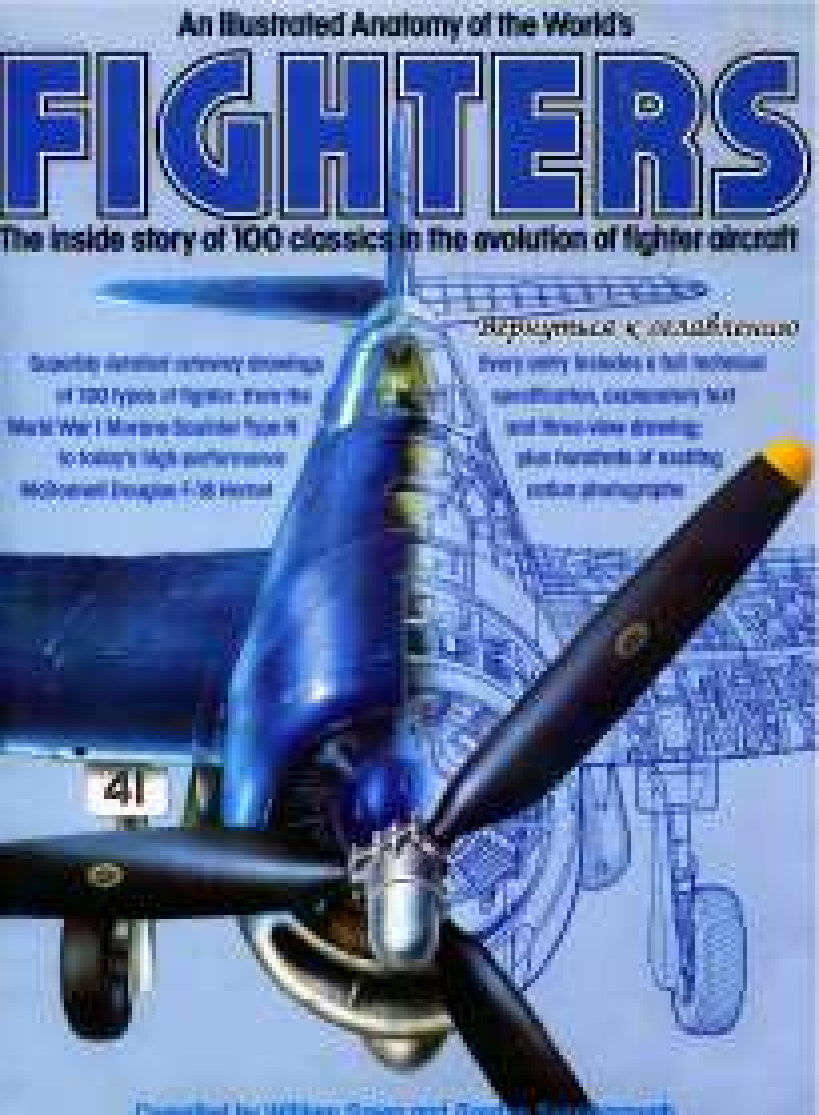
An Illustrated Anatomy of the World's

FIGHTERS

The inside story of 100 classics in the evolution of fighter aircraft



An Illustrated History of the World's

FIGHTERS

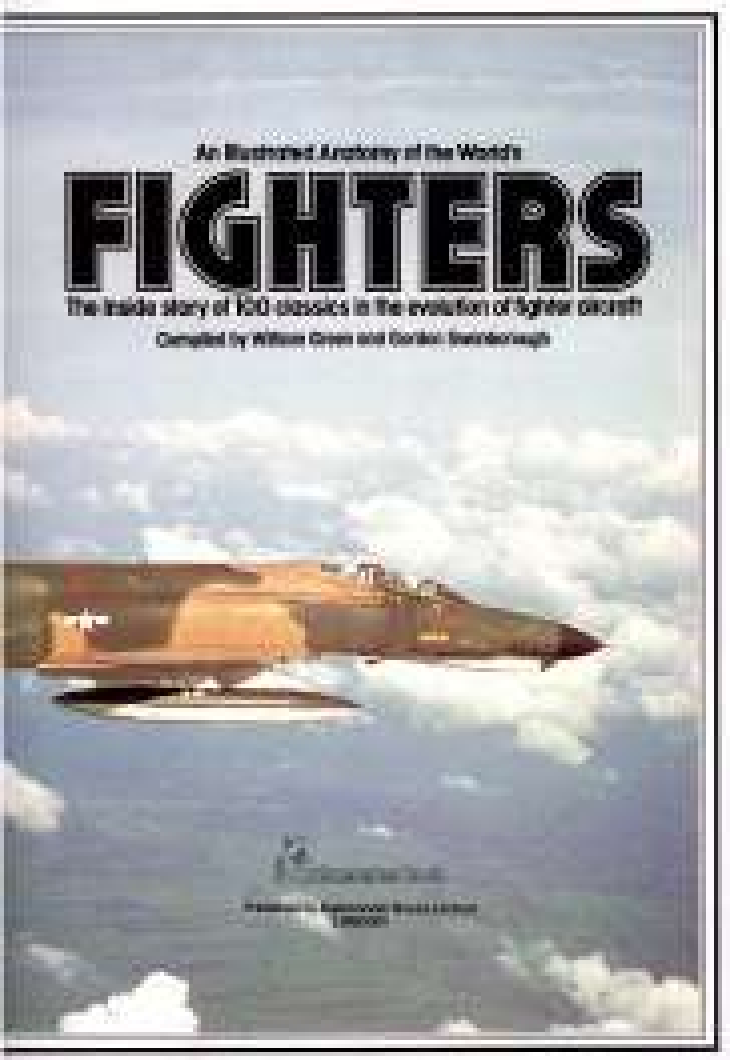
The inside story of 80 milestones in the evolution of fighter aircraft

