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# North American F-86 Sabre Single-Seat Jet-Powered Fighter Aircraft

**The North American F-86 Sabre achieved 757 air victories to just 103 losses in the Korean War of 1950-1953.**

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The F-86 Sabre was the product of the North American Aviation Company based in the United States of America. The aircraft served a pivotal role in the Korean War by winning back air superiority for the NATO allies, going toe-to-toe with the impressive Mikoyan-Gurevich MiG-15 "Fagot". Though its standard armament of 6 x machine guns were no match for the cannon-power of the MiG-15's, pilot training and tactics made all the difference in the long run, particularly when Sabre pilots were veterans and aces from World War 2 while North Korean and Chinese pilots were relatively green when it came to jet-powered dogfights. Only Soviet-piloted MiG's presented a serious threat, and this was proven in the early months of the conflict. Nevertheless, the F-86 Sabre went on to become a war winner, making aces out of many more pilots to come and eventually forcing the stalemate in the Korean Peninsula.

## **Origins:**

By this time in history (in a post-World War 2 world), North American had already made a grand name for itself with the success of the P-51 Mustang. The

company, like others around it, then began to look to the future of flight - namely jet-powered aircraft - and in 1944 started development of an in-house design. This design featured a stout cockpit, straight-wing, nose-mounted intake, bubble canopy and a single turbojet engine. The design was eventually showcased to - and accepted by - the United States Navy on January 1st, 1945 with the designation of FJ-1 "Fury". Prototypes followed in late 1946 and the original 100 production examples was curtailed to just 30.

Nevertheless, experience garnered in the development of the Fury led North American to look into a larger version of the aircraft for possible marketing to the USAAF (the United States Army Air Forces - later to become the USAF in 1947). In May, 1945, three of these XP-86 prototypes were ordered featuring straight wings but in all respects resembling her Fury pedigree.

The fall of the Third Reich in 1945 allowed American aircraft engineers (and engineers of other nations for that matter) to unprecedented access of German swept wing design studies. Swept wings were then added to a revised XP-86 design. The USAAF ordered 30 production models without so much as a completed prototype and added another 158 afterwards with some requested revisions and eventually increasing this total to 554 P-86A models. By this time (1948) the USAAF had become the USAF and the naming convention of "P" for "pursuit" gave rise instead to "F" for "fighter". As such, the F-86A was born. Deliveries to the USAF in three initial batches began in February of 1949 and the name designator of "Sabre" was officially bestowed to the system after a naming contest was held.

### **Design:**

Though the initial design featured straight wings, the revised design and eventual production models were all seen fitted with swept-back wings and tail surfaces. The monoplane wings were low-mounted onto the fuselage sides with slight dihedral to each. Wings were placed forward in the design and extended rearwards, giving the Sabre its noticeable silhouette. The fuselage was not a true cylindrical form though it was rounded at the edges when viewed from the front. The front edge was snipped off and was made up of the air inlet duct feeding the engine. The duct, engine and exhaust system ran the length of the fuselage to the very rear and base of the empennage. The pilot was afforded good vision from his forward-located cockpit which featured a hinged jettisonable canopy and large curved and frameless glass surface - only the forward portion of the canopy had framing. The cockpit was located just forward of the wing root and just aft of the air inlet duct. Accommodations amounted to one pilot seated in an ejection seat. The single engine powerplant was located in the center of the design. The empennage was of a traditional type, featuring a single vertical tail fin and horizontal surfaces with noticeable dihedral. The undercarriage was a traditional tricycle arrangement with two main single-wheel gears retracting inwards with a nose gear fitted with a single wheel retracting backwards under the cockpit.

### **Variants:**

XP-86 was the original designation of the Sabre, though this was later changed to the XF-86. North American targeted this design as model NA-140.

The XF-86 was the prototype day-fighter designation to which three prototypes were constructed.

YF-86A was the first prototype to mount the General Electric J47 series turbojet engine.

