Jet Aircraft Development

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The end of World War II saw the elimination of fascist Italy, Nazi Germany and Imperial Japan as world powers, but also resulted in a squaring off between the two principal victors of the struggle–the United States and the Soviet Union. One field that was stimulated by this ongoing international rivalry was jet aviation.

The emergence of the jet engine as a practical means of propulsion unlocked a Pandora's box of new problems for aircraft designers to solve–new aerodynamic factors, new degrees of stress, and new forces with which propeller-driven aircraft previously had not had to contend, most notably the sound barrier. In order to explore these new realms, the airplane had to be redesigned, even reconceptualized.

In consequence, the first five years of the Cold War saw a titanic struggle taking place in the air, one in which the rival nations never fired a shot in anger, yet one in which their airmen faced mortal danger with every flight. The conflict's aces were the test pilots, who regularly matched their flying skills against the hottest, most innovative, and in many cases the most horrendous aircraft that the design bureaus could create.

In regard to the aircraft themselves, the most noticeable trend during the five years following World War II was the transition from straight wings to swept wings. As early as 1935, Professor Adolf Büsemann of the German Luftfahrtforchungsamt (aeronautical research establishment) suggested that sweptback wings would reduce drag at the'sound barrier,' the point at which an aircraft moves at the speed of sound, where the compression of the surrounding air would have dangerous effects on the controls of the plane.

During World War II, the Germans had tried to put those principles into practical use on such revolutionary aircraft as the Messerschmitt Me-163 rocket fighter (calculations on the center of gravity had dictated the use of sweptback wings on the Me-262 jet fighter; their aerodynamic benefits were realized later). Only after the war did the victorious Allied powers, having access to the fruits of German research, begin to adapt those principles to their own designs.

Great Britain emerged from World War II with a decided head start in jet technology, the only Allied power to have had a jet fighter operational in squadron strength before the German surrender on May 8, 1945. This was the Gloster Meteor, which first flew on March 5, 1943. On July 21, 1944, the first two production Meteors arrived at Culmhead and formed the nucleus of No. 616 Squadron, Royal Air Force (RAF). Appropriately, the Meteor's first duty was to defend Britain from attacks by German V-1 pulse jet-powered guided bombs, of which they destroyed 13 by the end of the war. Meteor IIIs of No. 616 Squadron were committed to Continental

Europe in the last months of the conflict, but they never got the opportunity to meet the Me-262A in battle.

Powered by two Rolls-Royce Welland I engines, generating 1,700 pounds of static thrust (lb.s.t.), the Meteor I was a pleasant plane to fly, and for the next 12 years, upgraded models would serve in the RAF and other air arms around the world.

A second wartime British fighter was the deHavilland DH-100 Vampire, whose design dated to 1941, but which did not become operational until 1946. Unlike the twin-engine Meteor, the Vampire had a single deHavilland Goblin 2 jet engine, rated at 3,100 lb.s.t., which was housed in the pilot's nacelle, and its tail surfaces consisted of a twin-boom arrangement similar to that of the American Lockheed P-38 Lightning. Maximum speed was 540 mph. Six Vampire F.3s of No. 54 Squadron made the first crossing of the Atlantic by RAF jets in July 1948, and on December 3, 1945, a naval version, the Sea Vampire, became the first pure jet aircraft to operate from an aircraft carrier.

The first sweptwing jet to fly over Britain was the de Havilland DH-108, a tailless conversion of the Vampire that made its first flight on May 15, 1946. Unofficially known as the Swallow, the first DH-108, TG-283, was alleged to have suddenly jumped from Mach .98 to Mach 1.05 while being test-flown by John Derry on September 9, 1948. Derry's passage through the sound barrier, which he stated occurred during an uncontrolled dive, remains unofficial, but his principal achievement was having survived, for the DH-108 proved to be dangerously unstable and tricky to fly. Three versions were built and all three crashed, killing their pilots–the first victim being Geoffrey de Havilland himself, killed on September 27, 1946, while flying the second prototype.

In November 1948, a sweptwing development of the Hawker Sea Hawk carrier-based jet fighter, the P.1052, made its first flight, followed on December 29 by the first flight of the Supermarine 10, a sweptwing version of the Supermarine Swift naval fighter. Both the Supermarine and Hawker designs were powered by the Rolls-Royce Nene centrifugal-flow turbojet, an engine that would have as profound an effect on American and Soviet jet aircraft design in the late 1940s as it did on the British.