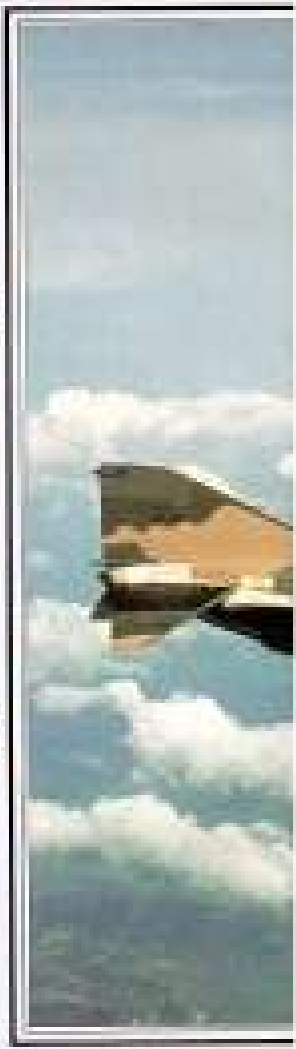
An Illustrated Anatomy of the World's

FIGHTERS

The inside story of 120 classics in the evolution of fighter aircraft

Compiled by William Green and Gordon Swanborough





A Salamander Book

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The Compilers

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Preface

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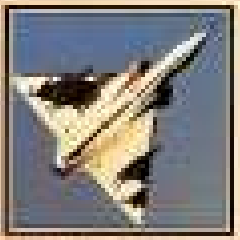
The History of the Fighter

by Bob Pritchard, one of Britain's leading aviation historians and consultants on military aviation. He has been associated with the Royal Air Force Museum, Hendon, and is now in private practice. Bob is also a consultant to the Smithsonian Air and Space Museum, Washington DC.



Until the appearance of the Wright Flyer in December 1903, the aeroplane was a curiosity, a mystery and a source of fear. It was considered impossible to control an aircraft in flight, and the prospect of flying machines dropping bombs on cities was the stuff of science fiction. But as soon as the problem of control was solved, and the aeroplane became a practical machine, the military began to take an interest in it.

At first there was a reluctance to arm aircraft. Early in 1914 the Royal Flying Corps issued a pamphlet which stated that "the machine gun is not a weapon for aircraft". Even after the outbreak of war in August 1914, the military authorities were slow to realise the potential of the aeroplane as a weapon. Most aircraft were used for reconnaissance, and pilots and observers would sometimes take pistols or rifles with them in the hope of shooting down an enemy aircraft. But it was not long before the idea of fitting machine guns to aircraft was being seriously considered.

The problem was how to fire a gun through the arc of the propeller without shooting off the blades. Early in 1915 Roland Garros, a French pilot, solved the problem by fitting metal deflectors to the propeller blades. Bullets which struck the blades were deflected harmlessly away. Garros used his invention to shoot down five German aircraft before he was forced down behind enemy lines and captured.

Anthony Fokker, a Dutch aircraft designer working for the German air force, developed a similar device, but his system was more reliable. Fokker's interrupter gear, patented in July 1915, synchronised the firing of the machine gun with the rotation of the propeller, so that the bullets passed between the blades. Fokker fitted his gear to the Eindecker monoplane fighter, which was the first aircraft to be armed with a machine gun that could be fired directly forward. The Eindecker was also the first fighter to be flown by a specially trained pilot. Fokker's pilots were organised into a unit known as the Kampfstaffel, which was the forerunner of the German fighter squadrons of the First World War.

The Eindecker was a formidable machine, and it gave the German air force a temporary superiority in the air. Allied pilots flying unarmed aircraft were easy prey for the Eindecker pilots, who became known as the "Fokker Scourge". The Eindecker's reign of terror lasted for about a year, until the Allies began to produce aircraft which could match it.