The F-86A became the initial Sabre production model and was the first to be delivered to the frontlines in the Korea War. First flight was achieved in May of 1948. Power was derived from a 1 x General Electric J47 turbojet engine of 4,850lbs thrust. These were progressively uprated in a series of four upgraded J47 engines, eventually topping 5,200lbs thrust. Armament consisted of 6 x 12.7mm machine guns with an optional offensive punch of 8 x 5" rockets or 2,000lbs of bombs held underwing. Performance of the model included a top speed of 685 miles per hour, a range of 1,200 miles and a combat ceiling of 49,000 feet. Production of the F-86A completed in December of 1950, to which 554 total examples were delivered. An F-86A model set the first Sabre world speed record in September of 1948, reaching a top speed of 670 miles per hour. Another speed record was set on November 19th, 1952, hitting 698.505 miles per hour and then again on July 16th, 1953 - this time topping at 715.697 miles per hour.

The F-86A spawned the DF-86A drone director conversions. Likewise, eleven A-models became the RF-86A three-camera reconnaissance aircraft.

The F-86B followed. The USAF ordered 188 of the type as an upgrade to existing F-86A models but the order eventually turned these aircraft into F-86A-5 models instead.

The F-86C was the original designation of the YF-93A which began life as a design intended to fulfill the USAF "Penetration Fighter" bomber escort competition requirement. The F-86C developed into such a different aircraft that the new YF-93A designation was assigned to it. The aircraft squared off against a McDonnell XF-88 (eventually to become the F-101 Voodoo) and a Lockheed XF-90 (never produced). Though the Penetration Fighter program was eventually abandoned, the USAF still put in an order for 118 F-93A models but this order was itself cancelled with the promising results of the Boeing B-47 Stratojet project - a new high-speed bomber with no need for an escort.

The YF-93A was designed as two prototypes as S/N 48-317 and S/N 48-318. The first prototype sported two flushed air inlet ducts along the fuselage sides, a departure from the Sabres underslung intake. This arrangement allowed for avionics to be placed in the fuselage between the two parallel intake ducts. The second prototype featured more conventional intakes though both sported a newer and more powerful nose landing gear to take on the added weight of additional fuel stores. Power was derived from a 1 x Pratt & Whitney J48 series turbojet engine of 8,750lbs with afterburner. Performance was reported with a 708 miles per hour top speed, 1,967 mile range and a service ceiling of 46,800 feet. The proposed armament of the aircraft was certainly something special and would have consisted of 6 x 20mm cannons. Despite the work put into these machines, they became test platforms for the National Advisory Committee for Aeronautics (NACA) and were eventually scrapped.

F-95 was the original designation of F-86D "Dog Sabre"/"Sabre Dog" models. Prototypes were made up of aircraft S/N 50-577 and S/N 50-578. These prototype aircraft began as YF-95A prototypes but were then designated as YF-86D and ultimately becoming the F-86D. As such, production D-models were originally designated as F-93A fighters but this was changed to F-86D before the production lines had started launching the model.

The original F-95A had been designed as a day/night, all-weather interceptor. The aircraft featured swept back wings and tail surfaces, an underslung air inlet duct fairing, external fuel tank provisions, an all-moveable horizontal tail, hydraulically-powered irreversible controls and an F-5 automatic pilot system. The cockpit was of a 5.0psi differential pressurization and featured anti-G suit controls along with an integrated cooling and heating system. The YF-93A featured wing flaps were single-slotted electrically operated types. Speed brakes were hydraulically operated and fitted to the aft portion of the fuselage. Two YF-95A prototypes were produced. These models became the YF-86D. Of course no Sabres were ever produced with the F-95A designation but some 2,500 F-85D models were.

The F-86D "Dog Sabre" was essentially an "all-new" Sabre model. This production model was based on the YF-95A prototype and the prototype YF-86D achieved first flight on December 22nd, 1949. However, the D-model was not featured in the Korean War while the A-, E- and F-models were - their designation order was not chronological with introduction into service as might be expected. The F-86D was an all-weather interceptor and - for all intents and purposes - a "bomber destroyer". Two YF-86D systems existed and led to approximately 2,506 total F-86D production models. The D-model was quite a different beast from previous Sabre variants - it was bigger, more powerful and shared just 25 percent of the previous form's parts. The nose radome was a discernible feature of the model type.

