouse 2.75-in folding-fin aerial rockets (FFARs) in each wingtip pod.
Accommodation: Two (pilot and radar operator in tandem). **Cost:** $801,602.
Max. speed: 632 mph.
Range: 1,370 mi.
Ceiling: Approx 49,200 ft.

F-94 Starfire

The F-94 was an interim all-weather interceptor developed from the T-33 trainer, which had been developed from the F-80. Initial tests showed that the engine was not powerful enough to support the increased weight of the electronic equipment and the Hughes E-1 fire-control radar. In addition to a higher-performing engine, several changes to the aircraft's lines were required. First accepted in December 1949, F-94As began replacing North American F-82s in Air Defense Command. When the Korean War broke out, Starfires were prohibited from flying over North Korea for fear of compromising their sophisticated electronic equipment. However, mounting B-29 losses led to the lifting of this restriction. On January 30, 1953, Capt. B.L. Fithian (pilot) and Lt. S.R. Lyons (radar operator) shot down an unseen LA-9 piston-engine fighter. The F-94C was phased out of Air Force service in 1959, and the last Air National Guard F-94s were retired in early 1960.

(Specifications for F-94C.)

Contractor: Lockheed Aircraft Co.
Location built: Burbank, Calif.
Number built (USAF): 856 (856).
FF: April 16, 1949.
FFM: YF-94.
FFL: Van Nuys, Calif.
FF Crew: Tony LeVier (pilot) and Glenn Fulkerson (observer).
Models/variants: F-94A, B, C.
Powerplant: One Pratt & Whitney J48-P-5 or -5A turbojet of 8,750 lb of thrust.
Wingspan: 42 ft 5 in (over tiptanks).
Length: 44 ft 6 in.
Height: 14 ft 11 in.
Weight: 24,200 lb gross.
Armament: 24 2.75-in Mighty Mouse FFARs in nose and 24 2.75-in FFARs in two wing pods (12 rockets in each).
Accommodation: Crew of two (pilot and radar intercept officer). **Cost:** $534,000.
Max. speed: 640 mph.
Range: 1,200 mi.
Ceiling: 51,000 ft.

F-100 Super Sabre

The F-100 was USAF's first operational airplane to be flown faster than the speed of sound (760 mph) at sea level in level flight. Originally designed as a dogfighter, the F-100 found greater utility as a fighter-bomber. On October 29, 1953, flying the YF-100A, Frank K. "Pete" Everest, Jr., established a new world speed record of more than 750 mph while flying a little more than 100 ft above the course set up at Salton Sea, Calif. On February 26, 1955, North American test pilot George Smith became the first person to survive ejection from an aircraft flying at supersonic speed. His F-100 was traveling 777 mph when the controls jammed and he was forced to punch out. The 479th Fighter Wing at George AFB, Calif., was the first unit to receive the "Hun," as the type became widely known. Shortly after initial delivery started, the airplanes were grounded and had to be modified, primarily because little was known about the sustained high-speed flight regimen. F-100s were sent to South Vietnam in February 1965. Several two-place F-100Fs became the first aircraft modified for the "Wild Weasel" radar-suppression mission. The first "Wild Weasels" arrived in Southeast Asia in November 1965; the first combat mission was flown on December 3. These Ironhand antiradar missions were usually undertaken by one F-100F accompanied by four F-105s. F-100s were used as armed forward air controllers, and these pilots were called Misty FACs. F-100s were used in Vietnam until the late 1960s. The Thunderbirds, the Air Force's aerial demonstration squadron, flew F-100Cs and Ds for most of 13 years and 1,080 shows. F-100s also flew with France, Denmark, Turkey, and Taiwan. F-100As were released to Air National Guard units in April 1958,

and the type served until 1979.
(Specifications for F-100D.)
Contractor: North American Aviation, Inc.
Locations built: Inglewood, Calif., and Columbus, Ohio.
Number built (USAF): 2,294 (2,249).
FF: May 25, 1953.
FFM: YF-100.
FFL: Edwards AFB, Calif.
FFP: George S. "Wheaties" Welch.
Models/variants: F-100A, C, D, F. RF-100A.
Powerplant: One Pratt & Whitney J57-P-21A turbojet of 16,000 lb of thrust in afterburner.
Wingspan: 38 ft 9 in.
Length: 47 ft 5 in (54 ft 2 in with pitot boom).
Height: 16 ft 2 in.
Weight: 38,048 lb gross.
Armament: Four M39E 20-mm cannon and six underwing hardpoints for up to 7,040 lb of payload, consisting of external tanks and/or ordnance incl bombs (incl nuclear), missiles (AIM-9 Sidewinder or AGM-12 Bullpup), or 38 2.75-in folding-fin aerial rockets (FFARs) in LAU-3/A launchers.
Accommodation: Pilot only (crew of two in tandem on F-100F).
Cost: $697,029.
Max. speed: 864 mph.
Range: 1,200 mi.
Ceiling: 47,700 ft.

F-101 Voodoo
Developed from the XF-88 interceptor, the F-101 was originally conceived as a long-range escort fighter for Strategic Air Command B-36s but went on to a lengthy career as an interceptor and the Air Force's first supersonic reconnaissance aircraft. After entering service in 1957, the F-101 was used in a number of speed and point-to-point record runs. On November 27, 1957, four RF-101A pilots took off from March AFB, Calif., as part of Operation Sun-Run. Refueled in flight, two of the crews landed at McGuire AFB, N.J., and two turned around and landed back at March. Lt. Gustav Klatt set an eastbound coast-to-coast record of three hours, seven minutes, 43 seconds, while Capt. Robert Sweet set a westbound coast-to-coast record (3:36:33) and a Los Angeles–New York–Los Angeles record (6:46:36). On December 12, 1957, Maj. Adrian Drew, flying an F-101A at Edwards AFB, Calif., set a new absolute speed record of 1,207.34 mph. The last record-breaking flight of this rush of records came on April 15, 1959, when Capt. George A. Edwards set a 500-km closed-course record of 816.28 mph, also at Edwards. The Voodoo picked up the nickname "One-Oh-Wonder." The F/RF-101 series achieved a record for the lowest first-year accident rate of any Air Force fighter in history to that point. F/RF-101 production ran until 1961. RF-101 crews flew their first missions in Vietnam in 1961 as part of Operation Pipe Stem and the later Operation Able Mable. Pilots from the 363d Tactical Reconnaissance Wing at Shaw AFB, S.C., flew the RF-101's first operational low-level missions on October 23, 1962, during the Cuban Missile Crisis. RF-101 crews provided a majority of tactical reconnaissance in Southeast Asia until 1965, then shared duties with RF-4 crews. Most of the RF-101s ended up with the Air National Guard, and a number of F-101 interceptors were later converted to RF-101G/Hs. Roughly 70 surplus Voodoos were transferred to the Royal Canadian and Nationalist Chinese Air Forces. The last Air Force F-101 and the last Guard RF-101 were both retired in 1982.
(Specifications for F-101B.)
Contractor: McDonnell Aircraft Co.
Location built: St. Louis, Mo.
Number built (USAF): 807 (807).
FF: September 29, 1954.
FFM: F-101A.
FFL: Edwards AFB, Calif.
FFP: Robert Little.
Models/variants: F-101A, B, C, F. RF-101A, B, C, G, H. TF-101B, F.
Powerplant: Two Pratt & Whitney J57-P-53 or -55 turbojets of 16,900 lb of thrust each in afterburner.
Wingspan: 39 ft 8 in.
Length: 71 ft 1 in (incl pitot boom).
Height: 18 ft 0 in.
Weight: 52,400 lb gross.
Armament: Two AIR-2A Genie rockets in an internal bay and two AIM-4 Falcon missiles under the fuselage.
Accommodation: Two (pilot and radar intercept officer in tandem).
Cost: $1.82 million.
Max. speed: 1,134 mph.
Range: 1,550 mi.
Ceiling: 52,100 ft.

F-102 Delta Dagger
The F-102 was the world's first supersonic all-weather jet interceptor and the Air Force's first operational delta-wing aircraft. It was developed from the XF-92A, and it was the first Air Force aircraft program to have an integrated weapons system, as the fire-control radar and the missile were both made by Hughes. At peak deployment, there were more than 25 squadrons of F-102s. After the prototype flew, it was readily apparent that the original design was seriously flawed and the aircraft would not routinely reach supersonic speeds. Convair embarked on a major redesign program and, using the "area rule" principle developed by noted aerodynamicist Richard T. Whitcomb, produced the revised prototype after only 117 days. With its pinched or "Coke bottle" waist, the revised design corrected the problems. The F-102 was the first Air Force fighter whose primary armament was guided missiles. F-102s were sent to South Vietnam, initially for air defense, but later flew escort for B-52s, and one was shot down by a MiG-21 on February 3, 1968. F-102s were also stationed in Greenland and Europe, in addition to the continental US and Alaska. Some of the Air Force planes were transferred to the Greek and Turkish air forces. The TF-102As were the operational trainers and had side-by-side seating. After being withdrawn from service, the F-102s were converted into target drones by Sperry Flight Systems under a program called Pave Deuce. The last F-102 was phased out of Air National Guard service in 1976.
(Specifications for F-102A, except as noted.)
Contractor: Consolidated-Vultee Aircraft Corp. (later Convair Division of General Dynamics Corp.).
Location built: San Diego, Calif.
Number built (USAF): 1,000 (1,000).
FF: October 24, 1953.
FFM: YF-102A.
FFL: Edwards AFB, Calif.
FFP: Richard L. "Dick" Johnson.
Models/variants: YF-102A. F-102A, TF-102A. QF-102A,

PQM-102A.
Powerplant: One Pratt & Whitney J57-P-23 turbojet of 16,000 lb of thrust in afterburner.
Wingspan: 38 ft 1 in.
Length: 68 ft 3 in (incl pitot boom).
Height: 21 ft 2 in.
Weight: 31,500 lb gross.
Armament: Two AIM-26 (nuclear warhead–tipped Falcon missile derivative; one W-54 nuclear warhead in the low kiloton range yield) or one AIM-26 and two AIM-4 Falcon missiles or six AIM-4 Falcon missiles and 24 2.75-in Mighty Mouse folding fin aerial rockets (FFARs) in an internal bay.
Accommodation: Pilot only (pilot and student, side by side in TF-102).
Cost: $1.2 million.
Max. speed: 825 mph.
Range: Approx 1,000 mi.
Ceiling: 54,000 ft.

F-104 Starfighter
The F-104 was frequently described as "the missile with a man in it." The type found greater use with foreign operators than with the US Air Force. The F-104, while an extremely high-performance airplane, was extremely "hot" and an unforgiving aircraft to fly. It was the first operational fighter capable of sustained speeds above Mach 2 and the first aircraft ever to hold the world speed and altitude records simultaneously. Because of development problems, the type entered service two years later than expected. Deliveries to the Air Force began in January 1958. On May 7, 1958, Maj. Howard C. Johnson reached an altitude of 91,243 ft, and on May 16, Capt. Walter W. Irwin reached a speed of 1,404.19 mph. On December 14, 1959, an F-104C pilot boosted the world's altitude record to 103,389 ft, thus becoming the first aircraft to take off under its own power and exceed the 100,000-ft plateau. In 1964, Jacqueline Cochran flew a TF-104 to three women's speed records over a closed course. One F-104 was modified with the addition of a rocket engine and reaction-control jets, was designated NF-104, and was used for astronaut training. F-104s were deployed to NAS Key West, Fla., in response to the Cuban Missile Crisis. F-104s were sent to Vietnam but were not effective. The Air Force used only about one-third of the F-104s built, with most going to or being built in West Germany, Italy, Japan, Belgium, Denmark, Greece, Norway, Spain, Taiwan, Jordan, Pakistan, and Turkey. A number of aircraft were converted into full-scale drones. The last Air National Guard Starfighters were retired in 1975.
(Specifications for F-104A.)
Contractor: Lockheed Aircraft Co.
Location built: Burbank, Calif.
Number built (USAF): 2,536 (296).
FF: March 4, 1954.
FFM: XF-104.
FFL: Edwards AFB, Calif.
FFP: Tony LeVier.
Models/variants: F-104A, B, C, D.
Powerplant: One General Electric J79-GE-3 turbojet 14,800 lb thrust in afterburner.
Wingspan: 21 ft 11 in.
Length: 54 ft 9 in.
Height: 13 ft 6 in.
Weight: 24,804 lb gross.
Armament: One General Electric M61 Vulcan 20-mm cannon and two GAR-8 (later redesignated AIM-9) Sidewinder air-to-air missiles.
Accommodation: Pilot only (student and pilot in tandem in F-104B, D).
Cost: $1.7 million.
Max. speed: 1,324 mph.
Range: 730 mi.
Ceiling: Approx 57,700 ft.

F-105 Thunderchief
The F-105 was developed to meet Air Force requirements for a supersonic, single-seat fighter-bomber able to deliver heavy loads of conventional bombs and rockets and nuclear weapons at high speeds over long ranges. The F-105, popularly known as the "Thud," "Lead Sled," and "Squash Bomber" (if all else failed, the pilot could shut down his engine and squash the target with the aircraft), ended up as the heaviest US single-engine, single-seat fighter ever. The first airplane was delivered to the Air Force on May 27, 1958. The F-105Ds bore the brunt of the Rolling Thunder campaign to bomb targets in North Vietnam. The F-105F replaced the F-100F in the "Wild Weasel" radar-suppression mission. Some later G models were also converted for that role. The F-105 "Wild Weasels" carried both the AGM-78 Standard ARM and the AGM-45 Shrike antiradiation missiles. Despite the huge size of the airplane, Thunderchief crews downed 25.5 enemy aircraft of all types in Vietnam. Thunderchief crews flew 101,000 strike missions and dropped 202,596 tons of bombs. All told, 382 F-105s were shot down over Vietnam. However, on August 2, 1967, F-105 pilots successfully destroyed the Paul Doumer Bridge north of Hanoi, which was one of the most heavily defended targets of the war. Fourteen SA-2 SAMs were launched at the F-105s, but not one aircraft was shot down. Capt. Merlyn H. Dethlefsen and Maj. Leo K. Thorsness were both awarded the Medal of Honor for their actions while flying F-105s during 1967. The F-105B was briefly flown by the Air Force's aerial demonstration team, the Thunderbirds, for six performances in 1964, but the aircraft was found to be unsuitable for airshows. The last active-duty F-105 was retired in 1980 and the last from the Air Force Reserve in 1984.
(Specifications for F-105D.)
Contractor: Republic Aviation Corp.
Location built: Farmingdale, N.Y.
Number built (USAF): 833 (833).
FF: October 22, 1955.
FFM: YF-105A.
FFL: Edward AFB, Calif.
FFP: Russell M. "Rusty" Roth.
Models/variants: F-105B, D, F, G.
Powerplant: One Pratt & Whitney J75-P-19W turbojet of 24,500 lb thrust in afterburner.

Wingspan: 34 ft 11 in.
Length: 64 ft 5 in (67 ft 0 in with boom).
Height: 19 ft 8 in.
Weight: 52,546 lb gross.
Armament: One General Electric M61 Vulcan 20-mm cannon and up to 14,000 lb of bombs (incl nuclear) or missiles.
Accommodation: Pilot only (pilot and weapons system operator in tandem on F-105F/G).
Cost: $2.14 million.
Max. speed: 1,390 mph.
Range: 2,206 mi.
Ceiling: 51,000 ft.

F-106 Delta Dart
The F-106 was originally developed from the F-102, but the changes were so extensive that the aircraft was redesignated. The Delta Dart was fitted with the MA-1 electronic guidance and fire-control system, which operated with the SAGE (Semiautomatic Ground Environment) defense system. The SAGE system allowed the F-106 to be flown automatically from wheels up on takeoff to flareout before touchdown. The F-106 was the aircraft that finally met the Air Force's original 1948 specifications for the "ultimate interceptor." The F-106 entered service in May 1959 with the 539th Fighter Interceptor Squadron at McGuire AFB, N.J., and 498th FIS at Geiger Field, Wash. Fourteen squadrons eventually received it, with deliveries completed in 1961. Retired from the active-duty (July 1987) and Air National Guard interceptor squadrons (August 1988), the remaining aircraft were converted into QF-106 target drones. The last dedicated air defense interceptor, the Delta Dart was universally referred to as "the Six." On February 2, 1970, an F-106 entered an uncontrollable flat spin, and the pilot ejected. After the pilot and seat departed, the aircraft recovered on its own (apparently due to the balance and configuration changes), circled, and miraculously made a gentle belly landing in a snow-covered field near Big Sandy, Mont. That aircraft was repaired, returned to service, and is now on display at the US Air Force Museum at Wright-Patterson AFB, Ohio. The F-106 was continually upgraded over its career, such as with a new ejection seat and updated avionics, under several programs named Wild Goose, Broad Jump, and Dart Board. The F-106 was primarily replaced by F-16s, although a few ANG units converted to F-15s.
(Specifications for F-106A, except as noted.)
Contractor: Convair Division of General Dynamics Corp.
Location built: San Diego, Calif.
Number built (USAF): 340 (340).
FF: December 26, 1956.
FFM: YF-106A (originally F-102B).
FFL: Edwards AFB, Calif.
FFP: Richard L. "Dick" Johnson.
Models/variants: F-106A, B. NF-106B.
Powerplant: One Pratt & Whitney J75-P-17 turbojet of 24,500 lb of thrust in afterburner.
Wingspan: 38 ft $3^1/2$ in.
Length: 70 ft 9 in.
Height: 20 ft 3 in.
Weight: 34,510 lb gross.
Armament: One AIR-2A Genie nuclear-tipped rocket (one W-25 warhead with a yield of approx 1.5 kilotons) and four AIM-4 Falcon missiles in an internal bay; the AIR-2A was later replaced in some aircraft with a General Electric M61A1 Vulcan 20-mm cannon.
Accommodation: Pilot only (student and pilot in tandem on F-106B).
Cost: $4.9 million.
Max. speed: 1,525 mph.
Range: Approx 1,500 mi.
Ceiling: 53,000 ft.