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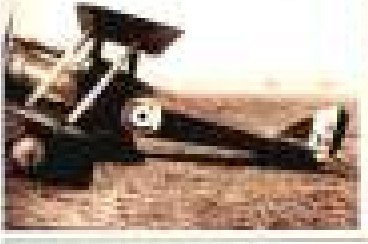
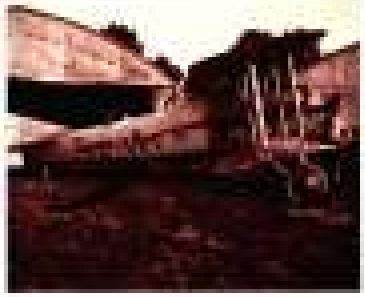
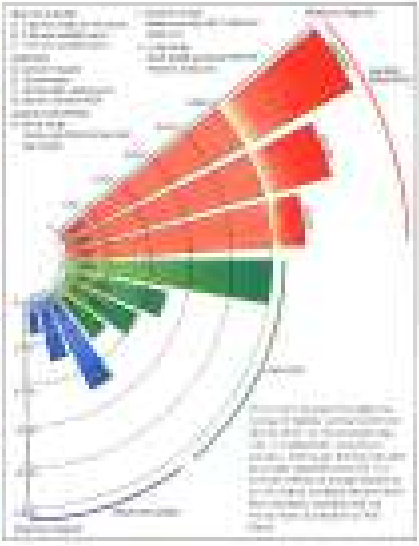
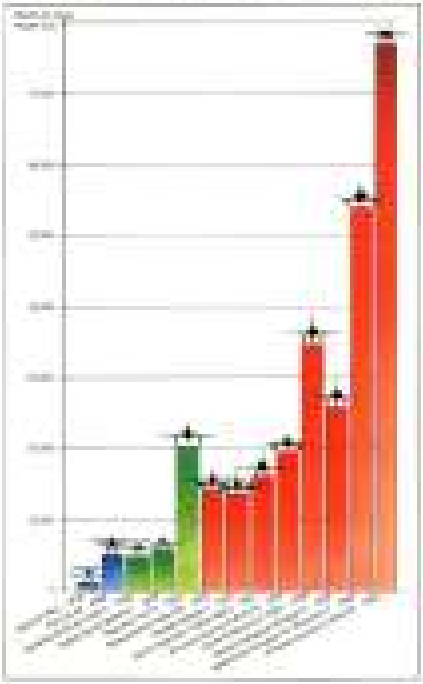
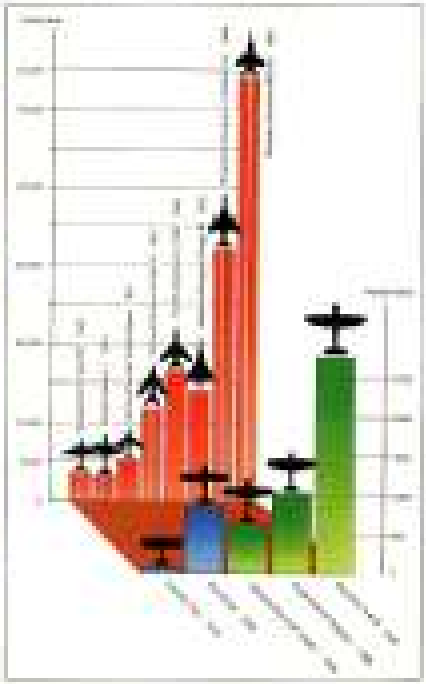
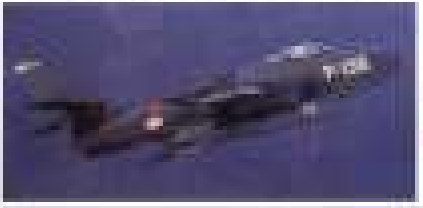