The F-86D became the first USAF aircraft to mount an all-rocket armament in an ventral weapons "tray" containing 24 x 2.75" "Mighty Mouse" Folding Fin Aerial Rockets (FFAR) - hence the "bomber destroyer" classification above. As another first, the solo F-86D pilot was charged with the operation of the aircraft while manning the advanced Hughes Aircraft Company collision-course radar fire-control system - most designs with this level of complication usually dictated the need for a dedicated second crew member in a two-man cockpit. To fit this interception radar and fire control equipment, the F-86D

model featured a distinct "nose" cone extending out over the upper portion of the existing Sabre air inlet duct opening at the front of the fuselage.

With the fire control computer and radar, the aircraft could literally "fly itself" to a computed targets position. Once within 500 yards of said target, the aircraft would lower its retractable rocket tray and spray the target (expected to be enemy bombers) with 24 x 2.75" Mighty Mouse missiles - with all actions handled automatically by the computer.

Power for the F-86D was derived from a 1 x General Electric J47-GE-33 turbojet of 5,550lbs and (eventually) up to 7,650lbs of thrust with afterburner. Performance was reported with a top speed of 761 miles per hour, a range of 800 miles and a combat ceiling of 50,000 feet. Production of D-models officially completed in September of 1953. The type spawned the F-86G, YF-86K, F-86K and F-86L forms.

The F-86G was based on the F-86D but featured an uprated engine with some internal systems changes. Though 406 of this type were eventually produced, the designation of F-86G was not used. Instead, these aircraft were delivered as F-86D models themselves.

Two YF-86K models were modified from existing F-86D models. This model became the production F-86K and differed mainly by replacing the all-rocket armament (and applicable armament tray) with 4 x 20mm M-24A1 cannons. Additionally, these aircraft were fitted with the APG-37 series radar and MG-4 fire control system. One hundred and twenty of these Sabres were produced as the F-86K along with more appearing under license production elsewhere. The F-86K models became a NATO stalwart.

The F-86L was an upgraded conversion model of the F-86D. Between 800 and 981 F-86D models were converted to this standard featuring lengthened leading wing edges, lengthened wingtips, uprated engine and new electronics. The instrument panel was also revised in these models. F-86L's were fielded in quantity around the globe (including in the US), intended to defend against a Soviet air attack.

The F-86E was an "improved" F-86A model and featured power-operated controls and an adjustable "all-flying tail" unit. The development of this all-flying tail system is partly the reason for the Sabre successes over the MiG's in the Korean War. Eight hundred examples were produced and saw action in the Korean War. Canadian built models of this version made their way into the Canadian Air Force, the Royal Air Force and the West German Luftwaffe. Despite the E-model designation, the aircraft actually followed as second in operational service to the A-models.

F-86F's were also improved Sabre models, though these were based on the F-86E models. F-models were fitted with General Electric J47-GE-27 engines of 5,970lbs thrust. Later production models featured a "6-3" type wing sans leading edge slats. 2,500 examples of this type were delivered and saw combat action in the Korean War. These followed the E-models and were third achieving operational status. Provision for the carrying of nuclear weaponry was introduced in this model.

F-models were converted into several other useful forms. Among them were the 50 QF-86F target drones for use by the US Navy. At least 18 were converted to a camera-laden reconnaissance model in the RF-86F. Only 2 twin-seat TF-86F trainer aircraft were produced. This model of course featured a lengthened fuselage to make room for the second pilot.

Two YF-86H prototypes appeared from the F-86F model. This Sabre was redesigned as a dedicated fighter-bomber. Wings were lengthened, the fuselage deepened and a new tailplane was implemented. This set the stage for production F-86H models.

The F-86H fighter-bomber appeared after the armistice in the Korean War. Actual combat experience was used to make this a "perfected" Sabre platform.