F-111 Aardvark
The F-111 was the first operational Air Force aircraft to have variable-geometry, or swingwings. This allowed for slower speeds for good takeoff and landing characteristics and better high-speed qualities with the wings swept back. The F-111 had a controversial history. Defense Secretary Robert S. McNamara mandated that the Air Force and Navy fly the same airplane. Seven Navy F-111Bs were built, but the type was deemed unsuitable for carrier operations. The Navy version was canceled, and the F-14 was built instead. Initially known as TFX, the F-111 was designed to replace the F-105. As an early operational test, six F-111s were sent to Vietnam, but three of the aircraft were lost to noncombat accidents and the type was withdrawn. The F-111 used a terrain-following radar system. The FB-111 was the nuclear-capable version. These aircraft were converted to F-111Gs in 1987. On April 15, 1986, F-111 crews stationed at RAF Lakenheath, UK, along with Navy A-6 crews, carried out a retaliatory raid (Operation Eldorado Canyon) against Libya in response to state-sponsored terrorism. During the Persian Gulf War, F-111s were used to great effect in a role for which they were never intended—"tank plinking," or hunting down and destroying individual vehicles. It was also the only airplane that could carry the GBU-28/U deep-penetrating bomb. The F-111 was retired in July 1996, although the EF-111A is still in service. The F-111 was nicknameless until the crews' unofficial name, Aardvark, was bestowed officially on the day it was retired.
(Specifications for F-111A.)
Contractors: 1. Fort Worth Division of General Dynamics. 2. Grumman Aerospace.
Locations built: 1. Fort Worth, Tex. 2. Bethpage, N.Y.
Number built (USAF): 562 (531).
FF: December 21, 1964.
FFM: F-111A.
FFL: Fort Worth, Tex.
FF Crew: Dick Johnson and Val Prahl.
Models/variants: F-111A, D, E, F, G. FB-111A. EF-111A Raven.
Powerplant: Two Pratt & Whitney TF30-P-103 turbofans of 18,500 lb thrust each with afterburner. (Two Pratt & Whitney TF30-P-7 turbofans of 20,350 lb thrust each with afterburner on FB-111A.)
Wingspan: Wings extended: 63 ft 0 in (70 ft 0 in on FB-

111A). Wings swept: 31 ft 11 in (33 ft 11 in on FB-111A).
Length: 73 ft 6 in (75 ft 6 in with pitot boom).
Height: 17 ft $1^{1}/2$ in.
Weight: 92,657 lb gross.
Armament: One General Electric M61A1 Vulcan 20-mm cannon and one B61 free-fall nuclear bomb with a selectable yield between 100 and 500 kilotons or two B61s internally and up to 31,000 lb of bombs, missiles, or fuel tanks on four underwing hardpoints. (Two AGM-69 Short-Range Attack Missiles, each with a W-69 nuclear warhead with a yield of 170 kilotons internally, and up to four AGM-69 on underwing hardpoints or provisions for up to 31,500 lb of conventional bombs on FB-111.)
Accommodation: Two (pilot and weapon system officer, side by side, in an escape module).
Cost: $8.2 million.
Max. speed: 1,452 mph.
Range: Approx 3,800 mi.
Ceiling: 51,000 ft.

Attack/Observation

A-1 Skyraider
This rugged, dump truck of an attack aircraft originally developed for the Navy was used to attack targets on the ground in Viet Cong strongholds in South Vietnam as well as in Cambodia and Laos. It was nicknamed “Spad,” as pilots considered it a throwback airplane in the jet-age Air Force. The Skyraider was also used to cover rescue operations, where the type picked up a second nickname, “Sandy,” its radio call sign. On March 10, 1966, Maj. Bernard F. Fisher, a 1st Air Commando Squadron A-1E pilot, landed on the A Shau airstrip after it had been overrun by North Vietnamese regulars and rescued Maj. D. Wayne “Jump” Myers. Major Fisher was awarded the Medal of Honor, and his A-1E was flown by Major Myers to the US Air Force Museum at Wright-Patterson AFB, Ohio, where it is now on display. On September 1, 1968, Col. William A. Jones III, while leading a rescue mission, was hit and his A-1H was heavily damaged, but he returned to base and reported the position of the downed flyer, who was rescued that day. Shortly thereafter, Colonel Jones perished in a civilian aircraft accident, and he was posthumously awarded the Medal of Honor. The Air Force flew Skyraiders in Vietnam until late 1972, when the aircraft were turned over to the South Vietnamese Air Force.
(Specifications for A-1E.)
Contractor: Douglas Aircraft Co.
Location built: El Segundo, Calif.
Number built (USAF): 3,180 (approx 100).
FF: March 18, 1945.
FFM: XBT2D-1.
FFL: El Segundo, Calif.
FFP: LaVerne Brown.
Models/variants: A-1E, G, H, J. EA-1E.
Powerplant: One Wright R-3350-26W89A Cyclone 18-cylinder radial of 2,700 hp.
Wingspan: 50 ft 0 in.
Length: 40 ft 1 in.
Height: 15 ft 10 in.
Weight: 24,872 lb.
Armament: Four 20-mm cannon mounted in the wings and 15 underwing and centerline hardpoints for up to 8,000 lb of bombs, rockets, gun pods, or fuel tanks.
Accommodation: Pilot only.
Cost: $414,000.
Max. speed: 321 mph.
Range: Approx 1,400 mi.
Ceiling: 26,200 ft.

A-7 Corsair II
The Air Force A-7s were derived from the Corsair developed for the Navy and were ordered virtually off the shelf, the only significant differences being in the engine and the addition of a 20-mm cannon, which the Navy adopted for later models. The aircraft were universally known as SLUFs, an acronym for Short Little Ugly Feller (polite form). The first Air Force YA-7D prototype was flown for the first time at NAS Dallas, Tex., by John W. Konrad on April 5, 1968. The type achieved high accuracy with bomb drops by the aid of an automatic electronic navigation and weapons delivery system. The first operational wing was the 354th Tactical Fighter Wing at Myrtle Beach AFB, S.C. A-7s were sent to Vietnam in October 1972 and were used for a number of missions, most extensively as support aircraft for search-and-rescue missions. The A-7 replaced the A-1 on these “Sandy” missions. In 1973, the Air Force began assigning A-7Ds to Air National Guard units. On August 15, 1973, Maj. John J. Hoskins and Capt. Lonnie O. Ratley flew the last US bombing mission of the Vietnam War when they bombed targets near Phnom Penh, Cambodia. Air Force A-7s were also used to support the rescue of the SS *Mayaguez* on April 30, 1975, after it was seized by Cambodian forces. The YA-7F was the Corsair II fitted with an F100 engine in an attempt to breathe new life into the type, but it never went beyond test flight. The Navy used some of their Corsairs in Desert Storm. All A-7s were phased out of Air National Guard service by the end of 1993.
(Specifications for A-7D, except as noted.)
Contractor: Ling-Temco-Vought, Inc. (LTV).
Location built: Dallas, Tex.
Number built (USAF): 1,551 (484).
FF: September 27, 1965.
FFM: YA-7A.
FFL: NAS Dallas, Tex.
FFP: John W. Konrad.
Models/variants: A-7D, K.
Powerplant: One Allison TF41-A-1 nonafterburning turbofan of 14,500 lb thrust.
Wingspan: 38 ft 9 in.
Length: 46 ft $1^{1}/2$ in.
Height: 16 ft $0^{3}/4$ in.
Weight: 42,000 lb gross.

Armament: One General Electric M61A1 Vulcan 20-mm cannon and up to 15,000 lb of bombs, missiles, mines, rockets, or gun pods on six underwing and two fuselage hardpoints.
Accommodation: Pilot only (student and pilot on A-7K).
Cost: $2.86 million.
Max. speed: 698 mph.
Range: 2,871 mi.
Ceiling: 51,000 ft.

A-20 Havoc
The A-20 was designed to meet an Army Air Corps attack specification in 1938 but was in use by the French and British before delivery to US squadrons. Begun as a company-funded venture, the Havoc eventually became the most-produced Army Air Forces attack aircraft. It was also the one of the first US combat aircraft to have a nosewheel. On July 4, 1942, the first Army Air Forces bomber mission over Western Europe was flown by US crews of the 15th Bomb Squadron operating British Bostons IIIs (the Royal Air Force's name for most of their Havocs) against airfields in the Netherlands. The A-20 was used in every theater of the war and was also flown by Australia, Brazil, South Africa, and the Netherlands. The Soviets actually received more A-20s than the US did, but little is known about the type's operational career there. Some of the Dutch aircraft were captured by the Japanese and appropriated into service. The export version of the A-20C was the first aircraft to be ordered under a lend-lease contract. The P-70 was a modified A-20 fitted with an airborne intercept radar and four 20-mm cannon in a belly package as an interim night fighter until the P-61 was available. The F-3A was the photoreconnaissance version.
(Specifications for A-20B.)
Contractors: 1. Douglas Aircraft Co. 2. Boeing Aircraft Co.
Locations built: 1. Santa Monica, El Segundo, and Long Beach, Calif. 2. Seattle, Wash.
Number built (USAF): 7,478 (approx 5,310).
FF: October 26, 1938.
FFM: Company Model 7B.
FFL: El Segundo, Calif.
FFP: Johnny Cable.
Models/variants: A-20, A-20A, B, C, G, H, J, K. P-70.
Powerplant: Two Wright R-2600-23 Cyclone 14-cylinder radials of 1,600 hp each.
Wingspan: 61 ft 4 in.
Length: 48 ft 0 in.
Height: 17 ft 7 in.
Weight: 27,200 lb gross.
Armament: Eight .50-cal. machine guns (six in the nose, two in the dorsal electric turret), one .30-cal. machine gun in the ventral opening and 2,000 lb of bombs internally and up to 2,000 lb of bombs externally on underwing hardpoints.
Accommodation: Crew of three (pilot, navigator, and gunner).
Cost: $74,000.
Max. speed: 339 mph.
Range: 1,090 mi.
Ceiling: 25,800 ft.

A-26 Invader
The A-26 was the follow-on design to the A-20 and entered combat in late 1944. The type had early developmental difficulties, and it took 28 months to go from first flight to combat operations. After being redesignated as B-26 in 1948, it was the only attack airplane available when war broke out in Korea. Crews flew their first mission against North Korea on June 29, 1950, when they bombed an airfield at Pyongyang. Air Force B-26s were credited with the destruction of 38,500 vehicles, 3,700 railway cars, 406 locomotives, and seven enemy aircraft on the ground in Korea. On September 14, 1951, while flying a night intruder mission, Capt. John S. Walmsley, Jr., attacked a North Korean supply train, but after his guns jammed he used his search light to light the way for his wingmen to finish destroying the train. Captain Walmsley was shot down, died, and was posthumously awarded the Medal of Honor. On July 27, 1953, 24 minutes before the cease-fire was signed, a B-26 crew from the 3d Bomb Wing dropped the last bombs of the Korean War. Some holdover RB-26s were part of the initial cadre of aircraft sent to Vietnam as part of Operation Farm Gate. In the early 1960s, On-Mark Engineering converted approximately 40 aircraft into the B-26K Counter Invader for counterinsurgency missions in Vietnam. These aircraft were later redesignated A-26A because of an agreement with the Thai government that no bombers would be stationed there. This type was flown by more than a dozen other countries. A number of aircraft were converted into executive transports for the civilian market. The Navy version, designated JD-1, was used into the 1960s for target towing. Most Air National Guard planes were retired by 1957, but the last VB-26 was retired in 1972.
(Specifications for A-26B.)
Contractors: 1. Douglas Aircraft Co. 2. On-Mark Engineering Co.
Locations built: 1. El Segundo and Long Beach, Calif., and Tulsa, Okla. 2. Van Nuys, Calif.
Number built (USAF): 2,452 (2,364).
FF: July 10, 1942.
FFM: XA-26.
FFL: El Segundo, Calif.
FFP: Ben O. Howard.
Models/variants: A-26B, C. B-26K (later redesignated A-26A). TB-26B, C. VB-26B. EB-26C.
Powerplant: Two Pratt & Whitney R-2800-27 Double Wasp 18-cylinder, twin-row radials of 2,000 hp each.
Wingspan: 70 ft 0 in.
Length: 50 ft 8 in.
Height: 18 ft 6 in.
Weight: 35,000 lb gross.
Armament: 10–12 .50-cal. machine guns (four or six in the nose and two each in the dorsal and ventral turrets)

and 4,000 lb of bombs internally and up to 2,000 lb of bombs on underwing hardpoints or four .50-cal. machine guns in gun packs underwing.
Accommodation: Crew of three (pilot, navigator, and gunner).
Cost: $172,000.
Max. speed: 355 mph.
Range: 1,400 mi.
Ceiling: 22,100 ft.

1909 Military Flyer
The world's first military aircraft. It was built in response to Signal Corps Specification 486, issued December 1907. On July 27, 1909, Orville Wright, with Lt. Frank P. Lahm as passenger, flew the aircraft for one hour, 12 minutes, 40 seconds and covered 40 miles, which met the Army's endurance requirement as stated in Specification 486. On July 30, 1909, Orville Wright, with Lt. Benjamin D. Foulois as passenger, covered a 10-mile test course from Fort Myer, Va., to Shooter's Hill in Alexandria, Va., and back to Fort Myer at an average speed of 42 mph, earning the Wrights their performance bonus (10 percent of the aircraft's base price for each mile an hour over 40). The aircraft was accepted by the Signal Corps on August 2, 1909, and redesignated Signal Corps Aeroplane Number 1. This aircraft was essentially the same as the 1908 Flyer, which had crashed and had been destroyed at Fort Myer on September 17, 1908, when a propeller shattered. Lt. Thomas E. Selfridge was killed and Orville Wright suffered a broken hip in that mishap. The 1909 Flyer was used to teach Lieutenant Lahm (the first US pilot to earn the distinction of "Military Aviator") and Lt. Frederic E. Humphreys to fly. Lieutenant Foulois taught himself to fly in this aircraft in 1910. Lt. Henry H. "Hap" Arnold, who would lead the AAF in World War II and would lead the crusade for a separate Air Force, also flew Aeroplane Number 1 while it was based in College Park, Md. The aircraft was determined unfit to fly by 1911 and was retired. It is now on display at the National Air and Space Museum in Washington, D.C.
Contractor: Wilbur and Orville Wright.
Location built: Dayton, Ohio.
Number built (USAF): One (one).
FF: June 3, 1909.
FFM: 1909 Military Flyer.
FFL: Fort Myer, Va. (first Army demonstration flight).
FFP: Orville Wright.
Models/variants: 1909 Military Flyer.
Powerplant: One Wright liquid-cooled, four-cylinder of 30.6 hp.
Wingspan: 36 ft 6 in.
Length: 28 ft 11 in.
Height: 8 ft 1 in.
Weight: 740 lb gross.
Armament: None.
Accommodation: two, side by side. **Cost:** $25,000, plus $5,000 bonus for exceeding the speed performance specification.
Max. speed: 47 mph.
Range: Endurance: Approx one hr. **Ceiling:** Approx 175 ft.

Caquot Balloon
The traditional spherical balloon spins and bucks terribly when tethered to the ground, so shortly after the turn of the century, the German Army came up with a kite-shaped balloon that would keep the aircraft pointed into the wind. This design was refined by the addition of tailfins for stability. French Lt. Albert Caquot greatly refined the design with the inclusion of three inflatable tailfins at 120° intervals around in the aft section of the gas bag. These fins were kept inflated by an airscoop facing into the wind. The Caquot-type balloons, capable of lifting the mooring cable, basket, observers, and communications and charting equipment, were used extensively for artillery-spotting over land and limited over-the-horizon observation at sea. During their months of service at the front, US balloon observers were credited with directing artillery fire at 316 targets, noting 11,856 aircraft, and reporting numerous enemy activities. Most of the US balloons were manufactured from 1918 to 1919 and, after being redesignated C-3s, were used until the 1930s at Army artillery schools. The design was briefly reprised at the beginning of World War II and produced in limited numbers. World War II barrage balloons used the same basic design.
(Specifications for Caquot Type R.)
Contractor: Goodyear Tire and Rubber Co., primarily.
Location built: Akron, Ohio.
Number built (USAF): Approx 1,000 (Most of the US production run went to the American Expeditionary Force in Europe, although some were supplied to other Allies. Also, until rate production was achieved in the US, the AEF used approx 20 French-supplied Caquots.).
FF: Unconfirmed.
FFL: Akron, Ohio.
FFP: Unconfirmed.
Models/variants: Type M, R. C-3.
Powerplant: None.
Length: 92 ft 0 in.
Diameter: 32 ft 0 in.
Gas Capacity: 3,220 cu ft of hydrogen.
Armament: None.
Accommodation: Two (both observers in a wicker basket suspended underneath). **Cost:** Unconfirmed.
Max. speed: N/A.
Range: Maximum observation distance was up to 40 mi, depending on weather and terrain.
Ceiling: Operating altitude ranged between 1,000 and 4,000 ft.