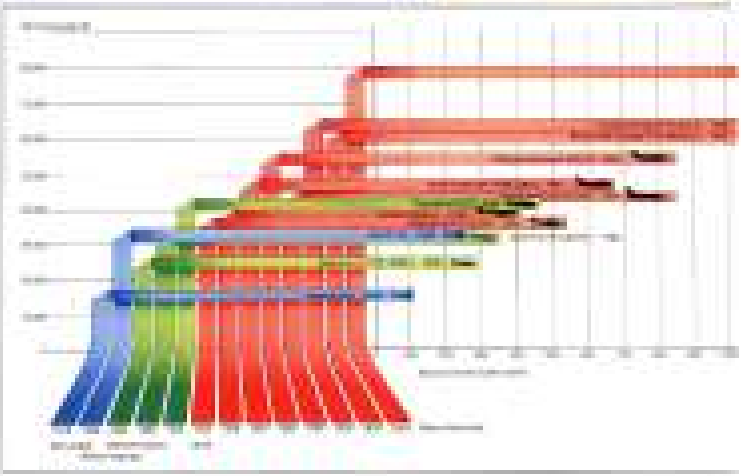


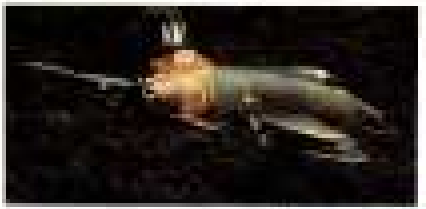


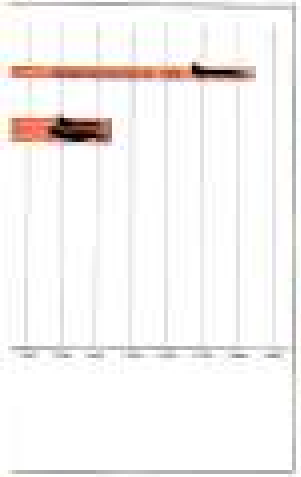




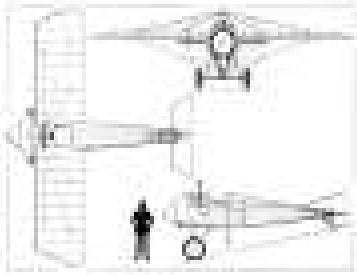


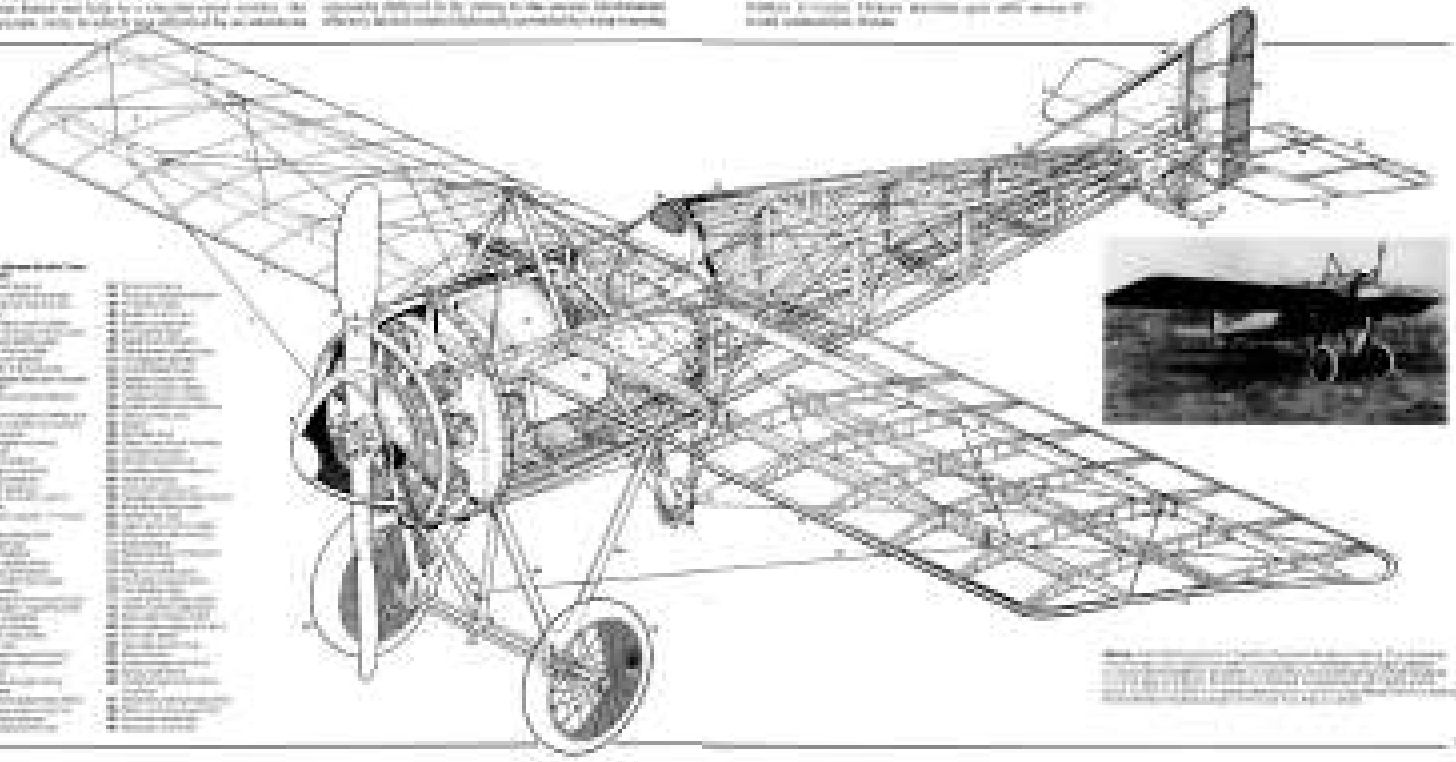






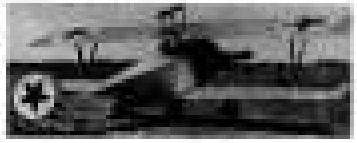
Morane-Saulnier Type N (May 1914)