Thousands of sorties were flown with F-86A, F-86E and F-86F models and, in that way, each preceding model had a direct hand at the relative level of perfection achieved in these newer H-models. Though it arrived with a higher overall weight and was physically larger than the models before it, the F-86H surpassed these early models in overall performance. Its F-86F origins basically made the F-86H an "improved" F-model. H-models were fitted with the Low Altitude Bombing System (LABS) to fulfill their fighter-bomber role classification. Production of the F-86H began in late 1953 and went on through August of 1955. Total production of H-models ended with 473 examples.

Though the first two arriving production H-models fitted no armament, Blocks 5 and 10 saw implementation of 4 x M-39 20mm cannon armament while Block 1, comprising 113 aircraft, was fitted with the standard 6 x 12.7mm machine gun armament. 8 x 5" rockets, 2,000lbs of bombs and a nuclear weapon were all optional to this model. Power stemmed from the General Electric J73-GE-3E series turbojet of 9,070lbs thrust. Maximum speed topped 693 miles per hour with a range of 1,050 miles. A combat ceiling of 51,400 feet was reported.

Commonwealth Aircraft Corporation of Australia produced the Sabre under license. There were three models known as Mk 30, Mk 31 and Mk 32. Mk 30, of which 21 were produced, featured the Avon 20 series engine and wing slats. The Mk 31 was also powered by the Avon engine, was fitted with the 6-3 wing and saw 21 of the type constructed. Mk 32 production totaled 69 examples and were fitted with the Avon 26 engine and four underwing pylons. These Avon powered Sabres eventually found their way into the inventories of Malaysia and Indonesia after serving with the Royal Australian Air Force.

Canadair of Canada handled license production of the Sabre as well. These were built in six marks beginning with Mk 1. Mk 1 represented a prototype of the F-86A model. Mk 2 followed with 350 examples produced (based on the F-86E). Deliveries of this initial production model were sent to the USAF and RAF as well as the Canadian Air Force. A single Sabre Mk 3 model was built as used as a test platform for the Orenda turbojet engine. The Sabre Mk 4 saw 438 examples produced. Only 10 served the RCAF while 428 of these were delivered for RAF use (known in the RAF inventory as the Sabre F 4). Sabre Mk 5 was based on the F-86F model but fitted with the Orenda engine. 370 of this type were built with a bulk going to the RCAF and 75 to the West German Luftwaffe. Sabre Mk 6 was the final production model for Canadair, to which totaled 655 examples split between the RCAF, the West German Luftwaffe, South Africa and Columbia.

In order of "activation", the Sabre came online as follows: F-86A; F-86E; F-86F; F-86D; F-86H; F-86K; F-86L. Broken down even further, the A-, E-, F- and H-models all fell into the classification of fighter or fighter-bombers while the D-, K- and L- models were of the all-weather branding.

### **Armament:**

Standard armament for the F-86 was a battery of 6 x 12.7mm heavy caliber machine guns. Though her Soviet (and German) counterparts had long focused on cannon armament to bring down enemy bombers, US armament was still generally relegated to the World War 2-era mentality of an all-machine guns platform. This was not wholly unfounded, however, as the rate of fire of machine guns was vastly superior to that of cannons. The issue being that newer aircraft were better armored, requiring more ammunition from these guns to maim the enemy aircraft.

The six 12.7mm machine guns were split into two groups, three machine guns to a fuselage side, with a somewhat staggered placement for these just forward of the cockpit. Some variants (F-86H) were eventually fitted with 4 x M-19 20mm cannons and 2 x 30mm cannons (Australian license-produced Sabres by CAC). Later versions of the Sabre were also designed around 5" rockets and one (F-86D "Dog Sabre") designed entirely around a 2.75" rocket armament. Underwing hardpoints could mount up to 2,000lbs of bombs or fuel in place of a bombload.