L-4 Grasshopper
The military version of the Piper Cub, the L-4 was produced in large numbers for the then-new role of airborne artillery spotting and liaison. The L-4 prototypes, which were designated YO-59 and O-59, were evaluated by the Army in its annual maneuvers at the end of 1941. The L-4Bs (980 airplanes), L-4Hs (1,801), and L-4Js (1,680) were the only models that were actually produced as such, but the need for this type of airplane was so great that the L-4Cs, Ds, Es, Fs, and Gs were all civilian airplanes impressed into service by the Army. The impressed airplanes were used mainly to train glider pilots. The L-4 performed its first combat mission for the Army on November 9, 1942, when three of these airplanes were flown off a carrier deck to spot for ground units going ashore in the invasion of North Africa. The airplanes were piloted by Lt. William Butler (with Capt. Brenton Deval sitting in the back seat), Lt. John R. Shell, and Capt. Ford Allcorn. The TG-8 was a training glider evolved from the L-4. Members of the Civil Air Patrol flew hundreds of the L-4s searching for enemy submarines in coastal waters. At the end of World War II, many of the L-

4s were sold in place in Europe.
(Specifications for L-4B.)
Contractor: Piper Aircraft Corp.
Location built: Lock Haven, Pa.
Number built (USAF): 14,125 (approx 5,160).
FF: September 10, 1930.
FFM: Taylor Aircraft Co. E-2.
FFL: Bradford, Pa.
FFP: Unconfirmed.
Models/variants: O-59, O-59A (later redesignated L-4, L-4A). L-4B, C, D, E, F, G, H, J, K.
Powerplant: One Continental O-170-3 flat-4 of 65 hp.
Wingspan: 35 ft 3 in.
Length: 22 ft 0 in.
Height: 6 ft 8 in.
Weight: 1,220 lb gross.
Armament: Usually one or two M1911 .45-cal. pistols carried by crew; aircraft had none.
Accommodation: Crew of two (pilot and observer).
Cost: $2,600.
Max. speed: 85 mph.
Range: 190 mi.
Ceiling: 9,300 ft.

O-1 Bird Dog
The O-1 is a two-place observation and liaison aircraft that was widely used by the Air Force in Vietnam for forward air control duties. It was developed from the Cessna commercial Model 170 for a joint Army and Air Force competition in 1950, although the Air Force did not buy any planes at that time. Originally designated L-19, the Bird Dog was redesignated O-1 when the observation category was revived in 1962. All of the Air Force's O-1s were originally transferred from the Army. Before pilots deployed to Vietnam, they trained at Holly Field, Fla., and then underwent special in-country training at Hue, South Vietnam, at what was called FAC University or, irreverently, "FAC U." The first dedicated Air Force FAC unit to be assigned to Vietnam was the 19th Tactical Air Support Squadron, which was activated at Bien Hoa AB, South Vietnam, in July 1963; three other squadrons were added later. In the high-threat environment, the slow and unarmed O-1s were eventually replaced by the O-2 in the Air Force and the OV-10 in the Marine Corps; most of the O-1s were given to the South Vietnamese Air Force. On February 24, 1967, Air Force Capt. Hilliard A. Wilbanks, a FAC, resorted to firing an M16 out of the side window of his O-1 in order to cover the retreat of a South Vietnamese Ranger battalion caught in an ambush near Dalat. Severely wounded by gunfire, Captain Wilbanks crashed in the battle area but was rescued by the Rangers. He soon died of his injuries and was posthumously awarded the Medal of Honor. The FACs became quite knowledgeable about the area where they worked and could spot even subtle changes that could indicate the presence of Viet Cong. On April 30, 1975, Vietnamese Air Force Maj. Buong Ly avoided capture by flying himself and his family on an O-1 out to the South China Sea and successfully landing on the aircraft carrier USS *Midway.* This airplane is now on display at the National Museum of Naval Aviation at NAS Pensacola, Fla.
(Specifications for O-1F.)
Contractor: Cessna Aircraft Co.
Location built: Wichita, Kan.
Number built (USAF): 3,431 (unconfirmed).
FF: On or about December 8, 1950.
FFM: Company Model 305A.
FFL: Wichita, Kan.
FFP: Hank Waring.
Models/variants: O-1D, F, G.
Powerplant: One Continental O-470-11 flat-six piston of 213 hp.
Wingspan: 36 ft 0 in.
Length: 25 ft 10 in.
Height: 7 ft $3^1/2$ in.
Weight: 2,800 lb gross.
Armament: Four underwing hardpoints for white phosphorus smoke rockets; one M1911 .45-cal. pistol carried by pilot and/or one M16 7.62-mm rifle carried in the cockpit.
Accommodation: Pilot only.
Cost: $11,000.
Max. speed: 151 mph.
Range: 530 mi.
Ceiling: 18,500 ft.

OA-1
The OA-1 was the first amphibious aircraft purchased by the Army Air Service in significant quantity and was the first to incorporate an integral fuselage float design. Three of the prototypes were turned over to the Navy for the 1925 MacMillan Expedition, during which Cmdr. Richard E. Byrd and his men flew 6,000 miles across the Arctic in less than 12 days. Those same airplanes were subsequently sent to Cuba where they were used to complete a hydrographic survey for the Navy. On December 21, 1926, five Air Corps OA-1A crews left San Antonio, Tex., on the 22,000-mile Pan-American Goodwill Tour of 25 Central and South American countries, which lasted until May 2, 1927. One airplane, *San Francisco,* was flown by Capt. Ira C. Eaker and 1st Lt. Muir S. Fairchild, who would go on to be leaders of the World War II Army Air Forces. All of the flyers on the tour were awarded the Mackay Trophy for the most meritorious flight of the year, and each member was awarded the Distinguished Flying Cross.
(Specifications for OA-1A.)
Contractor: Loening Aeronautical Engineering Corp.
Location built: New York, N.Y.
Number built (USAF): 34 (34).
FF: 1924.
FFM: XCOA-1.
FFL: Unconfirmed but likely New York, N.Y.
FFP: Unconfirmed.
Models/variants: OA-1A, B, C.
Powerplant: One Liberty V-1650-1 V-12 of 400 hp.
Wingspan: 45 ft 0 in.
Length: 34 ft 7 in.
Height: 12 ft 1 in.
Weight: 5,010 lb gross.
Armament: Three .30-cal. machine guns (one fixed firing forward and two flexible-mount).
Accommodation: Crew of two (pilot and observer in separate cockpits).
Cost: $21,000.
Max. speed: 122 mph.
Range: 600 mi.
Ceiling: 12,000 ft.

Special Duty/Gliders

T-2

The first airplane type to be flown across the US nonstop. Air Service Lts. Oakley G. Kelly and John A. Macready took off from Roosevelt Field, N.Y., on May 2, 1923, and landed 26 hours, 50 minutes, three seconds later at Rockwell Field, Calif., after covering a 2,520-mile route. Lieutenant Kelly was the pilot on takeoff and Lieutenant Macready landed the aircraft. The crew was later awarded the Mackay Trophy for the flight, and each pilot received the Distinguished Flying Cross. Two earlier west-to-east attempts to cross the country in this aircraft failed. The T-2 was modified for the flight by the addition of two (one 410- and one 185-gallon) fuel tanks prior to the flight. The T-2's sister ship was designated A-2 and was used as a four-litter and four-seat (for ambulatory patients or medical attendants) ambulance aircraft. The T-2 is now on display at the National Air and Space Museum in Washington, D.C.
Contractor: Fokker NV.
Location built: Veere, the Netherlands.
Number built (USAF): Two (two).
FF: Late 1921 or early 1922.
FFM: F.IV.
FFL: Veere, the Netherlands.
FFP: Unconfirmed, although Lt. Oakley G. Kelly served as one of the engineering test pilots for the aircraft at McCook Field, Ohio, after it was delivered to the Army on June 30, 1922.
Models/variants: T-2. A-2.
Powerplant: One Liberty 12-A liquid-cooled V-12 of 420 hp.
Wingspan: 79 ft 8 in.
Length: 49 ft 1 in.
Height: 12 ft 7 in.
Weight: 10,800 lb gross.
Armament: None.
Accommodation: Two, in connected cockpits (one open, the other enclosed).
Cost: Unconfirmed.
Max. speed: 95 mph.
Range: Endurance: The aircraft was flown for a record 35 hr, 18 min, 30 seconds over a 2,518-mi measured course on October 5–6, 1922, starting and ending at Rockwell Field, Calif.
Ceiling: Unconfirmed, although the aircraft did fly over the Rocky Mountains at least once in three attempts to cross the country.

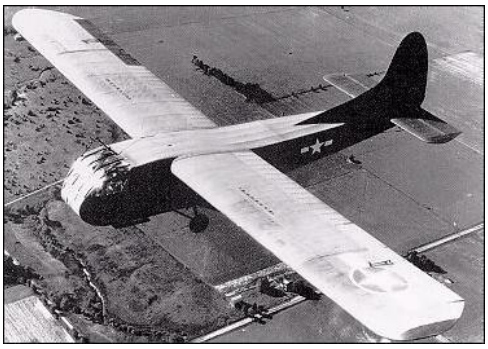
World Cruiser

The Douglas World Cruisers were the first aircraft to be flown around the world. The World Cruiser was a variant of the Navy's DT-2 torpedo bomber that could be operated either with wheels or floats. The prototype was delivered 45 days after the contract was let in summer 1923. Tests were successful, and four more DWCs were ordered. Each of the round-the-world flight aircraft was named after a US city representing a compass point: Aircraft number one, *Seattle,* crewed by Maj. Frederick Martin (pilot and flight commander) and SSgt. Alva Harvey ("mechanician," as the flight mechanics on the trip were called); aircraft number two, *Chicago,* crewed by Lt. Lowell H. Smith (pilot) and 1st Lt. Leslie Arnold; aircraft number three, *Boston,* with 1st Lt. Leigh P. Wade (pilot) and SSgt. Henry H. Ogden aboard; and aircraft number four, *New Orleans,* with Lt. Erik Nelson (pilot) and Lt. Jack Harding in the cockpits. The crews left Seattle, Wash., on April 6, 1924, and headed west. On April 30, *Seattle* crashed in Alaska, and Major Martin and Sergeant Harvey hiked out of the wilderness. The remaining crews continued, flying on to Japan, Southeast Asia, India, the Middle East, Europe, England, and Ireland. On August 3, *Boston* was forced down in the North Atlantic, and it sank in rough seas while being towed. The prototype was dispatched to Nova Scotia, where Lieutenant Wade and Sergeant Ogden renamed the aircraft *Boston II* and rejoined the flight. The crews stopped in several US cities and returned to Seattle on September 28. The trip totals: 175 days, 27,553 miles, stops in 61 cities, and a total flying time of 371 hours, 11 minutes. The logistics effort was equally impressive, which included securing cooperation of numerous governments, the Royal Air Force, and the US Navy. For example, 30 spare engines were dispatched all over the world prior to the flight. The Air Service later ordered five near-duplicate DWCs, and these were designated O-5. *Chicago* is now on display at the National Air and Space Museum in Washington, D.C., while *New Orleans* is on display at the Museum of Flying in Santa Monica, Calif.
Contractor: The Douglas Co.
Location built: Santa Monica, Calif.
Number built (USAF): five (five).
FF: October 1923.
FFM: DWC.
FFL: Clover Field, Santa Monica, Calif.
FFP: Eric Springer.
Models/variants: DWC, O-5.
Powerplant: One Liberty liquid-cooled V-12 of 420 hp.
Wingspan: 50 ft 0 in.
Length: 35 ft 6 in (39 ft 0 in with floats attached).
Height: 13 ft 7 in (15 ft 1 in with floats attached).
Weight: 7,380 lb gross (8,180 lb gross with floats attached).
Armament: None.
Accommodation: Two (pilot and observer/mechanic in separated, tandem cockpits).
Cost: $23,721 for prototype; $192,684 for four production aircraft plus spares.
Max. speed: 103 mph (100 mph with floats attached).
Range: 2,200 mi (1,650 mi with floats attached).
Ceiling: 10,000 ft (7,000 ft with floats attached).

R3C

One of only a handful of dedicated Army racing aircraft and the only Army seaplane racer. With public interest in airplane racing at an all-time high, the Army Air Service and the Navy teamed up in an effort to sweep both the 1925 Pulitzer Trophy for landplanes and the Schneider Cup for seaplanes. The result was the R3C, the latest in a line of Curtiss unlimited racers. The aircraft had several unique design features, including low-drag radiators made of corrugated brass sheeting .004 inches thick that covered most of the surfaces of the upper and lower wings, and a drop-forged duralumin propeller. Army Lt. Jimmy Doolittle lost a coin toss to Navy Lt. Al Williams to be the first to fly the new aircraft. On October 12, with the aircraft fitted with fixed landing gear (and designated R3C-1), Army Lt. Cyrus Bettis won the Pulitzer Trophy race with an average speed of 248.99 mph at Mitchel Field, N.Y. Lieutenant Williams was second. Ten days later, off the coast near Baltimore, Md., in the same

aircraft, but now fitted with streamlined single-step wooden floats (and designated R3C-2), Lieutenant Doolittle successfully defended the US's championship in the Schneider Cup race, winning with an average speed of 232.7 mph. The Navy entrants, Lts. George Cuddihy and Ralph A. Ofstie, flying the other two R3C-2s, both had mechanical trouble and had to withdraw but still finished third and fourth. On October 27, Lieutenant Doolittle set a world seaplane record of 245.713 mph over a three-km course in the Army aircraft. Fitted with a new 665-hp engine (and redesignated R3C-4), the Army aircraft was loaned to the Navy for the 1926 Schneider Cup race, and Marine Lt. Christian F. Schilt finished second. This was last US military Schneider Cup team. The Army R3C-2, the only surviving aircraft, is now on display at the National Air and Space Museum in Washington, D.C.
Contractor: Curtiss Aeroplane & Motor Co.
Location built: Garden City, N.Y.
Number built (USAF): Three (one).
FF: September 11, 1925.
FFM: R3C-1.
FFL: Garden City, N.Y.
FFP: Lt. Al Williams, USN.
Models/variants: R3C-1, -2.
Powerplant: One Curtiss V-1400 liquid-cooled V-12 of 610 hp.
Wingspan: 22 ft 0 in.
Length: 19 ft $8^1/2$ in.
Height: 6 ft $9^1/2$ in (R3C-1). 8 ft 1 in (R3C-2).
Weight: 2,150 lb gross (R3C-1). 2,539 lb gross (R3C-2).
Armament: None.
Accommodation: Pilot only.
Cost: Approx $70,000.
Max. speed: 263 mph.
Range: 216 mi at full throttle; approx 48 min endurance (R3C-1). 290 mi at full throttle; approx 1.3 hr endurance (R3C-2).
Ceiling: Unconfirmed, as it was mostly flown at low altitudes around race pylons.



CG-4 Hadrian
The only US-built glider to see combat action in World War II, the CG-4 was selected over three other designs. The type holds the US record for most different manufacturers, as eventually 16 companies produced at least one CG-4. Ironically, Waco, the company that designed the CG-4, built only 1,075 examples of the production aircraft, which trailed Ford (4,190), Northwestern (1,510), Commonwealth (1,470), General (1,112), and Gibson (1,078). The CG-4 first saw combat in the Sicily invasion in July 1943. On March 5, 1944, US crews flew British Brig. Gen. Orde Wingate's Chindit commandos to a clearing 150 miles behind Japanese lines in Burma at night. Several thousand CG-4s were towed behind C-46s and C-47s in Operation Overlord, the invasion of France on June 6, 1944. The CG-4s, which, like all gliders, were considered expendable, were also used in the landings in southern France, at Arnhem, and the Rhein River crossing. They were also used in large numbers by Britain, and a few were transferred to the US Navy. After the war, large numbers of CG-4s were sold, not for the aircraft but for the shipping boxes, which were converted to chicken coops and other civilian uses. The last of the CG-4s received a new Navy-developed tow bar in 1948 and were redesignated G-4Cs. The type was removed from service shortly after that.
Contractors: 1. The Waco Aircraft Co. 2. Babcock. 3. Cessna Aircraft Co. 4. Commonwealth Aircraft Co. 5. Ford Motor Co. 6. G and A Aircraft Co. 7. General Aircraft Corp. 8. Gibson Refrigerator. 9. Laister-Kauffman. 10. National Aircraft Division. 11. Northwestern Aeronautical Co. 12. Pratt, Read, & Co. 13. Ridgefield Manufacturing Co. 14. Robertson Aircraft Co. 15. Timm Aircraft Co. 16. Ward Furniture Co.
Locations built: 1. Troy, Ohio. 2. Deland, Fla. 3. Wichita, Kan. 4. Kansas City, Mo. 5. Iron Mountain, Mich. 6. Willow Grove, Pa. 7. Astoria, N.Y. 8. Greenville, Mich. 9. St. Louis, Mo. 10. Unconfirmed. 11. St. Paul, Minn. 12. Deep River, Conn. 13. Ridgefield, N.J. 14. St. Louis, Mo. 15. Van Nuys, Calif. 16. Fort Smith, Ark.
Number built (USAF): 13,908 (12,700).
FF: May or June 1942.
FFM: XCG-4.
FFL: Unconfirmed.
FFP: Unconfirmed.
Models/variants: CG-4A, G-4C.
Powerplant: None.
Wingspan: 83 ft 8 in.
Length: 48 ft 4 in.
Height: 12 ft 7 in.
Weight: 7,500 lb gross.
Armament: None.
Accommodation: Crew of two (pilot and copilot, side by side) and 13 troops or 3,710 lb of cargo.
Cost: $24,000.
Max. tow speed: 125 mph.
Range: Limited to range of tow aircraft and loaded weight.
Ceiling: Limited to tow aircraft.