Undoubtedly the oddest British jet fighter of the 1940s was the Saunders-Roe SR.A/1, a single-seat flying boat powered by two Metropolitan-Vickers F.2/4 Beryl axial-flow turbojets mounted side by side within the hull (see the September 1990 Aviation Heritage, P. 10). Three prototypes were built, the first of which made its maiden flight on July 16, 1947. The 'Squirt,' as it was unofficially known around the factory, performed well, with a top speed of 500 mph. Range, however, was somewhat limited, and the requirement that had inspired its creation–to fly from island bases where no airfield could be built for land planes–proved to be superfluous. Although two of the SR.A/Is were lost in accidents, the first prototype, TG263, survives as part of the Imperial War Museum collection at Duxford.

Another country that, like Britain, found itself with its own jet technology when World War II ended was the newly liberated nation of Czechoslovakia. During the war, the Avia factory at Letnany, north of Prague, had been compelled by the Germans to subcontract Me-262 fuselages, while the Walter plant at Jinonice and CKD works in Prague were building Junkers Jumo 004 turbojet engines. After the war, the Czechs found themselves with the makings of a modern aviation industry when Soviet Marshal Ivan A. Konev handed over the jigs, tools and components for building the Me-262 to the restored Czechoslovak government. On August 27, 1946–15 months after Czechoslovakia's revival as a nation–Avia test pilot Antonin Kraus took the unfamiliar controls of the Avia S-92.1, as the Czechs designated their version of the Me-262A, and lifted off from the airfield at Letnany. Production soon followed.

After the Communist coup in 1948, however, it became clear that an emphasis on the license-manufacture of Soviet aircraft would only be a matter of time. During the victory parade of May 9, 1951, six S-92s flew over Prague, symbolically followed by nine of 12 Yak-23s that had recently been delivered from the Soviet Union. In 1951, arrangements were concluded for license-manufacture of the MiG-15. From then on, indigenous Czech military jet aircraft designs were limited to trainers.

The United States was a relative latecomer to the jet age. But its emergence from World War II as the most powerful nation in the West, along with an economy that had not been devastated by the war, and the perceived Soviet threat, resulted in a mammoth American effort to develop jet aircraft. Although both American and Soviet jet designs were to get their greatest boost from the importation of British power plant and German sweptwing technology, it can safely be said that American designers, encouraged by generous financial support from the government, produced the most extensive and imaginative range of jet designs to fly during the 1940s.

The United States entered the jet age on October 2, 1942, when the Bell XP-59 made its first test flight from Muroc Dry Lake (now Edwards Air Force Base), but the new fighter's performance proved to be too disappointing for it to be committed to combat. Bell tried to improve the basic design with a more refined and more powerful twin-engine escort fighter, the XP-83, which first flew on February 25, 1945. Although it did have better range than the P-59 and had admirable maneuverability, the U.S. Army Air Forces (USAAF) had its eye on more promising designs that were waiting in the wings, and only two XP-83s were built.

One of those promising designs was the Lockheed P-80 Shooting Star, which would live up to its name in the decade to follow. Designed by Clarence L. 'Kelly' Johnson, William P. Ralston and Don Palmer around a de Havilland H.IB Goblin engine, the prototype XP-80 made its maiden flight on January 8, 1944, just 198 days after the USAAF approved its construction.

Production versions of this outstandingly clean fighter, powered by General Electric or Allison jet engines, would serve with distinction over Korea, where one of them would score the first jet-versus-jet victory over a Chinese-flown MiG-15 on November 7, 1950. A two-seat trainer version, the T-33A, would see even more extensive service long after the P-80 had

been superseded by newer fighter designs. The T-33, in turn, led to a successful all-weather fighter, the F-94 Starfire, which made its flying debut on April 16, 1949.

A final descendant of the P-80, with a 35-degree wing sweep and a needle nose, the XF-90, made its first flight on June 3, 1949, but its performance proved to be disappointing and it was passed over in favor of the North American F-86A Sabre and the McDonnell XF-88 Voodoo. The latter, a twin-engine escort fighter that was first flown on October 20, 1948, could attain a speed of only 700 mph and was temporarily abandoned–only to be revived after the Korean War and attain production in an improved form as the F-101 Voodoo.