### **Service:**

Introduction to NATO forces meant that the Sabre would have an expansive and long-term global reach. Operators (NATO and otherwise) included Argentina, Belgium, Bolivia, Canada, Colombia, Ethiopia, West Germany, Greece, Honduras, Indonesia, Iran, Iraq, Japan, Malaysia, Norway, Pakistan, Peru, Philippines, Portugal, Taiwan, Saudi Arabia, South Africa, South Korea, Spain, Thailand, Turkey, United Kingdom, United States, Venezuela and

Yugoslavia (see full list at right) done everything in. Taiwan became one of the first foreign receivers of the Sabre beginning December of 1954. Bolivia retired their F-86's as recently as 1994.

F-86A, F-86E and F-86F's Sabres all took part in the Korean War. Sabres took home a kill ratio of 8:1 while other sources go as high as 10:1 (ten enemy losses for every single Sabre loss). This of course was probably made more even when facing off against Soviet-piloted MiG-15's. MiG losses at the hands of Sabres are said to be between 757 to 792 while a total of some 810 total aircraft of different types were felled by Sabre guns. Between 76 and 103 Sabres were lost to enemy fighters. Soviet and Chinese reports have Sabre losses numbering some 600 which, of course, is denied by the USAF. Forty United Nations aviators became aces in the Korean conflict with an amazing 39 of these piloting Sabre aircraft.

The first MiG-versus-Sabre confrontation took place in December of 1950 at 25,000 feet. Four MiG's squared off against four Sabres with one MiG being set ablaze. The actual "kill" is speculative however, as Soviet reports say the MiG had dove to tree top level - jettisoning its fuel tanks in the process - in an effort to escape the fight and return home safely.

Sabres and MiG-15's inevitably squared off later that month in a showing of 8 Sabres versus 15 MiG's. The fight is said to have netted some six MiGs with combat taking place at altitudes as low as 1,000 and as high as 30,000 feet.

1958 brought about the Second Taiwan Strait Crisis and, along with it, engagements of Taiwanese Sabres against Chinese MiG-15 "Fagots" and MiG-17 "Frescos". Despite the altitude advantage inherent in the MiG designs, the battles turned in favor of the Taiwanese as these particular Sabres - with help from the Americans - were now armed with the capable AIM-9 Sidewinder air-to-air missile. Each Sabre could carry two of these infrared-homing systems and the altitude advantage held by the MiGs was now a moot point. In the first such engagement, 10 enemy MiGs were shot down with no loss to the Taiwanese forces.

Indo-Pak War of 1965 saw Pakistan field the Sabre against the Indian Air Force. Its versatility was showcased quite well as the type underwent sorties of interception and ground attack. Pakistani Sabres held an advantage with their use of the AIM-9B Sidewinder missile in air-to-air engagements, leaving Indian Air Force pilots alone to their guns. Sabres made up a large part of Pakistani success in the skies though the smallish British-designed Folland Gnat proved quite the nemesis. Nevertheless, Pakistan claims to have destroyed 15 Indian aircraft in the skies and a further 36 on the ground - numbers naturally disputed by India.

Canadian-built Sabres fought against India once more, this time in the Bangladesh Liberation War of 1971, again enjoying some level of limited success but the edge eventually went to the Indian Air Force by conflict's end.

### **Conclusion**

Total production of all Sabre models totaled 9,860 with Canadair (Canada) said to be responsible for at least 1,815 of that number. North American Aviation numbers report 6,297 production totals of the Sabre with 1,115 examples of its US Navy derivative, the FJ Fury. Additional manufacturers under-license became Commonwealth Aircraft Corporation (Australia) building some 112 of the Sabre, Fiat (Italy) building 221 total examples and Mitsubishi (Japan) accounting for 300 total Sabres. Production spanned from 1949 through 1956. The vast reach of Sabre production models through NATO meant that the Sabre was the first taste of high-speed jet-powered flight for many of these pilots.

The F-86 Sabre was eventually superseded by more capable types and was followed-up on by the North American F-100 Super Sabre, beginning service in 1954.