Experimental

X-1
Developed in secrecy, the XS-1 (later redesignated X-1) research aircraft was the first to explore flight beyond the speed of sound (761 mph at sea level). Design basis for the aircraft was a .50-cal. bullet. Air Force Capt. Chuck Yeager became the first pilot to exceed Mach 1 when on October 14, 1947, he reached a speed of Mach 1.06 (700 mph) at an altitude of 45,000 ft. News of the flight was not revealed until nearly two months later. The aircraft was carried aloft by a B-29 "mother ship," and the rocket motor was started after the aircraft was released. First glide flight was made on January 25, 1946, at Pinecastle AB, Fla., by company pilot Jack Woolams. (The noted

first flight was the first powered flight.) Eight USAF, seven NACA, and three company pilots made 157 flights in the type through 1951. The number one aircraft is on display at the National Air and Space Museum in Washington, D.C. The second aircraft was later modified to X-1E configuration and is on display at NASA's Dryden Flight Research Center at Edwards AFB, Calif. The third aircraft was destroyed on the ground prior to its second flight. Three other aircraft (X-1A, B, and D) were later built to investigate speeds greater than Mach 2 at high altitudes. X-1A reached Mach 2.44 (1,650 mph) in 1953. X-1s were flown for a total of 105 flights. Totals for other aircraft include: X-1A (25), X-1B (27), X-1D (1), and X-1E (26). The last flights came in 1958. The X-1A and D were destroyed in accidents; the X-1B is on display at the US Air Force Museum at Wright-Patterson AFB, Ohio.

(Specifications for X-1.)

Contractor: Bell Aircraft Corp.
Location built: Buffalo, N.Y.
Number built (USAF): Three (three).
FF: December 9, 1946.
FFM: XS-1.
FFL: Muroc AAF, Calif.
FFP: Chalmers "Slick" Goodlin.
Models/variants: X-1, X-1A, B, D, E.
Powerplant: One Reaction Motors XLR11-RM-3 liquid fuel, four-chamber rocket rated at 6,000 lb static thrust.
Wingspan: 30 ft 11 in.
Length: 28 ft 0 in.
Height: 10 ft 10 in.
Weight: 12,250 lb gross.
Armament: None.
Accommodation: Pilot only.
Cost: $4.28 million for total program (three aircraft and development).
Max. speed: 927 mph (Mach 1.43).
Range: Endurance: 5 min powered flight.
Ceiling: 70,000 ft.

NASA photo

X-5

The first aircraft to fly using a variable-geometry wing, which allows for relatively low landing and takeoff speeds, but allows for higher in-flight speeds. The design was based on the Messerschmitt P.1101 captured at the end of World War II. Brig. Gen. Albert Boyd, then commander of the Air Force Flight Test Center at Edwards AFB, Calif., was the first pilot to complete full conversion from 20° sweepback to 60° sweepback in flight on August 23, 1951. The aircraft was difficult to fly and had a tendency to spin. Capt. Raymond Popson was killed on October 14, 1953, and the second X-5 was destroyed when he wasn't able to recover from a spin. Despite its flaws, the X-5 achieved all of its design objectives and provided a wealth of data on variable-geometry design. A total of 11 USAF, NACA, and contractor pilots made a total of 149 flights in the X-5s through 1955. The surviving aircraft is now on display at the US Air Force Museum at Wright-Patterson AFB, Ohio.

Contractor: Bell Aircraft Corp. **Location built:** Buffalo, N.Y. **Number built (USAF):** Two (two).
FF: June 20, 1951. **FFM:** X-5. **FFL:** Edwards AFB, Calif.
FFP: Jean "Skip" Ziegler. **Models/variants:** X-5.
Powerplant: One Allison J35-A-17 nonafterburning turbojet rated at 4,900 lb static thrust.
Wingspan: 32 ft 9 in (wings extended); 22 ft 8 in (wings swept). **Length:** 33 ft 4 in. **Height:** 12 ft 0 in. **Weight:** 9,875 lb gross.
Armament: None.
Accommodation: Pilot only. **Cost:** Unconfirmed.
Max. speed: 705 mph. **Range:** 750 mi. **Ceiling:** 42,000 ft.

X-13 Vertijet

The diminutive X-13 was designed to test the idea of a jet-powered vertical takeoff aircraft that could make the transition to horizontal flight and then return to vertical flight for landing. A secondary design goal was to eliminate the need for conventional landing gear. The X-13 was transported on a specially constructed trailer. Once in position, the trailer, with the aircraft attached, would be raised to a vertical position. The aircraft had a hook under the nose and hung from the trailer on a steel cable attached to two movable hydraulic arms. Once airborne in vertical mode, the hook came off the cable, then pilot would clear the trailer and make the transition to horizontal flight. To land, the pilot would pull up, convert to vertical flight, and "walk" the aircraft into position to hook on the wire—a difficult maneuver, to say the least. The test program proceeded in small steps: conventional flight, then vertical flight with a test rig attached, then hooking and unhooking, and finally, full conversion. On July 30, 1957, in Arlington, Va., the X-13 took off vertically from a street in front of the Pentagon, retraced the route Orville Wright and Lt. Benjamin Foulois made on the final acceptance flight of the 1909 Military Flyer, and returned for a vertical landing. By early 1958, USAF and NACA turned their attention to other programs (mainly the X-15) and both X-13s were retired. One is on display at the San Diego (Calif.) Aerospace Museum, and the other is on display at the US Air Force Museum at Wright-Patterson AFB, Ohio.

Contractor: Ryan Aeronautical Co.
Location built: San Diego, Calif.
Number built (USAF): Two (two).
FF: December 10, 1955 (conventional takeoff and landing). April 11, 1957 (first full-cycle flight).
FFM: X-13. **FFL:** Edwards AFB, Calif.
FFP: Pete Girard.
Models/variants: X-13.
Powerplant: One Rolls-Royce RA.28-49 Avon nonafterburning axial flow turbojet of 10,000 lb max thrust.
Wingspan: 21 ft 0 in.
Length: 24 ft 0 in.
Height: 15 ft 0 in.
Weight: 7,200 lb gross.
Armament: None.
Accommodation: Pilot only.
Cost: Total cost was approx $9.4 million.

Max. speed: 483 mph.
Range: 167 mi.
Ceiling: 20,000 ft.

X-15

One of the most significant aircraft in history, the X-15 was designed to explore the identifiable problems of atmospheric flight at very high speeds and altitudes. The aircraft was the first to use a throttleable rocket engine, the first to be flown to speeds of Mach 4, 5, and 6, and the first to be flown to the lower edge of space (considered by the Air Force and NASA to be an altitude of 50 miles). There were also a great number of technical achievements in materials, construction, and testing associated with the X-15. Four Air Force pilots (Maj. Robert White, Maj. Robert Rushworth, Capt. Joseph Engle, and Maj. William "Pete" Knight) and three NASA pilots (Joseph Walker, John McKay, and William Dana) earned astronaut wings for flights above 264,000 ft. On July 17, 1962, Major White set the FAI-recognized absolute altitude record for an aircraft launched from a carrier airplane when he flew the number three X-15 to 314,750 ft. However, on August 22, 1963, Joe Walker reached a height of 354,200 ft, but the record is unofficial, as the necessary FAI paperwork was not submitted. Likewise, on October 3, 1967, Major Knight reached a speed of 4,520 mph in the number two X-15 (2,327 mph faster than the recognized absolute speed record set in 1976), but the record is not recognized. After a landing mishap on November 9, 1962, the number two X-15 was extensively modified for higher performance and was redesignated X-15A-2. Air Force Maj. Michael Adams was killed on November 15, 1967, when he became disoriented after a mechanical malfunction and the number three aircraft disintegrated. The type's 199th and final flight came on October 24, 1968. The number one X-15 is on display at the National Air and Space Museum in Washington, D.C., and the number two aircraft is on display at the US Air Force Museum.
(Specifications for X-15A-2.)
Contractor: North American Aviation, Inc.
Location built: El Segundo, Calif.
Number built (USAF): Three (three).
FF: June 8, 1959 (first glide flight). September 17, 1959 (first powered flight).
FFM: X-15.
FFL: Edwards AFB, Calif.
FFP: A. Scott Crossfield.
Models/variants: X-15. X-15A-2.
Powerplant: One Reaction Motors XLR99 Pioneer liquid fuel throttleable rocket of between 25,000 to 50,000 lb of thrust (until the XLR99 was delivered in November 1960, the aircraft flew with two Reaction Motors XLR11-RM-5 liquid fuel rockets of 8,000 lb of thrust each).
Wingspan: 22 ft 4 in.
Length: 52 ft 5 in.
Height: 12 ft 7 in.
eight: 56,130 lb gross.
Armament: None.
Accommodation: Pilot only.
Cost: Approx $300 million for design, development, three aircraft, and flight testing.
Max. speed: Mach 6.70 (4,520 mph).
Range: More than 250 mi (flight path distance); most flights lasted 11 to 12 min.
Ceiling: 354,200 ft.

X-24

The X-24 was one of several aircraft designed to test advantages of the lifting-body configuration (wedge-shaped, wingless aircraft that get their lift from body contours alone) for low supersonic, transonic, and landing-approach-speed flight. This work eventually paved the way for the space shuttle. The X-24 was also the last of the rocket-powered experimental aircraft. The program began slowly, as the X-24A was rolled out in July 1967 and, after full-scale wind tunnel tests at NASA's Ames Flight Research Center, did not fly until spring 1969. Three Air Force and NASA pilots made a total of 28 flights in the X-24A, totaling two hours, 54 minutes of flight time. It did not reach supersonic speeds until its eighteenth flight. The last flight came on June 4, 1971. In early 1972, the aircraft was sent to Martin Marietta's facility in Denver, Colo., where it was modified into the X-24B, with a delta-shaped body and nearly twice the lifting surface area. The modifications took 10 months and cost only $550,000. NASA pilot John Manke made the first glide flight of the X-24B on August 1, 1973, and the first powered flight on November 15, 1973. Four NASA pilots and two Air Force pilots (including Capt. Dick Scobee, who would be killed in the 1986 space shuttle *Challenger* accident) made a total of 36 flights totaling three hours, 46 minutes in the revised X-24B. On August 5, 1975, pilot Manke made the first landing of a lifting-body aircraft on a conventional concrete runway, and the feat was repeated by Air Force Lt. Col. Mike Love on August 20. The last flight of the program came on November 26, 1975. A proposed X-24C, which would have picked up the very-high-speed test role from the X-15 (planned speeds of Mach 8) was canceled. The X-24B is now on display at the US Air Force Museum at Wright-Patterson AFB, Ohio.
(Specifications for X-24B, except as noted.)
Contractor: Martin Marietta Corp.
Location built: Middle River, Md.
Number built (USAF): One (one).
FF: April 17, 1969 (first glide flight). March 19, 1970 (first powered flight).
FFM: X-24A.
FFL: Edwards AFB, Calif.
FFP: Jerauld Gentry.
Models/variants: X-24A, B.
Powerplant: One Thoikol XLR11-RM-13 liquid fuel, four-chamber rocket of 9,800 lb of thrust and two Bell hydrogen peroxide landing rockets of 400 lb thrust each that could be used at pilot's discretion on landing.
Wingspan: 19 ft 2 in.
Length: 37 ft 6 in.
Height: 10 ft 4 in.
Weight: 13,800 lb gross.
Armament: None.
Accommodation: Pilot only.

Cost: Unconfirmed.
Max. speed: 1,164 mph.
Endurance: Approx three min of powered flight followed by a five-min glide flight. **Ceiling:** 74,130 ft.

X-29
One of the most unusual-looking aircraft ever to fly, the X-29 was built primarily to explore the forward swept wing (FSW) concept, which gives an aircraft unprecedented agility. The X-29 also pioneered the use of advanced composite materials, movable close-coupled canards, and advanced flight controls. The FSW concept had first been explored by the Germans in World War II (and by the Army Air Forces with the XFG-1 fuel transport glider) but was not practical with conventional metal construction, as the wings could not be made rigid enough to keep them from bending. Funded by the Air Force, the Defense Advanced Research Projects Agency, and NASA, the X-29 was the first new pure research aircraft in more than a decade. In an effort to reduce costs, the two airplanes built were assembled by taking the forward fuselages from two F-5As and such off-the-shelf components as F-16 landing gear and flight-control actuators. Development of the triple redundant, fly-by-wire flight-control system and its software slowed the program. Also, as the program was a fairly low priority, the first X-29 was shipped from New York to California by military bulk freighter via the Panama Canal. Basic parameters, such as stability, loads, and flutter were examined in the first phase of flight test, which ran through 1986. The second phase of flight test concentrated on engine performance and air data collection. On June 8, 1988, the X-29 broke the record for most flights made by an X-series aircraft, when NASA pilot Rogers Smith flew the number one aircraft for the 200th time, breaking the X-15's record of 199. The first X-29 was flown 242 times before it was retired in 1988 and is now in the US Air Force Museum at Wright-Patterson AFB, Ohio. During testing, the X-29 picked up the unofficial nickname of "Polecat." The second X-29, identical to the first except for the addition of a spin test parachute and different instrumentation, was flown for the first time on May 23, 1989. The second aircraft was used to explore controlled flight at high angles of attack, including beyond 65°. It was retired in 1991.
Contractor: Grumman Aerospace.
Location built: Bethpage, N.Y.
Number built (USAF): Two (two).
FF: December 14, 1984.
FFM: X-29A.
FFL: Edwards AFB, Calif.
FFP: Chuck Sewell.
Models/variants: X-29A.
Powerplant: One General Electric F404-GE-400 turbofan of 16,000 lb thrust.
Wingspan: 27 ft 2 in.
Length: 48 ft 1 in.
Height: 14 ft 3 in.
Weight: 17,303 lb gross.
Armament: None.
Accommodation: Pilot only.
Cost: Approx $260 million (total program, incl two aircraft and flight test).
Max. speed: 1,200 mph.
Range: Endurance of slightly more than one hr.
Ceiling: 55,000 ft.

XB-70 Valkyrie
One of the most exotic aircraft ever built. Originally conceived as a high-altitude, Mach 3–capable bomber to replace the B-52, budget cuts reduced the number of aircraft to two and the program to a research effort aimed at studying aerodynamics, propulsion, and materials used on large supersonic aircraft. The original contract was let in 1955. The XB-70 was built largely of stainless-steel honeycomb sandwich panels and titanium and had heat-resistant paint. On one flight above Mach 3, the recorded skin temperature on the aircraft reached 620°. At Mach 3, it took the aircraft an arc of 287 miles and 13 minutes to make a 180° turn. The aircraft utilized the phenomenon of compression lift, where the aircraft actually rode its own shock wave. It was able to do this in part because of the wingtips that could droop in flight. The first Mach 3 flight came on October 14, 1965, with Al White and Col. Joe Cotton at the controls. That duo was also at the controls on the type's fastest flight, Mach 3.08 on April 12, 1966. On June 8, 1966, test pilot Joe Walker was killed when his F-104 made contact with the number two XB-70, got caught in vortices coming off the Valkyrie's wingtips, and rolled through the XB-70's tails. XB-70 copilot Maj. Carl Cross was also killed, and the XB-70 was destroyed. The two aircraft were flown 129 times for 252 hours, 28 minutes by seven contractor, Air Force, and NASA pilots. The two aircraft were flown at twice the speed of sound or better for nearly 52 hours. The surviving aircraft was flown to the US Air Force Museum at Wright-Patterson AFB, Ohio, on February 4, 1969, where it is now on display. Even on that flight, test data was collected.
Contractor: North American Aviation, Inc.
Location built: Air Force Plant 42, Palmdale, Calif.
Number built (USAF): Two (two).
FF: September 21, 1964.
FFM: XB-70A.
FFL: Air Force Plant 42, Palmdale, Calif.
FF Crew: Alvin S. White (pilot). USAF Col. Joseph F. Cotton (copilot).
Models/variants: XB-70A.
Powerplant: Six YJ93-GE-3 afterburning turbojets of 30,000 lb thrust each.
Wingspan: 105 ft 0 in.
Length: 189 ft 0 in.
Height: 30 ft 0 in.
Weight: 534,700 lb gross.
Armament: None.
Accommodation: Two (pilot and copilot, side by side).
Cost: Total program cost was approx $2 billion.
Max. speed: Mach 3.08 (more than 2,000 mph).
Range: 6,000 mi.
Ceiling: 74,000 ft.