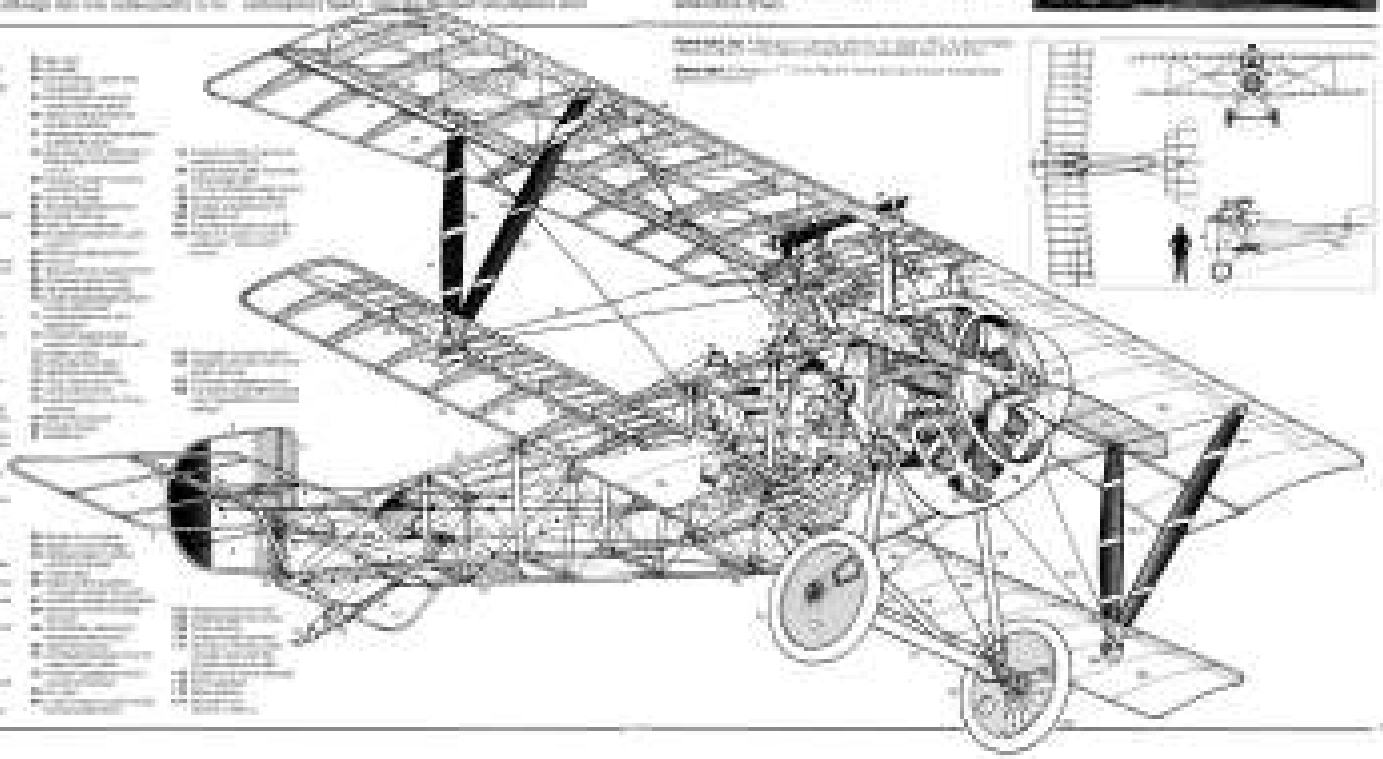


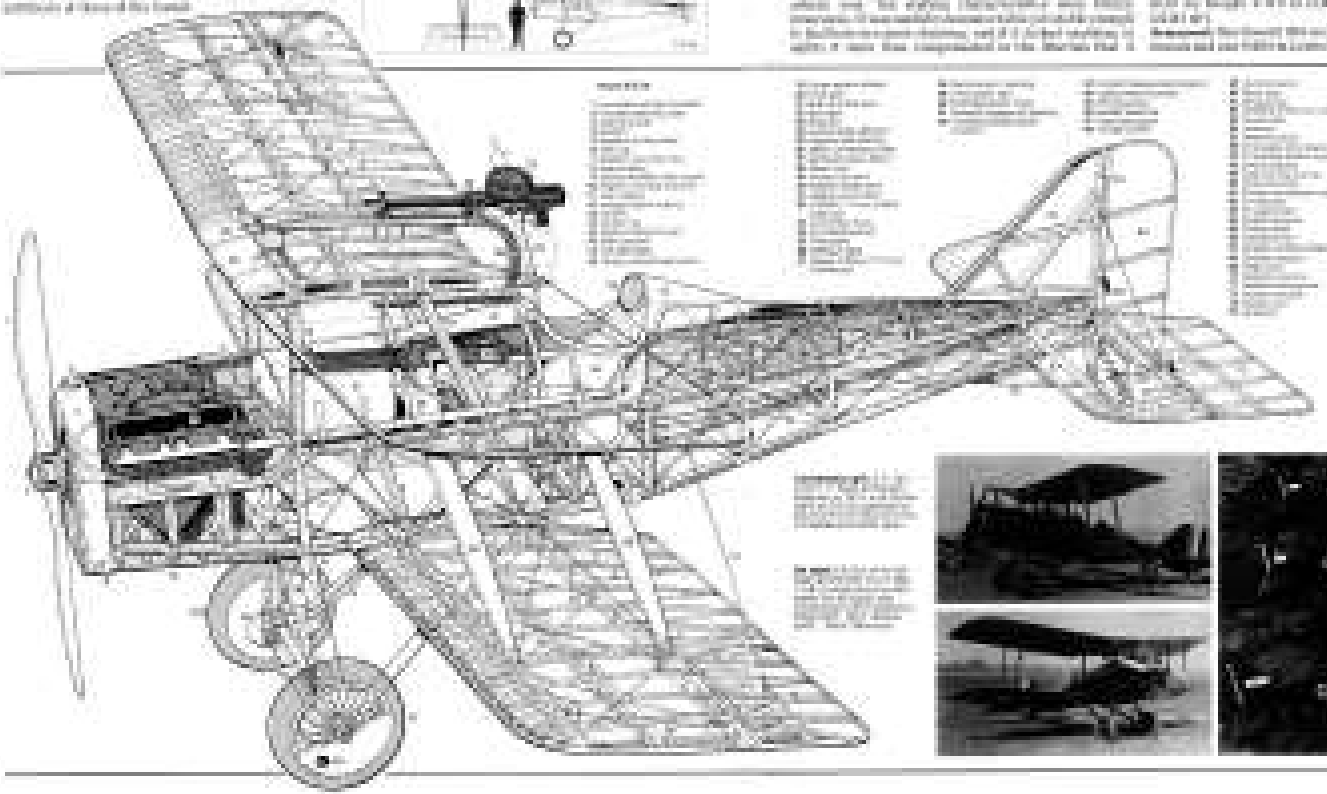


Sopwith Scout (February 1918)