Despite its design origins beginning in World War 2, the Sabre led a long and productive live. Its production total ensured that it would be made a deterrent

to Soviet actions in Europe and around the world. The aircraft's resilience also ensured that it could be adapted for a variety of roles to suit the needs of the world.

Jackie Cochran became the first woman to break the sound barrier, this accomplished in a Canadair F-86E model flying alongside famed American Aviator Church Yeager. This occurred on May 18th, 1953.

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## North American F-86D Sabre Technical Specifications

Service Year: 1949

Type: Single-Seat Jet-Powered Fighter Aircraft

National Origin: United States

Manufacturer(s): North American Aviation Company - USA; Mitsubishi - Japan

Production Total: 9,500

## Structural (Crew Space, Dimensions and Weights)

Operating Crew (Typical): 1

Overall Length: 37.50 feet (11.43 meters)

Overall Width: 37.07 feet (11.30 meters)

Overall Height: 14.99 feet (4.57 meters)

Weight (Empty): 10,950 lb (4,967 kg)

Weight (MTOW): 17,000 lb (7,711 kg)

## Cockpit Image

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## **Installed Power and Standard Day Performance**

Propulsion: 1 x General Electric J47-GE-27, turbojet engine developing 5,970 lb of thrust.

Maximum Speed: 690 mph (1,110 kph; 599 knots)

Maximum Range: 785 miles (1,263 km)

Service Ceiling: 50,000 feet (15,240 meters; 9.47 miles)

Rate-of-Climb: 12,000 feet-per-minute (3,658 m/min)

## **Armament / Mission Payload**

### STANDARD:

6 x 0.50 cal Heavy Machine Guns (HMGs) in forward fuselage sides.

### MODEL-SPECIFIC:

24 x 2.75" rockets in ventral tray

2 x AIM-9 Sidewinder short-range, air-to-air missiles under the wings.

4 x 20mm cannon armament in place of machine guns.

### OPTIONAL:

Up to 2,000 lb of external stores.

## **Global Operators / Customers**

Argentina; Bangladesh; Bolivia; Burma; Canada; Columbia; Denmark; Ethiopia; France; West Germany; Greece; Honduras; Indonesia; Iran; Iraq; Italy; Japan; Malaysia; Netherlands; Norway; Pakistan; Peru; Philippines; Portugal; Taiwan; Saudi Arabia; South Africa; South Korea; Spain; Thailand; Tunisia; Turkey; United Kingdom; United States; Venezuela; Yugoslavia

## **Model Variants (Including Prototypes)**

F-86 "Sabre" - Base Series Name

XP-86 - Original Army Air Force prototypes (3)

YP-86A - Re-engined with GE J47 turbojet.

P-86A - Redesignated from YP-86A

F-86A - Redesignated production model from P-86A; Featured J47-GE-1 turbojet.

F-86D "Sabre Dog" - Complete redesign of base model; Redesignated as night/all-weather aircraft; Hughes fire control system; J47-GE-33 turbojet.

F-86E - Slab tailplane adjustable in flight; J47-GE-27 turbojet

F-86F - J47-GE-27 turbojet; Extended leading edges; production also by Mitsubishi for Japan.

F-86K - Based on F-86D model with J47-GE-17B turbojet.

F-86L - Rebuilt "D" model with updated electronics and larger wing surface.

FJ-2 Fury - US Navy variant.

Commonwealth Aircraft Corporation (CAC) Sabre Mk 30 - Australian license-produced model; 2 x 30mm cannons; Rolls-Royce Avon turbojet.

CAC Sabre Mk 31 - Australian license-produced model; 2 x 30mm cannons; Rolls-Royce Avon turbojet.

CAC Sabre Mk 32 - Australian license-produced model; 2 x 30mm cannons; Rolls-Royce Avon turbojet.

Canadair Sabre Mk 2 - Canadian license-produced model featuring Orenda turbojet.

Canadair Sabre Mk 4 - Canadian license-produced model featuring Orenda turbojet.

Canadair Sabre Mk 6 - Canadian license-produced model featuring Orenda turbojet