Transports

C-46 Commando
The largest and heaviest twin-engine aircraft to see service with the Army Air Forces, this transport gained its greatest fame in airlifting supplies over "the Hump" (the Himalaya Mountains) in the China-Burma-India theater in World War II, although it saw action in every theater. The C-46 began its career as a pressurized, 36-passenger airliner with twin rudders, but the Army saw greater utility for the aircraft as a transport. The AAF bought the prototype in 1941, modified it to have a single fin, and designated it C-55. Demand for the C-46 grew rapidly, and manufacturing began at the new Curtiss plants in Louisville, Ky., and Saint Louis, Mo. The aircraft division of Higgins Industries (the New Orleans, La.–based boatbuilder that constructed most of the landing craft used in World War II) was given a contract for 500 aircraft, but only two C-46As were completed. A total of 1,490 C-46As were built, which included 160 R5Cs for the Marine Corps. The other major variant was the C-46D, with 1,410 aircraft built. The C-46 could carry more payload than its more famous stable-mate, the C-47, and it offered better high-altitude performance, which was one of the reasons it was used so extensively in the CBI. C-46 crews began flying the hazardous air route over the Himalayas in 1943 after the Japanese closed the Burma Road. However, as a result of the CBI's harsh conditions, the type had a relatively high loss rate, and maintenance was a problem. In Europe, the C-46 was used to drop paratroopers during the Rhein River crossing in March 1945. The C-46 could tow two CG-4 gliders. The C-46A, D, and F models were used in Korea, and a few aircraft were used by Air Force Special Air Warfare Center in the early years of the Vietnam War. C-46s were in limited Air Force service as late as 1969. Many went into civilian hands after World War II, and a fair number are still in use today.
(Specifications for C-46A.)
Contractors: 1. Curtiss-Wright Corp. 2. Higgins Aircraft Co.
Locations built: 1. Buffalo, N.Y., Louisville, Ky., and St. Louis, Mo. 2. New Orleans, La.
Number built (USAF): 3,182 (3,022).
FF: March 26, 1940.
FFM: Civilian CW-20T.
FFL: St. Louis, Mo.
FFP: Edmund T. "Eddie" Allen (on loan from Boeing).
Models/variants: C-46A, D, E, F.
Powerplant: Two Pratt & Whitney R-2800-51 Double Wasp 18-cylinder, twin-row radials of 2,000 hp each.
Wingspan: 108 ft 1 in.
Length: 76 ft 4 in.
Height: 21 ft 9 in.
Weight: 56,000 lb gross.
Armament: None.
Accommodation: Crew of four (pilot, copilot, navigator, and flight engineer/loadmaster) and 50 troops or 33 litters with four attendants or 15,000 lb of cargo.
Cost: $233,000.
Max. speed: 269 mph.
Range: 1,200 mi.
Ceiling: 27,600 ft.

C-47 Skytrain
The C-47 transport, commonly referred to as "Gooney Bird," was one of four weapons singled out by Gen. Dwight D. Eisenhower as the most instrumental in helping the US win World War II. (The others were the bazooka, the jeep, and the atomic bomb.) The C-47 was adapted from the DC-3 commercial airliner and was used to carry personnel and cargo, tow gliders (usually one Waco CG-4A), and drop paratroopers. Having great longevity, it was also used in Korea and in Vietnam, where it took on additional roles of attack as the AC-47 "Spooky" gunship and for psychological warfare missions. The need to take supplies over the Himalayas led to the C-47B version with higher horsepower engines. Among the unusual variants of the C-47 was one where the engines were removed and it was converted into a glider and another that was equipped with floats. The C-47 towed gliders and dropped 4,381 paratroopers in the invasion of Sicily on July 10, 1943; C-47 crews dropped 60,000 paratroopers and towed several thousand CG-4 gliders at Normandy on June 6, 1944. C-47s were used extensively in the Berlin airlift. In one notable action in Korea, C-47 crews flew 4,689 casualties out of the Chosin Reservoir area in five days. In Vietnam, the AC-47 gunships effectively suppressed enemy ground forces and picked up the secondary nickname of "Puff, the Magic Dragon." On February 24, 1969, while flying in a AC-47, A1C John L. Levitow, stunned and wounded by shrapnel, flung himself on an activated, smoking magnesium flare, dragged himself and the flare to the open cargo door, and tossed the flare out of the aircraft. For saving his fellow crew members and the gunship, he was awarded the Medal of Honor. AC-47s were replaced by AC-119s and AC-130s, and the last C-47 was retired from the Air Force in 1975.
(Specifications for C-47B.)
Contractor: Douglas Aircraft Co.
Locations built: Long Beach, Calif. (plus a few in Santa Monica, Calif.), and Oklahoma City, Okla.
Number built (USAF): 10,654 incl civilian models, plus approx 2,500 aircraft license-built in Japan and the Soviet Union (8,882).
FF: December 17, 1935.
FFM: Douglas Sleeper Transport (DST).
FFL: Santa Monica, Calif.
FF Crew: Carl Cover (pilot), Fred Stineman (co-pilot), and Frank Collbohm (flight engineer).
Models/variants: C-47, C-47A, B, D, E. TC-47B, D. EC-47B, D. VC-47B, D. SC-47D (later redesignated HC-47D). RC-47D. EC-47N. C-48, C-48A, B, C. C-49, C-49A, B, C, D, E, F, G, H, J, K. C-50, C-50A, B, C, D. C-52, C-52A, B, C, D. C-53, C-53B, C, D Skytrooper. C-117A, B, C, D. FC-47 (later redesignated AC-47) Spooky.
Powerplant: Two Pratt & Whitney R-1830-90C or -90D Twin Wasp 14-cylinder, twin-row radials of 1,250 hp each.

Wingspan: 95 ft 0 in.
Length: 63 ft 9 in.
Height: 16 ft 11 in.
Weight: 25,200 lb gross.
Armament: None (three side-firing General Electric MXU-470/A 7.62-mm Minigun pods on AC-47).
Accommodation: Crew of three (pilot, copilot, and flight engineer/loadmaster) and 27 troops or 18–24 litters or 10,000 lb of cargo.
Cost: $138,000.
Max. speed: 232 mph.
Range: 1,513 mi.
Ceiling: 24,450 ft.

C-54 Skymaster
This long-range heavy transport gained its greatest fame in World War II, the Berlin Airlift, and the Korean War. Originally developed for the airlines, the first batch of what would have been DC-4s was commandeered off the assembly line by the Army Air Forces in 1942 and redesignated C-54. Production orders followed, and to meet the demand, Douglas started a second assembly line in Chicago, Ill., which would eventually produce nearly 60 percent of all C-54s built. C-54s were first delivered on March 20, 1942, and saw service in every theater and became the primary airlifter across the Atlantic and Pacific. In the three years prior to V-J Day, C-54 crews made 79,642 crossings of the North Atlantic and only three aircraft were lost. The Navy received 201 C-54s, which were designated R5D. The first Presidential aircraft was the lone VC-54C, which was modified with a special hydraulic lift for Franklin D. Roosevelt's wheelchair. Nicknamed "Sacred Cow," it was used to take FDR to the Yalta Conference. President Harry S. Truman signed the National Security Act of 1947, creating an independent Air Force, on board this aircraft on July 12, 1947. It is now on display at the US Air Force Museum. Winston Churchill and Gen. Douglas MacArthur both used C-54s as their personal aircraft. On September 2, 1945, a C-54 crew made a record run of 31 hours, 25 minutes between Tokyo and Washington, D.C., to deliver films of the Japanese surrender ceremony on USS *Missouri.* At the height of the Berlin Airlift, 319 of the roughly 400 C-54s in service were hauling supplies to the city. On September 30, 1949, a C-54 crew made the last flight of the Berlin Airlift when it lifted off from Rhein-Main AB, West Germany. Less than six months later, on June 25, 1950, the first Air Force aircraft destroyed in the Korean War was a C-54 that was strafed on the ground at Kimpo AB, South Korea, by a pair of North Korean Yak fighters. C-54s were used for many other mis-sions and saw limited Air Force service until 1972.
(Specifications for C-54D.)
Contractor: Douglas Aircraft Co.
Locations built: Santa Monica, Calif., and Chicago, Ill.
Number built (USAF): 1,163 (955).
FF: March 26, 1942.
FFM: C-54.
FFL: Clover Field, Calif.
FF Crew: John F. Martin and crew.
Models/variants: C-54, C-54A, B, D, E, G, M.
Powerplant: Four Pratt & Whitney R-2000-11 Twin Wasp 14-cylinder radials of 1,350 hp each.
Wingspan: 117 ft 8 in.
Length: 93 ft 10 in.
Height: 27 ft 6 in.
Weight: 73,000 lb gross.
Armament: None.
Accommodation: Four (pilot, copilot, navigator, and flight engineer/loadmaster) and 50 troops or 32,500 lb of cargo.
Cost: Unconfirmed.
Max. speed: 275 mph.
Range: 3,900 mi.
Ceiling: 22,300 ft.

C-69/C-121 Constellation
Howard Hughes was one of the driving forces behind the design of the Lockheed Constellation. A number of aircraft intended for Hughes's Transcontinental and Western Airlines (and for Pan American) became the C-69 transport. It was the heaviest and the fastest transport built to date for the Army Air Forces. Twenty-two of these were built before V-J Day. The last aircraft piloted by Orville Wright was a C-69. The later model 1049G became the C-121 series. The C/EC-121s were ordered for use as cargo and passenger carriers, executive transports, and airborne early warning aircraft. The lone VC-121E was named *Columbine III* and was used throughout the Eisenhower Administration as Air Force One. Fifty-five percent of the Super Constellations built by Lockheed were delivered to the US Navy and Air Force, and the US military Constellations were flown from 1952 to 1977, when the last Air National Guard EC-121S was retired. A majority of the aircraft were used for electronic reconnaissance and airborne early warning. In the mid-1960s, the Air Force sent the first Warning Stars to Vietnam to maintain radar surveillance over North Vietnam and then later to warn of MiG attacks and alert American pilots who were straying over Chinese territory. Some versions were converted to airborne radio and TV transmitters for the Armed Forces Network in Vietnam. On October 24, 1967, an EC-121D crew guided a US fighter into position to destroy a MiG-21. This marked the first time a weapons controller aboard an airborne radar aircraft had ever directed a successful interception.
(Specifications for EC-121D, except as noted.)
Contractor: Lockheed Aircraft Co.
Location built: Burbank, Calif.
Number built (USAF): 856 incl commercial production (205 incl C-69s).
FF: January 9, 1943.
FFM: C-69.
FFL: Burbank, Calif.
FF Crew: Edmund T. "Eddie" Allen (pilot, on loan from Boeing) and Milo Burcham (copilot).
Models/variants: C-69. C-121A, C. VC-121A, B, C, E, G. RC-121C, D (later redesignated EC-121C, D). EC-121G, H, P, R.
Powerplant: Four Wright R-3350-34 or -91 Cyclone 18-cylinder radials of 3,250 hp each.
Wingspan: 126 ft 2 in (over wing tanks).
Length: 116 ft 2 in.
Height: 27 ft 0 in.
Weight: 143,600 lb.
Armament: None.
Accommodation: Crew of 27 (pilot, copilot, navigator, flight engineer, and 23 electronic warfare officers). Crew of four (pilot, copilot, navigator, and flight engineer) and up to 88 passengers or 72 troops on C-121A, C.
Cost: $2.03 million.
Max. speed: 321 mph.

Range: 4,600 mi.
Ceiling: 20,600 ft.

C-97 Stratofreighter
The C/KC-97 series was a transport and definitive early tanker aircraft that had its design origin in the B-29. Boeing engineers essentially stacked one fuselage on top of another in a "double bubble" arrangement and used the same wings, engines, and tails as the Superfortress. Shortly after it made its first flight, a C-97 was flown nonstop from Seattle, Wash., to Washington, D.C., in six hours, four minutes at an average speed of 383 mph, while carrying a payload of 10 tons. Only 74 cargo variants were built, while 816 were KC-97 tankers. In its cargo version, early models were used extensively to bring Korean War casualties back to the US west coast from Japan. The later C-97s used an overhead rail cargo delivery system. Several aircraft were modified to a straight passenger configuration and were designated VC-97. Many other aircraft were modified for specialized roles, such as electronic reconnaissance. A small number of KC-97s were sold to Israel. Starting in 1956, Air Force KC-97s were gradually replaced by KC-135 jet tankers. Later in their career, KC-97s had two jet engines added so that the type could match speeds with the jet fighters and bombers they were refueling. Even so, most of the time the tankers had to enter a shallow dive to keep up. Eighteen Air National Guard squadrons were eventually equipped with KC-97s, and the last were retired in 1977.
(Specifications for KC-97G, except as noted.)
Contractor: Boeing Aircraft Co.
Location built: Renton, Wash.
Number built (USAF): 945, incl commercial models (890).
FF: November 9, 1944.
FFM: XC-97.
FFL: Seattle, Wash.
FF Crew: Unconfirmed but likely Elliott Merrill (pilot) and John Fornasero.
Models/variants: YC-97, C-97A, C, D, G, K. KC-97E, F, G, L. HC-97G.
Powerplant: Four Pratt & Whitney R-4360-59B Wasp Major 28-cylinder, four-row radials of 3,500 hp each (Two additional General Electric J47 turbojets of 5,970 lb thrust each on KC-97L).
Wingspan: 141 ft 3 in.
Length: 117 ft 5 in.
Height: 38 ft 3 in.
Weight: 175,000 lb gross.
Armament: None.
Accommodation: Crew of five (pilot, copilot, flight engineer, navigator/radio operator, and boom operator). As a transport: no boom operator and 134 troops or 69 litters or 25,500 lb of cargo.
Cost: $2.21 million.
Max. speed: 375 mph.
Range: 4,300 mi.
Ceiling: 30,000 ft.

C-119 Flying Boxcar
The C-119 was a major redesign of the C-82 Packet. The C-119 had the same major design feature as the C-82—a rear-loading, all-through cargo hold—but featured more-powerful engines and a relocation of the flight deck. In an effort to speed production during the Korean War, Kaiser was chosen to establish a second assembly line (151 C-119F/Gs built; 41 C-119Cs assembled). The type saw extensive action in the Korean War, flying from bases in Japan. C-119s were also used to ferry supplies to the Arctic for construction of the Distant Early Warning (DEW) line radar sites. Production ended in 1955. A total of 68 C-119F/Gs were modified with an upward-hinged beaver-tail design cargo door and were redesignated C-119J. A few C-119Js were specially modified for midair retrieval of capsules containing Corona program satellite imagery reentering the atmosphere. The first successful effort came on August 18, 1960, when a C-119 crew flying over the Pacific snagged the parachute lowering the Discoverer XIV imagery capsule. The type was also used by US Navy and Marine Corps (as R4Qs), Italy, India, and Belgium. In the late 1960s, the Air Force selected the C-119 to replace the AC-47 Spooky. Fairchild Hiller (as the company had become in 1966) was chosen to modify 52 aircraft under the Gunship III program (26 AC-119G and 26 AC-119Ks). Entering service on March 11, 1969, with the 17th Special Operations Squad-ron, AC-119Gs mainly flew fire support and air base defense missions. (**Correction subsequent to publication:** The C-119Gs entered service with the 71st Special Operations Squadron. The 71st SOS became the 17th SOS in June 1969.) The 18th SOS (AC-119K) was employed almost exclusively to destroy targets along the Ho Chi Minh Trail during the Vietnam War. The last C-119 was retired in September 1975.
(Specifications for C-119G, except as noted.)
Contractors: 1. Fairchild Engine and Airplane Corp., Aircraft Division. 2. Kaiser Manufacturing Co.
Locations built: 1. Hagerstown, Md. 2. Willow Run, Mich.
Number built (USAF): 1,150 (963).
FF: November 1947.
FFM: XC-119A (Modified C-82 Packet).
FFL: Unconfirmed but likely Hagerstown, Md.
FFP: Unconfirmed.
Models/variants: C-119B, F, G, J, K, L. AC-119G Shadow, AC-119K Stinger.
Powerplant: Two Wright R-3350-89A Cyclone 18-cylinder radials of 3,500 hp each (C-119Ks also had two General Electric J85-GE-17 turbojets of 2,850 lb static thrust in underwing pods).
Wingspan: 109 ft 3 in.

Length: 86 ft 6 in.
Height: 26 ft 6 in.
Weight: 72,700 lb gross.
Armament: None (C-119); four side-firing SUU-11A/A or SUU-11B/A gun pods (GAU-2B/A 7.62 mini-guns) (AC-119G/K) and two General Electric M61A1 Vulcan 20-mm cannon (AC-119K only).
Accommodation: Six (pilot, copilot, navigator, radio operator, flight engineer, and loadmaster) and up to 62 troops (normally 45) or 35 stretchers plus four attendants or cargo. Eight (pilot, copilot, two navigators, flight engineer, two gunners, and loadmaster) on AC-119G/K.
Cost: $590,000 for basic aircraft (AC-119G modifications cost approx $623,000 for each aircraft; AC-119K modifications cost approx $2.6 million for each aircraft).
Max. speed: 281 mph.
Range: 1,630 mi.
Ceiling: 24,000 ft.

C-123 Provider
The C-123 was a tactical transport originally designed as a glider, although the design was drawn up with the intention of its eventually being powered. There were many experimental and one-off variants of the Provider during its career, including one that was modified by Stroukoff and called a Pantobase, which allowed it to land on ice, snow, or water. A couple of aircraft were also modified as lightships (with high-intensity lighting on the cargo ramp to find targets on the ground), but the idea was not practical. Two C-123Ks were modified to the NC-123K configuration (also referred to as AC-123K) under the Black Spot project. This was designed to give the Air Force a self-contained night attack capability to seek out and destroy targets on the Ho Chi Minh Trail. C-123s contributed a substantial portion of in-country airlift and resupply in Vietnam and Cambodia. UC-123Bs and Ks were equipped for aerial spraying and were used extensively on defoliation missions. One of these Operation Ranch Hand units (as the defoliation mission was called) carried the motto, "Only we can prevent forests," as a play on Smokey Bear's famous slogan. On May 12, 1968, Lt. Col. Joe M. Jackson, flying a C-123, landed at a forward outpost at Kham Duc, South Vietnam, in a rescue attempt of a Combat Control Team. After a rocket-propelled grenade fired directly at his aircraft proved to be a dud, Colonel Jackson took off with the CCT on board and landed at Da Nang. He was later awarded the Medal of Honor. C-123s remained in Guard service until 1979. The type was also flown by five other countries and by Air America, the CIA's covert transport operation.
(Specifications for C-123B, except as noted.)
Contractors: 1. Fairchild Engine and Airplane Corp., Aircraft Division. 2. Chase Aircraft Co.
Locations built: 1. Hagerstown, Md. 2. West Trenton, N.J.
Number built (USAF): 328 (304).
FF: October 14, 1949.
FFM: Chase XC-123 Avitruc.
FFL: West Trenton, N.J.
FFP: Unconfirmed.
Models/variants: C-123B, J, K. UC-123B. NC-123K. UC-123K.
Powerplant: Two Pratt & Whitney R-2800-99W Double Wasp 18-cylinder, twin-row radials of 2,500 hp (C-123K also had two General Electric J85-GE-17 turbojets of 2,850 lb thrust each on underwing pylons).
Wingspan: 110 ft 0 in.
Length: 75 ft 9 in.
Height: 34 ft 1 in.
Weight: 60,000 lb gross.
Armament: None (NC/AC-123K aircraft had two dispensers for up to 6,372 one-lb bomblets).
Accommodation: Crew of three or four (pilot, copilot, flight engineer/loadmaster, and navigator usually) and 61 troops or 50 litters with six attendants or up to 15,000 lb of cargo.
Cost: $601,719.
Max. speed: 245 mph.
Range: 1,470 mi.
Ceiling: 29,000 ft.