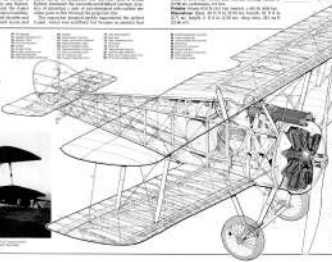
Nieuport 17 (February 1916)







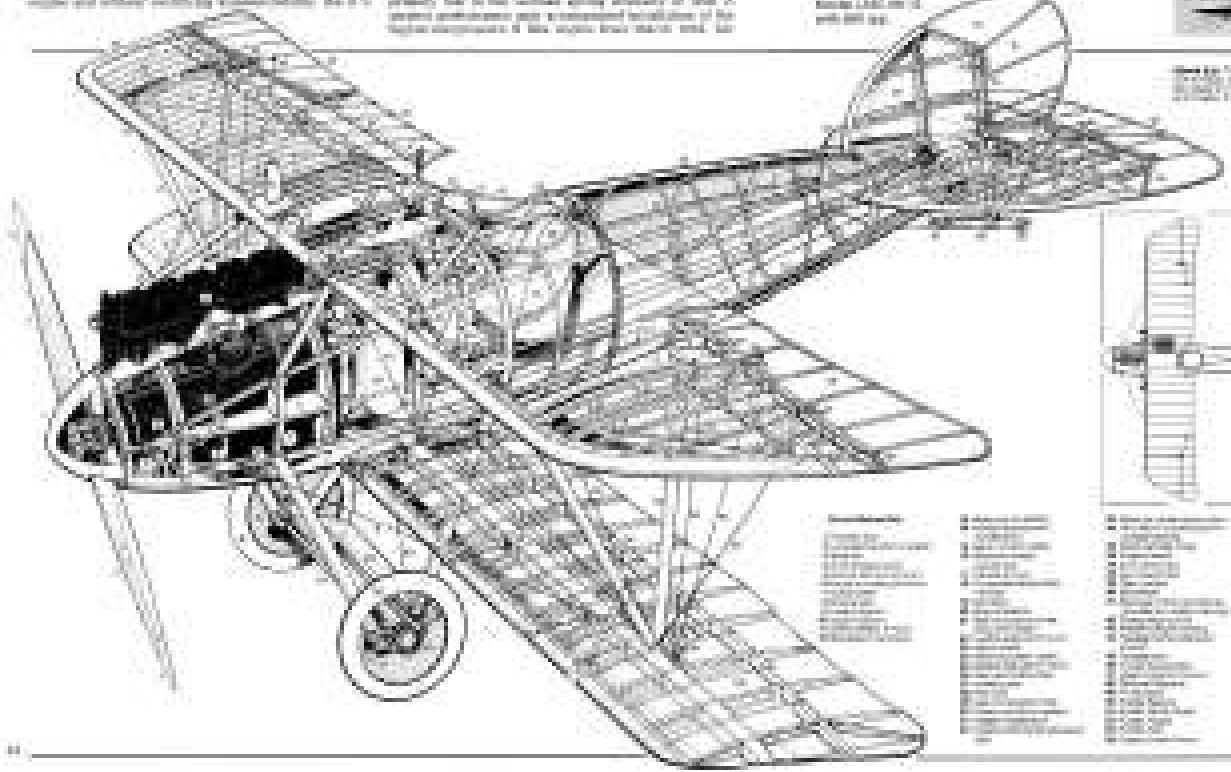
Sopwith Camel (December 1916)