Hot on the P-80's heels came a wide assortment of postwar jet fighters. The Republic design team, led by Alexander Kartveli, investigated the possibilities of mounting a jet engine in the airframe of its successful P-47 Thunderbolt, then wisely dropped the idea in favor of starting over from scratch. Republic's concept, the XP-84, was the first American jet to have the air inlet for its General Electric J33-GE-7 turbojet engine located in the nose. First taking off from Muroc Dry Lake on February 28, 1946, with Major William A. Lein at the controls, the XP-84 Thunderjet was the first American jet to be test-flown since the end of World War II. On September 7, it set a world speed record of 611 mph–only to have it snatched away that very same day when British Group Captain E.M. Donaldson reached 616 mph in a Gloster Meteor.

In October 1947, the U.S. Army Air Forces became the U.S. Air Force (USAF). In mid-1948, this new, separate branch of the U.S. military redesignated all pursuit (P) aircraft as fighters (F). Consequently redesignated as the F-84, the Thunderjet went on to serve with distinction during the Korean War. The Thunderjet's basic airframe got a new lease on life in 1950, when a sweptwing version, initially designated the XF-96A and later F-84F, was developed and put into production under the name of Thunderstreak.

More exotic spin-offs also emanated from the original F-84 concept: the turbine-propeller-driven, T-tailed XF-84H, unofficially called the 'Thunderscreech,' and the jet-and-rocket-powered XF-91 Thunderceptor (September 1992 Aviation Heritage, P.10), whose sweptback wings featured a unique inverse taper (being thicker and wider outboard from the wing root). In December 1951, an XF-91 became the first American airplane to exceed the speed of sound in level flight, but by that time it was clear that simpler, more conventional aircraft would soon be capable of the same feat, and only two prototypes of the Thunderceptor were built.

The most successful jet fighter in the USAAF/USAF during the 1940s traced its origins to an unsuccessful Navy fighter. On November 27, 1946, the straight-winged North American XFJ-1 Fury made its maiden flight, but its performance was so disappointing that a Navy contract for 100 was reduced to 30. By that time, however, the North American design team of J. Lee Atwood, L.P. Green, Ray Rice and Edgar Schmued had learned of German sweptwing development and were already applying it to a lengthened, more streamlined version of the Fury with a 35-degree sweep to its wings.

On October 7, 1947, test pilot George Welch took the XP-86 for its first flight, and on April 26, 1948, he broke the sound barrier in a dive. In June of that year, the P-86 became the F-86, and in March 1949 it was named the Sabre. With the added power of a GE J47 engine of 5,200 lb.s.t., the F-86A jet became the best overall fighter of the Korean War and started a line of Sabre variants that would ensure its place among the great fighter aircraft of all time. The Navy also benefited from the change–it got its own versions of the F-86, starting with the FJ-2 Fury.

The U.S. Navy was slower than the Air Force in eliminating piston-engine fighters from its first-line inventory–not until 1952 did the Vought F4U Corsair become the last piston-engine fighter to go out of mass production. On January 26, 1945, Woodwark Burke took McDonnell's XFD-1 on its first flight, using only one of its two engines because the other was not yet ready. On November 1, the first prototype suffered engine failure, and Burke was killed in the crash. On July 26, 1946, however, Lt. Cmdr. James Davidson scored a U.S. Navy first when he landed the second XFD-1 on the flight deck of the aircraft carrier Franklin D. Roosevelt.

Placed in production and later redesignated the FH-1 Phantom, McDonnell's fighter was a handsome, dependable and popular brute. A larger version, the F2H Banshee fighter-bomber, made its first flight on January 11, 1947, and went on to a longer and more successful career than the Phantom.

Another successful U.S. Navy fighter of the period was the Grumman F9F-2 Panther, which first flew on November 24, 1947, and, like the USAF's F-84, later went on to acquire sweptback wings as the F9F-6 Cougar.