C-124 Globemaster II
The Air Force's long-range airlifter that performed yeoman service through two wars and nearly 25 years, the C-124 was a major redesign of the C-74 that was developed at the end of World War II. The C-124 used the same wings, tail, and engines as the C-74 but had a deeper fuselage that featured clamshell doors in the nose that allowed for driving vehicles on and off under their own power. The C-124 retained the C-74's electrically operated elevator in the rear of the aircraft for loading of bulk cargo. The first operational aircraft were delivered in May 1950, and production ran through May 1955 (204 C-124As and 243 C-124Cs). The improved C-124C featured more-powerful engines, as well as wingtip-mounted combustion heaters that provided cabin heating and wing and tail surface deicing, and an APS-42 weather radar in a distinctive nose "thimble." These latter improvements were eventually retrofitted to the C-124As. Shortly after entering service with Military Air Transport Service and Troop Carrier Command, the C-124 suffered two isolated accidents (December 1950 and June 1951), each resulting in what was then the largest number of people killed in a single aircraft accident (86 and 129, respectively). The C-124 went on to provide a much-needed airlift capability in the Korean War, as it was the only aircraft that could carry many of the Army's vehicles. Nicknamed "Old Shaky," the C-124 saw service all over the world, from Antarctic resupply flights, to refugee evacuation in the Congo, to mercy flights in Chile and elsewhere. C-124s were used to deliver supplies to the French in Indochina in 1954–55 and then were regularly flown to Vietnam through the US buildup in the 1960s. While reliable, the C-124s were slow (97 hours from Travis AFB, Calif., to Tan Son Nhut AB, South Vietnam, and back), and they were all the Air Force had until the C-133, and later C-141 and C-5, came along. Most C-124s were transferred to the Air National Guard and Air Force Reserve by 1970. The type was phased out of service in mid-1974.
(Specifications for C-124C.)
Contractor: Douglas Aircraft Co.
Location built: Long Beach, Calif.
Number built (USAF): 448 (448).
FF: November 27, 1949.
FFM: YC-124.
FFL: Long Beach, Calif.
FFP: Unconfirmed.
Models/variants: C-124A, C.
Powerplant: Four Pratt & Whitney R-4360-63A Wasp Major four-row, 28-cylinder radials of 3,800 hp each.

Wingspan: 174 ft 2 in.
Length: 130 ft 0 in.
Height: 48 ft 4 in.
Weight: 194,500 lb gross.
Armament: None.
Accommodation: Crew of eight plus 68,500 lb of cargo or 200 passengers or 127 litters and 15 attendants.
Cost: $1.65 million.
Max. speed: 304 mph.
Range: 4,030 mi.
Ceiling: 21,800 ft.

Trainers

JN-4 "Jenny"
The Jenny is probably the most famous US-built airplane to come out of World War I. This trainer and observation biplane picked up its nickname from its designation, JN. Roughly 95 percent of the US and Canadian pilots trained during World War I flew a Jenny at some point during their training. When the buildup of American airpower began after the US entered World War I, the JN-4 was the only proven domestic design ordered into immediate mass production. Wartime need required an ex-pansion of production, and five other companies were chosen to build JN-4D. An earlier version, the JN-3, was used in 1916 during Maj. Gen. John J. Pershing's punitive expedition into Mexico, but the aircraft's performance was not satisfactory. After World War I, thousands of JN-4s were put on the civilian market, and the type was used by countless barnstormers all across the country. Some 200 airplanes were transferred to the US Navy from 1920 to 1923. The Army Air Service continued to use the better performing JN-4H and JN-6 models until September 1927.
(Specifications for JN-4D.)
Contractors: 1. Curtiss Aeroplane and Motor Co. 2. Fowler Airplane Corp. 3. Liberty Iron Works. 4. Springfield Aircraft Co. 5. St. Louis Aircraft Co. 6. US Aircraft Co. 7. Howell & Lesser Co.
Locations built: 1. Buffalo, N.Y. 2. San Francisco, Calif. 3. Sacramento, Calif. 4. Springfield, Ill. 5. St. Louis, Mo. 6. Redwood City, Calif. 7. San Francisco, Calif.
Number built (USAF): 6,070 (approx 5,500).
FF: 1915.
FFM: JN-2 (although it is sometimes referred to as just JN).
FFL: Hammondsport, N.Y.
FFP: Unconfirmed.
Models/variants: JN-4, JN-4A, B, C, D, H. JN-4Can. JN-4HT, HB, HG. JN-5H. JN-6, JN-6HB, HG, HO, HP. JNS.
Powerplant: One Curtiss OX-5, liquid-cooled V-8 of 90 hp.
Wingspan: 43 ft 7 in.
Length: 27 ft 4 in.
Height: 9 ft 10 in.
Weight: 1,920 lb gross.
Armament: Usually none.
Accommodation: Crew of two (student and pilot in separate tandem cockpits).
Cost: $4,750 (airframe only; engines added approx $1,000 to the cost).
Max. speed: 75 mph.
Endurance: two hr, 15 min.
Ceiling: 6,500 ft.

AT-6 Texan
One of the most widely used aircraft in history. Nearly every Army Air Forces pilot, a majority of British, Canadian, Australian, and New Zealand pilots, and thousands of US Navy pilots in World War II trained in the AT-6 (called Harvard in Canada or SNJ by the Navy) prior to earning their wings. This aircraft exposed students to high-performance aircraft with retractable landing gear. One of two Army Air Forces aircraft types that were developed from the NA-16 company demonstrator. The AT-6C was unusual in that low-alloy steel and plywood were substituted for aluminum structure in an attempt to save strategic materials. While this saved more than 1,200 pounds of weight, fears of materials shortages were found to be exaggerated, and the standard materials were returned in the AT-6D. In service long after World War II ended, more than 2,000 remaining aircraft were redesignated T-6A, C, D, and F in 1948, when the A for "advanced," B for "basic," and P for "primary" trainer prefix nomenclature was dropped. These aircraft were remanufactured in 1948–49 and were all designated T-6G. The type was eventually used by several dozen nations. The T-6 was used in Korea for forward air control (or "mosquito missions," as they were known) and carried an observer in the second seat to spot enemy troops and gun emplacements for the pilot to mark with smoke rockets. On July 10, 1950, the first day of mosquito operations, Lt. James Bryant and Lt. Frank Mitchell called in a strike by F-80 pilots who destroyed a column of North Korean tanks. The 6147th Tactical Air Control Squadron was later "officially" formed for this mission and by the end of the war had flown 40,354 sorties and was responsible for the destruction of at least eight Communist divisions, 563 artillery pieces, 5,079 vehicles, 12 locomotives, thousands of railcars, and 84 bridges. The T-6 was phased out of Air Force and Navy service in 1958
(Specifications for T-6G.)
Contractor: North American Aviation, Inc.
Locations built: Inglewood, Calif., Dallas, Tex., Fresno, Calif., and Columbus, Ohio.
Number built (USAF): 15,109 (approx 7,088).
FF: April 1, 1935.
FFM: NA-16.
FFL: Dundalk, Md.
FFP: Edmund T. "Eddie" Allen.
Models/variants: AT-6, AT-6A, B, C, D, F. T-6G. LT-6G. BC-1, BC-1A.
Powerplant: One Pratt & Whitney R-1340-AN1 Wasp nine-cylinder radial of 550 hp.
Wingspan: 42 ft $0^{1}/4$ in.
Length: 29 ft 6 in.

Height: 11 ft 9 in.
Weight: 5,617 lb gross.
Armament: Usually none (although some AT-6B aircraft were used for gunnery training and carried two .30-cal. machine guns; T-6Gs in the Korean War carried smoke rockets for marking targets).
Accommodation: Crew of two (student and pilot in tandem). **Cost:** $27,000.
Max. speed: 210 mph.
Range: 770 mi.
Ceiling: 23,200 ft.

AT-7 Navigator/AT-11 Kansas/C-45 Expeditor/F-2
The military versions of the popular civilian Model 18. The AT-7 was the Army Air Forces' first dedicated navigation trainer and featured a rotatable astrodome behind the cockpit. The AT-11 featured a glass nose, Norden bombsight, and a bomb bay and was used to train 90 percent of World War II bombardiers. Both types were first purchased in 1941. The C-45 was used as a utility transport and for advanced training. The F-2, like the C-45, was first purchased in 1940 and was the AAF's first specialized mapping and photoreconnaissance aircraft and featured up to four fuselage-mounted cameras. These aircraft also had uprated engines and an oxygen system for the crew. This aircraft type also saw service with the US Navy as the JRB (C-45) and SNB (AT-7/AT-11). Approx 900 USAF aircraft (mostly C-45s) were remanufactured by Beech in Herington, Kan., after the war. The C-45G/Hs (the remanufactured aircraft) stayed in USAF use until 1963.
(Specifications for C-45H, except as noted.)
Contractor: Beech Aircraft Co.
Location built: Wichita, Kan.
Number built (USAF): 7,796, incl civilian models (4,526 of all types).
FF: January 15, 1937.
FFM: Company Model 18A.
FFL: Wichita, Kan.
FFP: James N. Peyton.
Models/variants: C-45, C-45A, B, F, G, H. UC-45C, D, E, J. AT-7, AT-7A, B, C. AT-11. F-2.
Powerplant: Two Pratt & Whitney R-985-AN-14B nine-cylinder radials of 450 hp each.
Wingspan: 47 ft 8 in.
Length: 34 ft 3 in.
Height: 9 ft 2 in.
Weight: 9,300 lb gross.
Armament: None on C-45, AT-7, F-2. Two .30-cal. machine guns and 10 100-lb bombs on AT-11.
Accommodation: Crew of two, side by side, and six passengers (C-45); crew of two, side by side, and three students (AT-7, AT-11).
Cost: $57,838.
Max. speed: 219 mph.
Range: 1,440 mi.
Ceiling: (C-45) 18,200 ft. (F-2) 26,200 ft.

PT-1 Trusty/PT-3
The PT-1 was the first airplane produced in substantial quantity following World War I. It was used for training aviation cadets in California and Texas and established the basic design for primary trainers into World War II. The PT-1 had a welded fuselage framework of chrome-molybdenum steel tubing for structural strength. Nicknamed "Trusty" because it was so sturdy and easy to fly, it bred overconfidence in some of the student pilots—an undesirable trait for men who were soon to be flying faster airplanes with more difficult handling qualities. It had excellent spin-recovery characteristics. The PT-3 was essentially the same airplane, with a different engine and other minor differences. The PT-1 was selected as the winner of a competition in 1924 held at Brooks Field, Tex. In its first year of service at Brooks, 531 students were trained without a serious injury, significantly better than the JN-4 that it replaced. Four PT-1s were built for Siam. The Navy's NY-1/NY-2 trainer was developed from the PT-1. The O-17 Courier was a development of the PT-3. The Trusty was one of the first aircraft used by the Air National Guard. Only a few PT-1s survive today, and one is on display at the US Air Force Museum at Wright-Patterson AFB, Ohio.
(Specifications for PT-1, except as noted.)
Contractor: Consolidated Aircraft Co.
Location built: Buffalo, N.Y.
Number built (USAF): PT-1: 224 (220). PT-3: 157 (150).
FF: 1923.
FFM: TW-3.
FFL: Unconfirmed but most likely East Greenwich, R.I.
FFP: Unconfirmed.
Models/variants: PT-1/PT-3.
Powerplant: One Wright E liquid-cooled V-8 of 180 hp (One Wright R-790, also called J-5, Whirlwind of 220 hp on PT-3).
Wingspan: 34 ft 9 in.
Length: 27 ft 8 in.
Height: 9 ft 6 in.
Weight: 2,577 lb gross.
Armament: None.
Accommodation: Crew of two (student and pilot in tandem).
Cost: $9,800.
Max. speed: 95 mph.
Range: 325 mi.
Ceiling: 13,450 ft.

PT-13/PT-17/PT-18 Kaydet
The PT-13/-17/-18 series began as a company-funded venture in 1934, and nearly every pilot in the Army Air Corps/Army Air Forces, the US Navy, and a number of foreign countries flew the Kaydet as the first step toward earning their wings. The PT-13 replaced the PT-1 as the Army's primary trainer. The prototype was designed and built in only 60 days, and the Kaydet's airframe was stressed to a much higher load factor than it was ever expected to encounter in training operations. The aircraft was commonly called a "Stearman," even after Boeing bought the company. The PT-17 and PT-18 were essentially the same as the PT-13 with different engines and some different minor details. The PT-17 featured a blind-flying hood that fit over the rear cockpit to allow the students to become familiar with instrument flight. The Navy also flew hundreds of these airplanes as the N2S. Military flying schools in the 1930s provided the last market for the biplane as the type had ceased to be a factor even in civil aviation by then. Several thousand of these trainers were on the civil market after World War II, and a surplus Kaydet could be purchased for a few hundred dollars. The PT-27 was essentially a PT-17 with a full canopy to keep out the elements for pilots training in Canada. The last production Kaydet came off the line in

1945 after the type had been in production for 10 years. The Kaydet was the last biplane bought by the Air Force's predecessor organizations.
(Specifications for PT-17, except as noted.)
Contractor: Stearman Aircraft Division of Boeing Aircraft Co.
Location built: Wichita, Kan.
Number built (USAF): 8,585 (4,328).
FF: Early 1934.
FFM: Company Model 70.
FFL: Unconfirmed but most likely Wichita, Kan.
FFP: Unconfirmed.
Models/variants: PT-13, PT-13A, B, C, D. PT-17, PT-17A, B. PT-18, PT-18A.
Powerplant: One Continental R-670-5 nine-cylinder radial of 220 hp.
Wingspan: 32 ft 2 in.
Length: 24 ft 10 in.
Height: 9 ft 8 in.
Weight: 2,635 lb gross.
Armament: None.
Accommodation: Crew of two (student and pilot in separate tandem cockpits).
Cost: $9,120.
Max. speed: 135 mph.
Range: Approx 450 mi (PT-13D).
Ceiling: 13,200.

PT-19/PT-23 Cornell
The PT-19 was developed as a company-funded effort to satisfy a military requirement for a rugged, monoplane trainer. Massive orders in 1941 led to the doubling of Fairchild's production facilities, but the demand exceeded capacity at Hagerstown, Md., and additional sources were provided by Aeronca and St. Louis Aircraft Corp. All three companies built the PT-19 version. The PT-19B had a hood that fit over the cockpit for blind-flying instrument instruction. The PT-19 and PT-23 were the same airplane except the PT-23 had a radial engine. The PT-26 had a canopy, a new engine, and other slight differences and was used by the Canadian government for the Commonwealth Air Training Plan. Cornells were also flown by the Norwegian forces in exile, Brazil, Ecuador, and Chile. Some PT-19s were in Air Force use as late as 1948.
(Specifications for PT-19A.)
Contractors: 1. Fairchild Engine & Airplane Corp. 2. Aeronca Aircraft Corp. 3. St. Louis Aircraft Corp. 4. Howard Aircraft Corp.
Locations built: 1. Hagerstown, Md. 2. Middletown, Ohio. 3. St. Louis, Mo. 4. St. Charles, Ill.
Number built (USAF): 6,016 of both models (5,942 of both models).
FF: 1939.
FFM: Company Model 62.
FFL: Unconfirmed but most likely Hagerstown, Md.
FFP: Unconfirmed.
Models/variants: PT-19, PT-19A, B. PT-23, PT-23A.
Powerplant: One Ranger L-440-1 six-cylinder in-line of 175 hp.
Wingspan: 36 ft 0 in.
Length: 27 ft 11 in.
Height: 10 ft 6 in.
Weight: 2,450 lb gross.
Armament: None.
Accommodation: Crew of two (student and pilot in separate tandem cockpits).
Cost: $9,896.
Max. speed: 132 mph.
Range: 400 mi.
Ceiling: 15,300 ft.