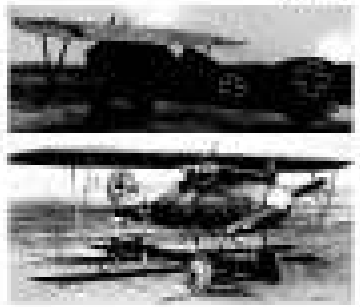


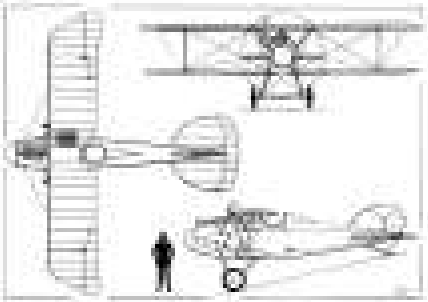
Albatros D V (March 1917)

In hindsight one of the most important aircraft types to be developed during the First World War, the Albatros D V was the ultimate development of the basic design that had begun with the Albatros D I, which had first appeared in September 1916. Although the D I had been a very successful aircraft, it had been overtaken by the Sopwith Pup and Nieuport 17 by the time that the Albatros D II had been introduced in October 1916, and the D II had been followed by the D III in January 1917. Although the D III had been a very successful aircraft, it had been overtaken by the Sopwith Triplane and SE5 by the time that the Albatros D V had been introduced in March 1917.