Vought tried to follow up on its Corsair with a jet-powered straight-winged Navy fighter called the F6U Pirate, which first flew on October 2, 1946. Lateral instability resulted in Vought's trying five different tail arrangements before the design was finalized, with two small vertical stabilizers added to the horizontal tail planes to supplement the main stabilizer and rudder. Inferior in performance to the FJ-1 Fury and the F9F-2 Panther, the Pirate was doomed to a short voyage, but Vought soon had another, more unconventional proposal flying on September 29, 1948. This was the XF7U-1, a tailless design with broad, 38-degree sweptback wings influenced by wartime research left by the German Arado firm.

Stabilized by two vertical surfaces installed in the wings and powered by two Westinghouse J34-WE-22 engines, the XF7U-1 could reach 672 mph at 20,000 feet and was put into production as the F7U Cutlass. The rakish Cutlass looked exciting, but its performance and flying characteristics were downright terrifying–by the time the type was retired from service in 1957, it would be responsible for the deaths of four test pilots and 21 Navy fliers.

Radar-equipped, all-weather jet fighters were also developed prior to 1950. On December 22, 1949, the first F-86D, a Sabre with an AN/APO-36 radar mounted above a redesigned nose inlet, made its first flight and went on to become America's first operational all-weather jet interceptor. A more purpose-built interceptor by Northrop, the XF-89, made its first flight at Edwards Air Force Base on August 16, 1949, with Fred Bretcher at the controls, but was found

to be underpowered. An 80 percent redesign, using two Allison J-35-21A engines with 6,800 lb.s.t. and an afterburner and equipped with AN/APG-33 radar, was more successful and entered service at the end of 1951 as the F-89A Scorpion.

The Navy's first radar-equipped jet, the twin-engine Douglas F3D Skyknight, which first flew on March 23, 1948, was a straight-winged, two-seat, carrier-based night fighter whose relatively large size earned it the unofficial nickname of 'Willie the Whale.' Only 268 were built, but they served actively over Korea and Vietnam, the last not being retired until 1978. On November 2, 1952, an F3D-2 scored the first jet victory over another jet at night when it destroyed a North Korean Yak-15, and Skyknights accounted for more victories over enemy aircraft over Korea than any other single Navy type.

American jet fighter development inevitably included some intriguing dead ends. The earliest was the Northrop XP-79B Flying Ram (January 1996 Aviation History, p.10), a flying wing whose pilot was supposed to fly from a prone position and supplement his four 50-caliber wing guns by slicing off the wings or tail surfaces of enemy aircraft with the reinforced leading edge of his own wings. The XP-79's first flight, on September 12, 1945, was also its last. After 15 minutes, the plane suddenly fell into a spin, and when test pilot Harry Crosby tried to bail out, he got caught in the slipstream and his parachute failed to open. Northrop turned its attention to flying-wing bombers rather than continue with the Flying Ram.

More conventional-looking, save for its unusually hefty size, was the Curtiss XP-87 Blackhawk, one of the few four-engine fighter aircraft ever built (November 1991 Aviation Heritage, P. 8). Originally intended as a ground attack plane, its role changed in midstream to that of an all-weather interceptor by the time it made its first flight on March 5, 1948. The USAF had planned to order 88 Blackhawks despite a 'buffeting' problem that was never eliminated, but the deal fell through on October 10, when the superior Northrop XF-89 was chosen over the XP-87. That final disappointment, after an investment of 38 months and $11 million, marked the ignominious end for the illustrious Curtiss Aeroplane Division, which was taken over by North American shortly thereafter.

On the other side of the scale was McDonnell's XF-85 Goblin (January 1995 Aviation History, P. 18), a tubby little parasite fighter that was intended to provide protection for American bombers by stowing away in their bomb bays until needed, launching and returning by means of a retractable trapeze bar. During flight testing on August 23, 1948, test pilot Edwin F. Schoch found himself unable to hook up due to the turbulence caused by the Boeing EB-29B under which he was trying to 'land.' After 10 minutes of trying, Schoch collided with the trapeze, smashing his canopy, and was fortunate to bring the Goblin down for a belly landing. Four subsequent attempts were more successful, but there was an equal number of failures, and in late 1949 the Goblin project was canceled.