T-28 Trojan
The winner of the competition to build the first new Air Force trainer after World War II, the T-28A fell short of expectations, and the Air Force eventually added the T-34 to the syllabus to provide *ab initio* training. Following a Department of Defense decision to standardize training, the Navy also purchased the T-28B and C versions, which had some significant differences from the Air Force version, including an arresting hook for carrier-landing training. The US used a number of T-28s in the ear-ly stages of Operation Farm Gate to train the South Vietnamese in commando-type operations. In 1962, the US Air Force began to modify nearly 300 T-28s as fighter-bombers for counterinsurgency warfare, and these were redesignated T-28D Nomads. Many of these airplanes were turned over to the South Vietnamese Air Force. T-28 pilots normally flew in two-plane formations for day strikes. One of the most successful uses for the T-28 was on night hunter-killer missions. A forward air control pilot in an O-1F used a Starlight scope to locate enemy vehicles, which the T-28 pilots then bombed. Several Air National Guard squadrons used T-28s briefly in the late 1950s while awaiting conversion to jets. Air Force training in T-28s ended in the late 1950s to the early 1960s, when the T-37 entered service. Armed T-28s were also used by France in Algeria.
Contractor: North American Aviation, Inc.
Location built: Inglewood, Calif.
Number built (USAF): 1,989 (1,175).
FF: September 24, 1949.
FFM: XT-28.
FFL: Unconfirmed but most likely Inglewood, Calif.
FFP: Unconfirmed.
Models/variants: T-28A, D. AT-28D.
Powerplant: One Wright R-1300-1 Cyclone nine-cylinder radial of 800 hp.
Wingspan: 40 ft 7 in.
Length: 32 ft 0 in.
Height: 12 ft 8 in.
Weight: 6,365 lb gross.
Armament: None (T-28A); two .50-cal. machine guns in detachable pods and underwing pods for up to 1,800 lb of rockets or bombs (T-28D).
Accommodation: Crew of two (student and instructor in tandem).
Cost: $123,000.
Max. speed: 283 mph.
Range: 1,000 mi.
Ceiling: 25,000 ft.

T-29 Flying Classroom/C-131 Samaritan
The T-29/C-131 series was a development of the civilian models 240/340/440 Convair-Liner. The T-29 was designed to replace TB-25J. A number of both types were modified with civilian interiors for executive transport. The first T-29 was delivered in 1950, but the first C-131 was not delivered until 1964. The C-131 was primarily used for casualty evacuation. Some were modified for special duties, including missile tracking, photographic survey, and airways checking. Air forces of Australia, West

Germany, Italy, Bolivia, Spain, Paraguay, and Sri Lanka obtained small numbers of ex-civilian models. The US Navy flew a number of R4Y aircraft, and later some C-131s transferred from the Air Force. The current T-43 replaced the T-29 for training navigators. The last C-131s were retired from the Air National Guard in the mid-1980s. One C-131 was extensively modified, complete with a second cockpit attached to the front of the aircraft, to allow for simulation of large aircraft handling characteristics. The aircraft, designated NC-131H, is known as the Total In-Flight Simulator (TIFS) and is still in use.
(Specifications for T-29C.)
Contractor: Consolidated-Vultee Aircraft Corp. (Convair).
Location built: San Diego, Calif.
Number built (USAF): 1,076 incl civilian models (472).
FF: March 16, 1947.
FFM: Company Model 240.
FFL: San Diego, Calif.
FF Crew: Sam Shannon, pilot; Russell Rogers, copilot; and L.J. Bordelan and J.T. Ready, flight engineers.
Models/variants: T-29A, B, C, D. AT-29C (later redesignated ET-29C). VT-29C. C-131A, B, D, E. JC-131B. VC-131D. RC-131F, G.
Powerplant: Two Pratt & Whitney R-2800-99W Double Wasp 18-cylinder, two-row radials of 2,500 hp.
Wingspan: 91 ft 9 in.
Length: 74 ft 8 in.
Height: 26 ft 11 in.
Weight: 43,575 lb gross.
Armament: None.
Accommodation: Crew of four (pilot, copilot, and instructors) and 16 students.
Cost: $635,000 (C-131D).
Max. speed: 299 mph.
Range: Approx 1,000 mi.
Ceiling: 24,000 ft.

T-33 Shooting Star
The two-place T-33 was the world's first jet trainer. It was developed from the single-seat F-80 fighter by lengthening the fuselage approximately three ft to accommodate a second cockpit. Lockheed undertook the design of the T-33 with $1 million of its own money. Entering service in 1948, the T-33 was the only Air Force jet trainer until the advent of the Cessna T-37 in 1957. The T-33 then went from being an advanced trainer to a primary trainer. The T-33 was eventually used by the navies and air forces of more than 20 countries. Many are still in use today. One modified T-33, designated NT-33, was used to simulate the handling characteristics of different aircraft; this particular aircraft was in use until the early 1990s, when it was replaced by the NF-16 Variable Stability In-Flight Simulator Test Aircraft. A number of the T-33s for export were modified to carry light armament. A number of T-33s were built under license in Canada. Untold thousands of pilots earned their wings on the T-33. The last Air National Guard T-33 was retired in 1987.
(Specifications for T-33A.)
Contractor: Lockheed Aircraft Co.
Location built: Burbank, Calif.
Number built (USAF): 5,691 plus 1,046 license-built aircraft (approx 3,980).
FF: March 22, 1948.
FFM: TP-80C.
FFL: Van Nuys, Calif.
FFP: Tony LeVier.
Models/variants: T-33A. DT-33A; NT-33A; RT-33A. QT-33.
Powerplant: One Allison J33-A-23, or -25 (or later 35) turbojet of 5,200 (5,400 on the -35) lb of thrust.
Wingspan: 38 ft 10^{1}/2 in.
Length: 37 ft 9 in.
Height: 11 ft 7 in.
Weight: 12,000 lb gross.
Armament: Two fixed .50-cal. machine guns.
Accommodation: Crew of two (student and pilot in tandem).
Cost: $123,000.
Max. speed: 525 mph.
Range: 1,275 mi.
Ceiling: 47,500 ft.

Helicopters

YG-1
The YG-1 was the first practical rotorcraft procured by the Air Corps. Two Kellet KD.1 civilian autogyros were acquired and were given the designation of YG-1 and YG-1A. Both of these open-cockpit aircraft crashed. Seven additional aircraft (with slight changes) were ordered, and these aircraft were delivered to Wright Field, Ohio, for evaluation in 1938. These seven were designated YG-1B. A much-improved version, the XO-60, was ordered in 1942. This version featured a Jacobs R-915-3 of 300 hp, an enclosed, bulged cockpit to allow the crew to look down (along with windows in the floor), taller landing gear to increase the angle of attack on takeoff, and two vertical fins attached to the horizontal stabilizer for better stability and performance. Both of these types could make a near-vertical takeoff (a takeoff roll followed by "jumping" to become airborne). In flight, the rotor blades, which were driven by the engine, were disengaged, and the aircraft's propeller took over. The XO-60s (six of which were later redesignated YO-60) were sent to Florida, Georgia, California, New Mexico, and Wright Field for evaluation. What is believed to be the last XO-60 is now in the collection of the National Air and Space Museum in Washington, D.C.
(Specifications for YG-1.)
Contractor: Kellett Autogiro Corp.
Location built: Philadelphia, Pa.
Number built (USAF): Nine (nine).
FF: 1936.
FFM: YG-1.
FFL: Most likely Wright Field, Dayton, Ohio, or, possibly,

Philadelphia, Pa.
FFP: Unconfirmed.
Models/variants: YG-1.
Powerplant: One Jacobs R-755-3 nine-cylinder radial of 225 hp.
Rotor Diameter: 40 ft 0 in.
Fuselage Length: 28 ft 10 in.
Height: 10 ft 3 in.
Weight: 2,250 lb gross.
Armament: None.
Accommodation: Two (pilot and observer in tandem).
Cost: Unknown.
Max. speed: 125 mph.
Range: 360 mi.
Ceiling: 14,000 ft.


XR-4 Helicopter

R-4 Hoverfly
The world's first production helicopter, the first helicopter designed specifically for the military, and the only US helicopter to see action in World War II, the XR-4 was developed from the VS-300, the world's first practical helicopter. To demonstrate what a giant leap the XR-4 was over the VS-300, company pilot C.L. "Les" Morris flew the prototype 761 miles from the Stratford, Conn., factory to Wright Field, Ohio, in five days and 16 flights. Igor Sikorsky was the passenger on the last hop from Springfield, Ohio, to Wright Field. Orville Wright was present when the XR-4 was formally accepted on May 30, 1942. Three YR-4As and 27 YR-4Bs were ordered in 1943. These were sent to Burma (six), Alaska, Wright Field (six), and other places and other services (three in all to the Navy and designated HNS) to test the aircraft in various conditions. The first landing on a ship came on May 6, 1943, when USAAF Capt. H. Franklin Gregory touched down on the stern of the tanker SS *Bunker Hill* riding at anchor in Long Island Sound. The first combat rescue came on April 25–26, 1944, when 2d Lt. Carter Harman lifted a downed L-1 pilot and the three injured British soldiers he was flying out of the jungle in Burma. Col. Philip Cochran, commander of the 1st Air Commando Group, later wrote, "Today, the 'egg-beater' went into action, and the damn thing acted like it had good sense." One hundred R-4Bs were ordered, and the type was used by the AAF, US Navy and Coast Guard (as HNS-1s), and the British Royal Navy. Later, the R-4s were used for heli-copter training. Some were in use as late as 1948.
(Specifications for R-4B.)
Contractor: Vought-Sikorsky Division of United Aircraft.
Location built: Stratford, Conn.
Number built (USAF): 131 (73).
FF: January 14, 1942.
FFM: XR-4.
FFL: Stratford, Conn.
FFP: Unconfirmed but likely C.L. "Les" Morris or possibly Igor Sikorsky.
Models/variants: YR-4B, R-4B.
Powerplant: One Warner R-550-3 Super Scarab seven-cylinder radial of 200 hp.
Rotor diameter: 38 ft 0 in. **Fuselage Length:** 35 ft 5 in.
Height: 12 ft 5 in.
Weight: 2,540 lb gross.
Armament: None.
Accommodation: Two (pilot and observer/passenger, side by side).
Cost: Unconfirmed.
Max. speed: 81 mph.
Range: 230 mi.
Ceiling: 8,000 ft.

H-19 Chickasaw
The H-19 was the first helicopter to be procured in quantity by the Air Force. It was also the world's first helicopter to have a nose-mounted engine, which left the main cabin free for cargo, troops, or litters. A long drive shaft, running up through the elevated cockpit, turned the rotor. The H-19 entered service in 1951 and saw extensive service in the Korean War. Shortly after it entered service, Capts. Joseph D. Copper and Russell Winnegar, with some South Koreans, lowered an H-19 into a canyon 35 miles behind North Korean lines. The South Koreans fieldstripped a crashed MiG-15 and hooked the carcass on the H-19's external winch. Overloaded, the crew lifted off and, flying through heavy ground fire, returned safely to base. In April 1953, Capt. Joseph McConnell, Jr., who would go on to be the leading ace of the Korean War, was pulled out of the Yellow Sea by an SH-19B (as the dedicated rescue aircraft were designated) crew. H-19 crews were also heavily involved in Special Operations in Korea, including retrieving agents who had parachuted into North Korea. On January 15, 1953, Capt. Lawrence A. Barrett and Lt. R.F. Sullivan flew more than 100 miles behind North Korean lines to rescue a downed F-51 pilot. On July 13–31, 1952, two Air Force crews, Capts. Vincent McGovern and Harry C. Jeffers and Capt. George O. Hembrick and Lt. Harold Moore, flying two H-19s nicknamed *Hopalong* and *Whirl-o-Way,* made the first crossing of the Atlantic by helicopter. The crews flew from Westover AFB, Mass., to Prestwick, Scotland, in five stages, covering 3,535 miles in 42 hours, 25 minutes. The H-19/S-55 series was also flown by the US Navy, Marine Corps, Coast Guard (as HRS and HO4S), and Army (H-19D, which carried the official nickname of Chickasaw), as well as 35 other nations. License production took place in Britain, France, and Japan. The H-19s were redesignated UH/HH-19 in 1962 when the Department of Defense standardized the designation system. The last Air Force UH-19s were taken out of service in 1964.
(Specifications for H-19B.)
Contractor: Sikorsky Aircraft Division of United Aircraft Corp.
Location built: Bridgeport, Conn.
Number built (USAF): Approx 1,600, incl civilian models and licensed production overseas (334).
FF: November 10, 1949.
FFM: S-55.
FFL: Bridgeport, Conn.
FFP: Unconfirmed.
Models/variants: H-19A, B (later redesignated UH-19A, B). SH-19B (later redesignated HH-19B).

Powerplant: One Wright R-1300-3 Cyclone seven-cylinder radial of 700 hp.
Rotor Diameter: 53 ft 0 in. **Fuselage Length:** 42 ft 3 in.
Height: 13 ft 4 in.
Weight: 7,200 lb gross.
Armament: None.
Accommodation: Crew of two (pilot and copilot, side by side) and 10 passengers or six litters.
Cost: $150,000.
Max. speed: 112 mph.
Range: 360 mi.
Ceiling: 15,000 ft.

HH-43 Huskie
The first helicopter purchased by the Air Force specifically for airborne fire-fighting and air base crash rescue. The twin intermeshing, counter-rotating rotors made the Huskie very stable in flight, and in fact, the downwash actually helped suppress fires. The Navy first bought the Huskie (designated HOK-1 for the Marines and HUK-1 for the Navy) as a general-purpose helicopter. The Air Force H-43A could carry only four passengers, as it was powered by a 600-hp engine that occupied a large part of the cabin. However, the smaller, roof-mounted turboshaft on the HH-43B freed up much interior space. Deliveries of the HH-43B began in 1959, and the type was used for base crash rescue for all flying commands. A number of Huskie crews set time-to-climb, altitude, and distance records. A Huskie crew could become airborne in a minute, taking 30 seconds to get airborne and 30 seconds to pick up the fire-suppression kit (foam and water bottle, nitrogen pressure bottle, and hose), and would often beat the fire trucks to a crash scene. In mid-1964, three units were transferred from the Philippines and Okinawa to Southeast Asia for combat rescue. The 33d Air Rescue Squadron assigned to Nakhon Phanom RTAB, Thailand, was the first to begin combat rescue operations, in June 1964. The HH-43F (nicknamed Pedro) featured 800 pounds of titanium armor plating, an uprated engine, and some carried a flexible-mount .30-cal. machine gun for this expanded mission. Most of the B model aircraft were later brought up to HH-43F standard. After the introduction of the Jolly Green Giants (HH-3s), the HH-43s reverted to air base crash rescue duties. HH-43s were also flown by Burma, Colombia, Morocco, Pakistan, Thailand, and Iran. The last of the USAF HH-43s were retired by the early 1970s.
(Specifications for HH-43B.)
Contractor: Kaman Aircraft Co.
Location built: Bloom-field, Conn.
Number built (USAF): 264 (253).
FF: September 27, 1956.
FFM: Navy HOK.
FFL: Bloomfield, Conn.
FFP: Unconfirmed.
Models/variants: H-43A. HH-43B, F.
Powerplant: One Lycoming T53-L-1B turboshaft of 860 shp.
Rotor Diameter: 47 ft 0 in.
Fuselage Length: 25 ft 0 in.
Height: 15 ft 6 in.
Weight: 9,150 lb gross.
Armament: None.
Accommodation: Normally four (pilot, copilot, and two fire fighters) or up to 10 passengers or four stretchers with attendants.
Cost: $304,000.
Max. speed: 120 mph.
Range: 235 mi.
Ceiling: 25,700 ft.

CH/HH-3
The CH/HH-3 was a long-range, amphibious transport helicopter that performed a number of duties for the Air Force for more than 30 years. However, the H-3's most prominent role was combat rescue in Southeast Asia. Developed as a US Navy antisubmarine warfare platform, the H-3 was first used to fill an Air Force requirement for a support aircraft for its Texas Tower radar sites located in the Atlantic and to recover drones in the Gulf of Mexico. These six CH-3Bs were virtually identical to the Navy's Sea Kings. The first USAF-specific version was the CH-3C, which featured a redesigned fuselage, a rear cargo ramp, and tricycle landing gear and was first flown on June 17, 1963. The first CH-3Cs were sent to Vietnam in 1965, primarily for clandestine missions along the Ho Chi Minh Trail. The definitive Air Force version was the CH/HH-3E, which featured an uprated engine, more than 1,000 pounds of titanium armor, additional tankage, and an in-flight refueling boom. Eventually, all CH/HH-3Cs were brought up to this standard. The HH-3Es, universally known as Jolly Green Giants because of their green-and-tan camouflage schemes, were used on 496 of the 980 aircrew rescues made between 1966 and 1970 in Southeast Asia. On May 31–June 1, 1967, two Air Force crews flying HH-3Es made the first nonstop flight across the Atlantic by helicopter. The 4,271-mile flight took 30 hours, 46 minutes and required nine in-flight refuelings. Lt. Col. Herbert E. Zehnder, the pilot on one of the HH-3Es on the transatlantic flight, flew that same aircraft in the raid on the Son Tay prisoner of war camp near Hanoi on November 20–21, 1970. The Jolly Greens had some limitations and were mostly replaced by the HH-53. The CH/HH-3s continued to serve in ANG and AFRES and with Air Force Special Operations Forces into the 1990s. One Reserve HH-3 unit served in Operation Desert Storm. All the HH-3s were retired by 1995.
(*Specifications for CH-3E, except as noted.)*
Contractor: Sikorsky Aircraft of United Technologies.
Location built: Stratford, Conn.
Number built (USAF): Approx 825, incl civilian models and license production overseas (134).
FF: March 11, 1959.
FFM: XHSS-2.
FFL: Stratford, Conn.
FFP: Unconfirmed.
Models/variants: CH-3B, C, E. HH-3C, E.
Powerplant: Two General Electric T58-GE-5 turboshafts

of 1,500 shp each.
Rotor Diameter: 62 ft 0 in.
Fuselage Length: 57 ft 3 in.
Height: 18 ft 1 in.
Weight: 22,050 lb gross.
Armament: Up to three .50-cal. machine guns or three 7.62-mm M60 Miniguns (HH-3C/E only).
Accommodation: Crew of two or three (pilot, copilot, and flight engineer/loadmaster) normally, plus gunners and pararescuemen as necessary (HH-3C/E only), plus 25 troops or 15 litters or 5,000 lb of cargo.
Cost: $796,000.
Max. speed: 162 mph.
Range: 465 mi on internal fuel, 779 mi with external tanks.
Ceiling: 11,100 ft.

Strategic & Tactical Missiles

Kettering Aerial Torpedo
Designed by Dayton, Ohio, native and engineering genius Charles Kettering (who sat on the board of directors of the Dayton-Wright Co.), the Kettering Aerial Torpedo was the world's first guided missile and a precursor to today's cruise missiles. Nicknamed "Bug," the aerial torpedo was launched from a dolly running down a track pointed precisely in the direction of the target. With a fuselage made of wood laminate and papier-mâché, the Bug was guided to the target by a system of internal preset vacuum-pneumatic and electrical controls. After a preset length of time, an electrical circuit would close and shut down the engine. The wings would then be released, and the fuselage and warhead would fall on the target. Initial tests were successful, but World War I ended before the Bug could be used in combat. After the war, the Air Service conducted additional tests, but the lack of funds in the 1920s halted development. A reproduction of the Bug now hangs in the US Air Force Museum at Wright-Patterson AFB, Ohio.
Contractor: Dayton-Wright Co.
Location built: Dayton, Ohio.
Number built (USAF): Approx 50 (approx 50).
First Launch: October 2, 1918.
FFM: Kettering Aerial Torpedo.
FFL: Dayton, Ohio.
Models/variants: Kettering Aerial Torpedo.
Powerplant: One DePalma V-4 of 40 hp.
Wingspan: 14 ft 11 1/2 in.
Length: 12 ft 6 in.
Height: 4 ft 8 in.
Weight: 530 lb gross.
Warhead: 180 lb high explosive.
Cost: Approx $400.
Max. speed: 120 mph.
Range: 75 mi.
Ceiling: Approx 300 ft.

TM-61 Matador
The TM-61 was the Air Force's first modern mobile, short-range, surface-to-surface tactical missile. The Air Force officially characterized all of the early missiles as types of aircraft, so Matador, as a point-to-point delivery system (or "pilotless bomber"), was originally designated B-61. However, the tremendous differences in maintenance and operations between bomber aircraft and missiles led to Matador's being redesignated TM-61, for "tactical missile," but keeping the bomber mission design series number. Development began in 1946. The Matador was launched from a 40-ft-long trailer, and the rocket booster would be jettisoned after liftoff. The missile would continue on with its jet engine. The missile was controlled from the ground station. Once at its target, the missile would begin a terminal dive. The first Pilotless Bomb Squadron (Light) was organized at Patrick AFB, Fla., in October 1951 for testing the new weapon and to train launch crews. In March 1954, the first two operational Matador units were deployed to West Germany to bolster NATO forces. Two other units were sent to South Korea and Taiwan. The 1,000th missile was delivered in 1957, but phaseout of the Matador began in 1959 when it was replaced by the more advanced TM-76 Mace missile.
(Specifications for TM-61A.)
Contractor: Glenn L. Martin Co.
Location built: Middle River, Md.
Number built (USAF): More than 1,000 (more than 1,000).
FF: January 19, 1949.
FFM: XB-61.
FFL: Holloman AFB, N.M.
Models/variants: TM-61A, B, C.
Powerplant: One Allison J33-A-37 turbojet of 5,200 lb thrust, plus one Aerojet solid fuel rocket booster of 57,000 lb thrust for zero-length launch.
Wingspan: 27 ft 11 1/2 in.
Length: 39 ft 8 in.
Height: 9 ft 8 in.
Weight: 13,593 lb gross at launch.
Armament: One 3,000-lb high-explosive conventional warhead or one W-5 nuclear warhead of approx 81 kilotons or one chemical or biological warhead.
Cost: $132,000.
Max. speed: 600 mph (supersonic during terminal dive).
Range: 690 mi.
Ceiling: 44,000 ft.

CIM-10 BOMARC
The CIM-10 was designed as a supersonic, ground-launched missile to intercept large formations of bombers or incoming missiles. Its unusual name came from the two organizations that developed the system, Boeing for the missile (BO) and the University of Michigan's Michigan Aeronautical Research Center (MARC) for the aircraft warning system that linked the launch bases. The Air Force officially characterized all of the early missiles as types of aircraft, so BOMARC, as an interceptor, was originally designated F-99. However, the tremendous differences in maintenance and operations between fighter aircraft and missiles led to BOMARC's being redesignated IM-99, for "intercept missile," but keeping the fighter-mission design series number. The final redesignation came as the Pentagon added a third letter to the missile series to indicate how the weapons were launched, in this case in a reinforced concrete coffin with

a rollback roof. At launch, the roof would roll back, and the missile would be raised to a vertical position and then launched. At launch, the rocket motor would propel the missile to a sufficient speed for the ramjet to operate. The missile was then guided to the vicinity of the target by ground control, where its internal seeker would then take over and guide BOMARC to the target. The CIM-10A was declared operational in 1960. On March 3, 1961, in a full-range operational test, a pair of BOMARCs with conventional warheads were launched from Eglin AFB, Fla., and intercepted both a supersonic GQM-15 Regulus II drone and a subsonic, radio-controlled QB-47 over the Gulf of Mexico. The improved CIM-10B became operational in 1961. By 1969, CIM-10Bs were operational at six Air Force bases in the US and two sites in Canada. Some BOMARCs were modified and flown as supersonic targets and were designated CQM-10Bs. The CIM-10 was phased out of service in October 1972.

(Specifications for CIM-10A, except as noted.)

Contractor: Boeing Aircraft Co.
Location built: Seattle, Wash.
Number built (USAF): Approx 700, incl test rounds (approx 700, incl test rounds).
FF: February 24, 1955 (first fully instrumented flight).
FFM: XF-99.
FFL: Patrick AFB, Fla.
Models/variants: IM-99A, B (later redesignated CIM-10A, B).
Powerplant: One Aerojet General LR59-AG-13 liquid fuel rocket of 35,875 lb thrust and two Marquardt RJ43-MA-3 ramjets of 1,408 lb thrust each (CIM-10A). One Thiokol solid fuel rocket of approx 50,000 lb thrust and two Marquardt RJ43-MA-7 ramjets of 6,000 lb thrust (unconfirmed) each (CIM-10B).
Wingspan: 18 ft 2 in.
Length: 46 ft 10 in.
Height: 10 ft 4 in.
Weight: 15,619 lb.
Armament: Primarily one W-40 nuclear warhead with a seven- to 10-kiloton yield; also could be fitted with a conventional warhead.
Cost: $1.15 million.
Max. speed: 1,975 mph.
Range: 260 mi.
Ceiling: 65,000 ft.

HGM-16 Atlas

The first US intercontinental ballistic missile, Atlas was declared operational in 1959 and stood alert for nearly six years. On December 18, 1958, Project Score, an Atlas booster with a communications repeater satellite, was launched into Earth orbit. The satellite carried a Christmas message from President Dwight D. Eisenhower that was broadcast to Earth, which marked the first time a human voice had been heard from space. On May 20, 1960, an Atlas was launched from Cape Canaveral AFS, Fla., that carried a 1.5-ton payload 9,040 miles to the Indian Ocean, the greatest distance ever flown by a US ICBM. The missile found greater fame as an unmanned booster. However, on February 20, 1962, Marine Corps Lt. Col. John H. Glenn, Jr., made the first US orbital space mission when he was launched from Cape Canaveral on an Atlas booster and circled the Earth three times. The three later Mercury missions also used Atlas as a booster. Atlas was also used to launch the Ranger, Surveyor, and Mariner series of interplanetary probes. The stainless-steel structure on the booster was so thin that the tanks had to be pressurized with helium at all times to support the weight of its own skin.

(Specifications for HGM-16E.)

Contractor: Astronautics Division of General Dynamics (Convair).
Location built: San Diego, Calif.
Number built (USAF): Unconfirmed (126 operational missiles at peak deployment).
FF: June 11, 1957.
FFM: XSM-65A.
FFL: Cape Canaveral AFS, Fla.
Models/variants: SM-65A, B, C, D (later redesignated CGM-16A, B, C, D). CGM-16E. HGM-16F.
Powerplant: One Rocketdyne LR89-NA-3 liquid fuel sustainer engine of 57,000 lb thrust, two Rocketdyne LR105 liquid fuel booster engines of 150,000 lb thrust each, and two Rocketdyne LR101 liquid fuel vernier engines of 1,000 lb thrust each.
Height: 82 ft 5 in. **Diameter:** 10 ft 0 in.
Weight: 260,000 lb.
Armament: One Mk. 4 reentry vehicle with a W-38 nuclear warhead with a yield of three to four megatons.
Cost: $1.7 million.
Max. speed: More than 16,000 mph.
Range: More than 6,800 mi.
Max. altitude: 640 mi.

LGM-25 Titan

The Air Force's second major intercontinental ballistic missile program. Titan was the tallest ICBM, and the Titan II carried the largest warhead, in terms of physical size and yield, in the US nuclear arsenal. Titan I was operational from 1962 to 1966 at five bases (Lowry AFB, Colo., Ellsworth AFB, S.D., Beale AFB, Calif., Larson AFB, Wash., and Mountain Home AFB, Idaho). The missiles were housed in silos and were raised to the surface to fire, which took an average of 20 minutes. Titan II development began in 1958, and the missile was flight tested in 1961 and entered operational service in 1963. The Titan II featured storable liquid fuel, which reduced reaction time to about one minute. During its terminal dive, the warhead streaked toward the target at more than 15 times the speed of sound. Modified Titan IIs were used as the booster rocket on all of the Gemini manned space missions. Titan IIs were stationed at Davis-Monthan AFB, Ariz., McConnell AFB, Kan., and Little Rock AFB, Ark. On May 5, 1987, the last Titan II was taken off strategic alert at Little Rock. After being retired from service as ICBMs in 1987, 14 Titan IIs were refurbished to provide an expendable space-launch

capability. Later developments, Titan III and Titan IV and the Titan 34 family, are still in use as satellite boosters.
(Specifications for LGM-25C, except as noted.)
Contractor: Martin Co. (later Martin Marietta Aerospace).
Location built: Denver, Colo.
Number built (USAF): Unconfirmed (64 operational missiles at peak deployment).
FF: February 6, 1959.
FFM: XSM-68A.
FFL: Patrick AFB, Fla.
Models/variants: SM-68A (later redesignated HGM-25A Titan I). LGM-25B, C Titan II.
Powerplant: First stage: one Aerojet General LR87 storable liquid fuel rocket of 430,000 lb thrust; second stage: one Aerojet General LR91 storable liquid fuel rocket of 100,000 lb thrust.
Height: 103 ft 0 in.
Diameter: 10 ft 0 in.
Weight: 330,000 lb.
Armament: One Mk. 6 reentry vehicle with one W-53 nuclear warhead with a yield of nine megatons.
Cost: $1.5 million (Titan I).
Max. speed: More than 17,000 mph.
Range: 6,300 mi. **Ceiling:** 620 mi (Titan I).

AIR-2 Genie
Genie, an air-to-air unguided rocket for use against formations of enemy bombers, became operational in 1957. The weapon remained inert in a nuclear sense until it was armed in the air a few minutes before firing. On July 19, 1957, a Genie was launched from an F-89J, marking the only time in history that an air-to-air rocket with a nuclear warhead was launched and detonated. The test took place at 20,000 ft over the Nevada test site, and the rocket was fired at a point approximately 14,000 ft away. The Genie covered this distance in 4.5 seconds and was detonated by ground command. The Air Force had personnel standing directly under the blast in an attempt to demonstrate that a low-yield nuclear weapon could be used over cities. These people on the ground suffered no immediate ill effects from the experiment. Production of the Genie ended in 1962, and the rocket was phased out of service by 1986. A training version, designated ATR-2A, featured a white-cloud spotting charge instead of a nuclear warhead. These rounds were nicknamed “Ting-a-Lings.” Carrier aircraft were F-89J, F-101B, and F-106A.
Contractor: Douglas Aircraft Co.
Location built: Huntington Beach, Calif.
Number built (USAF): Several thousand, exact number unconfirmed (all).
FF: 1956.
FFM: Unconfirmed but possibly XMB-1.
FFL: Unconfirmed.
Models/variants: MB-1 (later redesignated AIR-2A).
Powerplant: One Thiokol SR49-TC-1 solid-propellant rocket of more than 36,000 lb thrust.
Length: 9 ft 7 in. **Diameter:** 1 ft 5.35 in.
Finspan: 3 ft $3^1/2$ in.
Weight: 820 lb.
Armament: One W-25 nuclear warhead with a yield of approx two kilotons.
Cost: Unconfirmed.
Max. speed: Approx 1,800 mph.
Range: 6 mi.
Ceiling: Limited to carrier aircraft.

AIM-4 Falcon
The Falcon family of missiles was the world’s first air-to-air guided weapon to enter operational service. Development began in 1947 under the name Project Dragonfly, and the Falcon was first designated XF-98, as it was a “pilotless interceptor.” The Air Force decided to build a fire-control radar first and then build the aircraft and weapons around it. Hughes was also selected to build the radar—the E-9 for the F-89H and the MG-10 for the F-102. The Falcon was first tested in 1954 and became operational in 1955. AIM-4A was radar-guided; AIM-4B was infrared-guided. AIM-4F/G, introduced simultaneously in 1960 to provide reduced susceptibility to enemy countermeasures and higher performance, was the primary armament for F-106. Falcon reached initial operational capability with Air Defense Command in mid-1956. The AIM-4F and G were retired along with the F-106 in 1988. AIM-26 was the nuclear-tipped version, using a similar warhead to the AIR-2A Genie, the major difference being that the nuclear Falcon was guided to a specific target, rather than a general area.
(Specifications for AIM-4F/G.)
Contractor: Hughes Aircraft Co.
Location built: Tucson, Ariz.
Number built (USAF): Approx 60,200 (approx 48,000).
FF: 1954.
FFM: YGAR-1.
FFL: Unconfirmed but possibly White Sands Missile Range, N.M.
Models/variants: GAR-1D (later redesignated AIM-4A) AIM-4B, C, D. AIM-4E, F, G Super Falcon. GAR-11 (later redesignated AIM-26) AIM-26A, B.
Powerplant: One Thiokol M46 two-stage solid propellant rocket motor; first stage of 6,000 lb thrust.
Length: 7 ft 2 in (AIM-4F); 6 ft 9 in (AIM-4G).
Diameter: $6^1/2$ in. **Finspan:** 2 ft 0 in.
Weight: 150 lb (AIM-4F); 145 lb (AIM-4G).
Armament: One 40-lb high-explosive conventional warhead (AIM-4F/G) (One W-54 nuclear warhead with a yield in the low kiloton range on AIM-26).
Cost: Unconfirmed.
Max. speed: Approx 1,500 mph.
Range: Approx 7 mi.
Ceiling: Limited to carrier aircraft.

BGM-109 Gryphon
The first Air Force weapon to be eliminated by treaty. Called ground-launched cruise missiles (GLCMs), this version of the Navy’s Tomahawk sea-launched cruise missile was a mobile ground-to-ground missile that was developed to modernize NATO’s intermediate-range nuclear forces (INF). Its characteristics included a small radar cross section, low-altitude flight profile, and all-weather capabilities. A total of 464 missiles was planned, but deliveries were halted at 19 flights—a flight consisting of four transporter-erector-launchers (TELs), each carrying four missiles (along with four spares), and two launch control centers—with the signing of the INF Treaty with the Soviet Union. Five bases were eventually operational with GLCMs—RAF Greenham Common, UK (established 1983), Comiso AB, Italy, and Florennes AB, Belgium (both 1984), Wueschheim AB, West Germany (1986), and RAF Molesworth, UK (1987). Under the INF Treaty, the first missiles were removed from Europe in September 1988, and the last were removed prior to May

31, 1991. The missiles (sans warheads), TELs, and control centers were flown to the Aerospace Maintenance and Regeneration Center at Davis-Monthan AFB, Ariz., where the missile engines and guidance sets were removed (and actually reused in Navy Tomahawks). The missile bodies were cut into pieces according to strict protocols and with on-site verification by the Soviet officials. The other US missile to be destroyed under the INF Treaty was the Army's Pershing II.

Contractors: Convair Division of General Dynamics Corp. and McDonnell Douglas Astronautics Co.
Location built: San Diego, Calif., and St. Louis, Mo.
Number built (USAF): 380 (380).
FF: 1980.
FFM: BGM-109G.
FFL: Unconfirmed but most likely the Pacific Missile Range Facility, Calif.
Models/variants: BGM-109G.
Powerplant: One Williams International/Teledyne CAE F107-WR-400 nonafterburning turbofan engine of 600 lb thrust. One Atlantic Research solid fuel booster of 7,000 lb thrust for launch only.
Wingspan: 8 ft 7 in. Length: 20 ft 6 in (with booster).
Diameter: 1 ft 9 in. Weight: 3,250 lb (with booster).
Armament: One W-84 nuclear warhead with a yield between 10 and 50 kilotons. Cost: Approx $1 million each.
Max. speed: Approx 500 mph. Range: 1,500 mi.
Ceiling: Missile flew at low altitudes with terrain contour matching and inertial guidance.