On October 14, 1947, Air Force Captain Charles E. Yeager, flying in a rocket-powered Bell XS-1 research plane over Muroc Dry Lake, became the first man to officially pass through the sound barrier when he hit a speed of 700 mph (Mach 1.06). Although great effort and sacrifice

were expended to build a jet airplane capable of sustaining level flight above Mach 1 during the 1940s, it would not be until late 1952 that a Soviet I-350M (the precursor of the MiG-19) achieved that goal. The USAF would match the feat on May 25, 1953, when George Welch reached the sound barrier over Edwards Air Force Base in a descendant of the F-86 Sabre, the YF-1OOA Super Sabre.

If any major power felt left behind at the onset of the jet age, it was the Soviet Union. The first turbojet-powered flight to be conducted in Soviet air space was made on August 5, 1945, when Colonel Andrei G. Kotchetkov test-flew a captured Me-262 near Moscow.

Soviet work in turbojet engines had begun in the 1920s with the experiments of Arkhip Lyulka and his assistants I.F. Kozlov and P.S. Shevchenko, on the VRD-1, an axial-flow engine with an eight-stage compressor and a projected thrust capability of 1,323 pounds. The German invasion on June 22, 1941, postponed Lyulka's experiments, but they resumed at the end of 1942, and by the end of 1944 he had developed the TR-1, a more advanced power plant capable of producing 2,866 pounds of thrust. In February 1945, Soviet forces advancing into Germany discovered the first BMW 003 and Junkers Jumo 004 turbojets. So Josef Stalin, perceiving Western advances in military aircraft as a potential threat to Soviet security, placed maximum priority on the development of Soviet turbojet fighters and bombers.

Four design teams took up the challenge; two of them delivered prototypes for flight testing a bare six months after the Me-262's first trials. The first to fly–by the outcome of a coin toss–was Artem Mikoyan and Mikhail Gurevich's MiG-9, which took off on April 24, 1946, with MiG test pilot Alexei Grinchik in the cockpit. It was followed by the Yakovlev Yak-15, flown by Mikhail I. Ivanov.

Developed by Yevgeny Adler of the Yakovlev design collective, the Yak-15 represented a remarkable shortcut to satisfy Stalin's crash program, being essentially the airframe of a piston engine Yak-3U fighter with a duralumin main wing spar in place of the original wooden one and a 1,984-lb.s.t. Jumo 004B turbojet engine slung beneath the fuselage. Fire protection aft of the engine was provided by a stainless steel sheath under the rear fuselage and a steel roller in place of the rubber tail wheel. The racket made by the aircraft during takeoff and landing was described as 'horrendous.' In late spring 1947, however, a version with tricycle landing gear, the Yak-15U (U standing for Usovershenstovanny, or 'improved'), was introduced. It was later refined into the Yak-17, which also introduced wingtip fuel tanks to compensate for the sacrifice in fuselage fuel capacity to accommodate the nose wheel. In general, the early Yaks were pleasant to fly and were ideal interim fighters for the first generation of Soviet pilots to make the transition from piston- to jet-powered flight.

The MiG-9, in contrast, was a completely original design, a midwing monoplane with two BMW 003 jets mounted side by side within a semimonocoque fuselage. Similar in performance to the Gloster Meteor, the MiG-9 had a better thrust-to-weight ratio, but higher wing loading, than the Yak-15. Despite some hair-raising experiences during its early test flights, the MiG-9 was described by its pilots as being easier to fly than the Yak-15, but its modest performance

(a maximum speed of 566 mph at 16,400 feet) was recognized as being good only until the lessons learned from its construction could be applied to creating something better.

Coming later than the Yak-15 and MiG-9 were Pavel O. Sukhoi's Su-11 and Semyon A. Lavochkin's La-150. Although it had an oval-section fuselage and numerous other original characteristics, the twin-jet Su-11, which first flew on August 18, 1946, was dismissed out of hand by its evaluators as a 'warmed over Me-262' because of its superficial resemblance to the German jet.

First flown in September, the La-150 had a single Jumo 004B engine and was of pod-and-boom configuration. The La-150 was heavier than the Yak-15, and its performance was handicapped further by a substantial wetted area, on top of which its shoulder-mounted wing produced an excessive dihedral effect and its tail boom tended to oscillate dangerously. It was quickly abandoned.

As had been the case with the Americans, British jet engines and German research into sweptwing configuration radically accelerated Soviet jet development. In 1946, the British government allowed the export of Rolls-Royce Derwent and Nene engines as well as technical drawings to the USSR, which the Russians promptly placed in license production as the RD-500 and RD-45, respectively. Renewed efforts were then made to take advantage of these new developments. Yakovlev simply stuck the RD-500 in a final refinement of the basic Yak-15 formula, the straight-winged Yak-23, which featured the first ejector seat in a Soviet fighter and entered service in 1948. Mikoyan and Gurevich, on the other hand, built an original sweptwing fighter around one of the imported British Nenes, the I-310, which first flew on December 17, 1947. Production using the RD-45 engine quickly followed, under the designation of MiG-15.

Forgotten by posterity are the MiG-15's contemporary rivals. The prototype Yak-30, which looked similar to the MiG-15, performed well enough, but did not fly until September 1948, by which time the MiG-15 was about to go into production. Lavochkin's shoulder-wing La-15 did get a small production contract.

The MiG-15 was a distressing surprise to the West, for it not only advanced Soviet jet technology faster than anyone had expected, but it also gave the Soviets a fighter that could outperform anything in the West except for the F-86 Sabre. During the fighting over Korea between 1950 and 1953, the MiG proved capable of outmaneuvering and outclimbing the Sabre, while the Sabre could outdive the MiG. In combat, however, the MiG-15 revealed one fatal weakness–an unstable gun platform, especially in a dive, where it had a tendency to snake. Soviet pilots who flew the MiG-15 over Korea found that to be a serious handicap, which was even more grievous for its less experienced North Korean and Chinese pilots. The problem was recognized by the MiG team, which remedied it by lengthening the fuselage and completely redesigning the wing to create the MiG-17, one of the outstanding jet fighters of the 1950s–and even of the 1960s. This was only the beginning for Mikoyan and Gurevich,

whose wartime products had previously been known only for their mediocrity. The jet age was to make MiG a household word.

The Soviet Yak-15 and its progeny were almost unique in the history of jet aviation, but not quite. Sweden also tried, with less success, to enter the jet age by adapting a jet engine to a piston-engine airframe. Recognizing the unprecedented challenge that the Cold War would present to her policy of strict neutrality, Sweden embarked on a crash program to modernize her air defenses. On November 9, 1945, the Swedish government instructed the Svenska Aeroplan Ante Bolaget (Saab) to adapt its twin-boom, piston-engine 21A fighter to use the British de Havilland Goblin turbojet. The result, the Saab 2IR, retained some 50 percent of the 21A's original design when its prototype took off on March 10, 1947, with Ake Sunde at the controls.

Although its configuration resembled the de Havilland Vampire's, the Saab 21R's handling characteristics did not. Its maximum speed of 497 mph, which was about 100 mph faster than the 21A's, coincided with the stress factors for which the 21A had been aerodynamically intended, and pilots who exceeded that speed found the controls to be excessively heavy. An additional problem was the plane's fuel capacity, because it allowed a flying time of only 40 minutes. By the time the first Saab 21R entered service early in 1950, its production order had been halved from 120 to 60.

In October 1945, the Saab design team had tentatively laid out Project R-1001 for a pod-and-boom turbojet fighter whose corpulent appearance led the team's leader, Lars Brising, to dub it the Tunnan ('Barrel'). At the end of the year, the project was affected by two new developments. First, it was learned that de Havilland was working on a more powerful engine than the Goblin, called the Ghost. Second, a Saab engineer came back from a visit to Switzerland with a wealth of Luftwaffe reports on its experiments with wing sweepback.

By January 1946, a revised design incorporating the Ghost engine and a 25-degree wing sweepback had been finalized, and the first prototype, designated the Saab 29, was flown by British test pilot Wing Cmdr. A.R. Moore, RAF, on September 1, 1948. Such was the Swedish government's sense of urgency that large-scale production was requested before the new fighter was flight tested, and the first Saab 29A was delivered to fighter squadron F13 just 32 months later, on May 10, 1951. Fortunately, despite its hasty gestation, the 29 proved to be an excellent airplane. Just as the mediocre MiG-9 and the outstanding MiG-15 turned the Soviet design team of Mikoyan and Gurevich into one of the great success stories of the jet age, so did the unsuccessful 21R and first-rate 29A Tunnan sire a proud line of fighting Saabs, with names like Lansen, Draken and Viggen.

France, recovering from a devastating German occupation, was understandably late in entering the jet age, although the Rateau firm had been experimenting with jet turbines as early as 1939. During the occupation, the Societé Nationale de Constructions Aéronautiques de Sud-Ouest (SNCASO) began clandestinely to design a jet test-bed called the SO 6000 Triton.

Wind tunnel tests with models were conducted in 1944, and following the liberation, construction of five prototypes began early in 1945.

Seating two crewmen side by side within a corpulent fuselage, the S0-6000 was to have been powered by a Rateau SRA-1 axial-flow engine with 16-stage compressor and two-stage turbine embodying the bypass principle. At the time the airplane was completed, however, the SRA-1 was still not fully developed, so the modified prototype, SO-6000J No.1, used a German-built 1,984-lb.s.t. Junkers Jumo 004B-2 engine when it made its first flight on November 11, 1946. Subsequent Triton prototypes were built around the British Rolls-Royce Nene engines and were designated SO-6000N. The fourth airplane in the series crashed in 1949, but much was learned from the Tritons, and S0-6000N No. 3 survives at the Musée de l'Air et l'Espace at le Bourget.

The only operational French combat jet aircraft to fly before 1950 was the product of Marcel Bloch, a World War I pilot who had manufactured aircraft prior to World War II and had spent the war in a Nazi prison camp. Bloch survived his captivity, then suddenly changed his religion from Judaism to Catholicism and changed his name to Marcel Dassault. In 1946, he embarked on a private venture to rebuild his aircraft firm and, on June 29, 1948, succeeded in obtaining a French government grant to build three prototypes of a new jet fighter design.

On February 29, 1949, Dassault's straight-winged creation, the M.D.450 Ouragan ('Hurricane') took to the air, and promptly earned a contract for 150 more. As with McDonnell, MiG and Saab, Dassault's first jet was to be the forerunner of a dynasty of great aircraft, such as the Mystère and the Mirage.

A second noted French designer would create a jet fighter in the 1940s, but not for France. Emile Dewoitine lent his aeronautical experience to the Fabrica Militar de Aviones (FMA) to produce Argentina's first indigenously-built turbojet-powered aircraft, the I.Ae.27 Pulqui ('Arrow'). Powered by a Rolls Royce Derwent 5 engine generating 3,600 lb. of thrust, the all-metal, straight-winged Pulqui was armed with four 20mm cannons and was intended as a single-seat interceptor capable of operating from short, rustic runways. The prototype was first flight-tested on August 9, 1947, but its maximum speed of 447 mph and initial climb rate of 4,921 feet per minute were far below international standards of the time. As a result of that disappointing performance, FMA abandoned further development of the Pulqui jet fighter, turning its attention to the production of less sophisticated but more economically feasible aircraft types.

January 1950 ushered in a new decade and one more belated newcomer to the jet age: Canada. On January 19, the first prototype of a two-seat, radar-equipped interceptor, designed to defend Canada–and the United States–from the possibility of a Soviet bombing attack via the Arctic Circle, made its inaugural flight. Built by A.V. Roe Canada, a newly established branch of Britain's Avro firm, the first CF-100 was powered by two Rolls-Royce Avon engines, pending the completion of the indigenously designed Orendas that had originally been intended for it. Variously known as the Canuck and, more popularly, as the 'Clunk' (a reference to the

sound made by the landing gear as it retracted into place), the CF-100 had the distinction of being NATO's first operational all-weather fighter and the first straight-winged jet to exceed the speed of sound.

While the development of fighter aircraft seemed to dominate the scene prior to 1950, the bombers they were designed to intercept would not come into full stride until the 1950s. Two straight-wing medium bombers, the Soviet Ilyushin Il-28 and the English Electric Canberra, entered service in the late 1940s and went on to remarkably long careers. In strategic bombing, the United States took the lead with the Boeing B-47, which had six jet engines slung under its sweptback wings and which would be the progenitor of one of the most influential designs in civil airliners, the Boeing 707. Without a doubt, however, the most original bomber of the 1940s was the Northrop XB-49, a giant jet-powered flying wing whose futuristic design failed to find favor in the Air Force.

The late 1940s had not established the definitive configuration for jet aircraft, but they had seen the genesis of its most fundamental elements. The decades to follow would see those fundamentals refined and expanded, as man's quest to fly greater loads farther, higher and faster applied itself to the jet age.