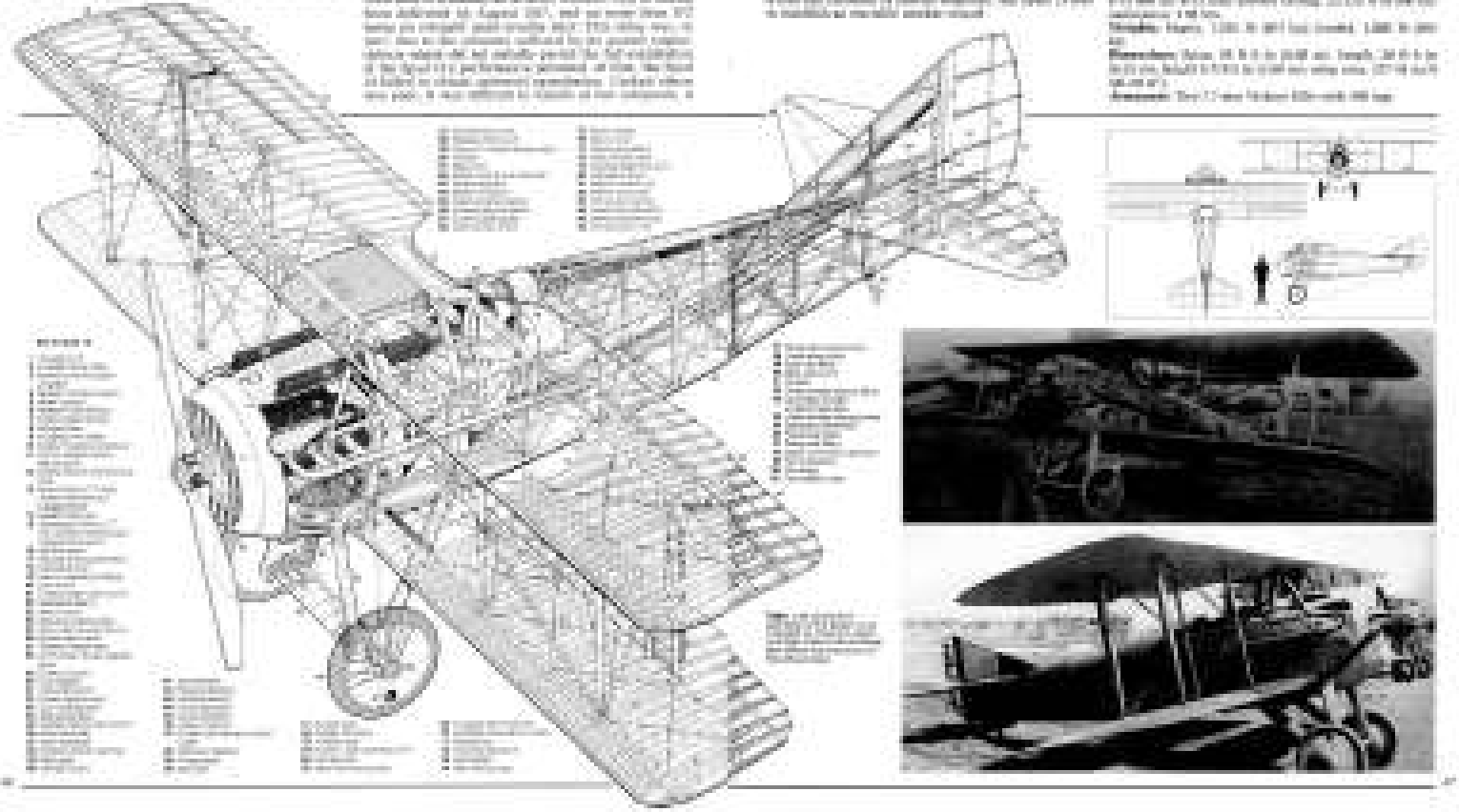
The D V was a development of the D III, with a new fuselage and a new wing. The new fuselage was deeper and more rounded than that of the D III, and the new wing was thicker and had a greater chord. The new aircraft was also heavier than the D III, and its performance was inferior to that of the D III. The D V was withdrawn from service in August 1917, and was replaced by the Albatros D Va.







Spad 13 (March 1917)



Fokker Dr I (Spain 1917)

Above: Manfred von Richthofen in the cockpit of his Fokker Dr I triplane, which he flew in 1917 and 1918. Note the extra cockpit coaming and the cut-out in the upper wing.

Based on the fighter version of a successful but unsatisfactory recent monoplane, Anthony Fokker's latest triplane was a small, single-seat fighter with unusual maneuverability and rate of climb, but an unreliable wood and metal wing structure. The Dr I was an abbreviation from the German word for triplane (Dreidecker). It was first seen in flight in October 1917 and by the following March had made a name for itself as a formidable fighting machine. But many were grounded after structural failures.

The Fokker triplane was a product of Anthony Fokker's early association with Reinhold Platz, the designer of the Fokker D.VII biplane. Platz had joined Fokker's company in 1916 and had been responsible for the Fokker D.VI monoplane, which was a failure. Fokker's own design for a triplane fighter had been rejected by the German authorities in favor of the Albatros D.III biplane, but Fokker was convinced that a triplane would be superior to a biplane in maneuverability and rate of climb. Platz was given the task of designing a triplane version of the D.VI monoplane, which was to be the Fokker Dr I.

Fokker's triplane was a conventional design of wood and fabric construction, with a welded steel fuselage. The fuselage was of rectangular section, with a sloping decking behind the cockpit. The engine was a 110-hp Oberursel U.0 rotary, which was enclosed in a neat cowling. The pilot sat in a cockpit with a cut-out in the upper wing to improve his upward view. The wings were of wooden construction, with fabric covering. The ailerons were fitted to the upper wing only. The tail was of conventional design, with a fixed fin and rudder, and a balanced elevator. The undercarriage was of the divided type, with a pair of wheels on each side of the fuselage. The wheels were fitted with brakes, which were operated by a lever on the control column.

The Dr I was a very maneuverable aircraft, with a good rate of climb and a high ceiling. It was also very stable in the air, and could be flown hands-off for short periods. However, it was not a very fast aircraft, and was easily outclassed by the faster Allied fighters of the time. The Dr I was also prone to structural failures, and many were grounded after only a few hours of flying.

Despite its shortcomings, the Dr I was a popular aircraft with its pilots, and it was used by a number of German aces, including Manfred von Richthofen, who scored 80 of his 80 victories in a Dr I. The Dr I was also used by the Austro-Hungarian Air Force, and a few were captured by the Allies and flown by them.

SPECIFICATION: Fokker Dr I

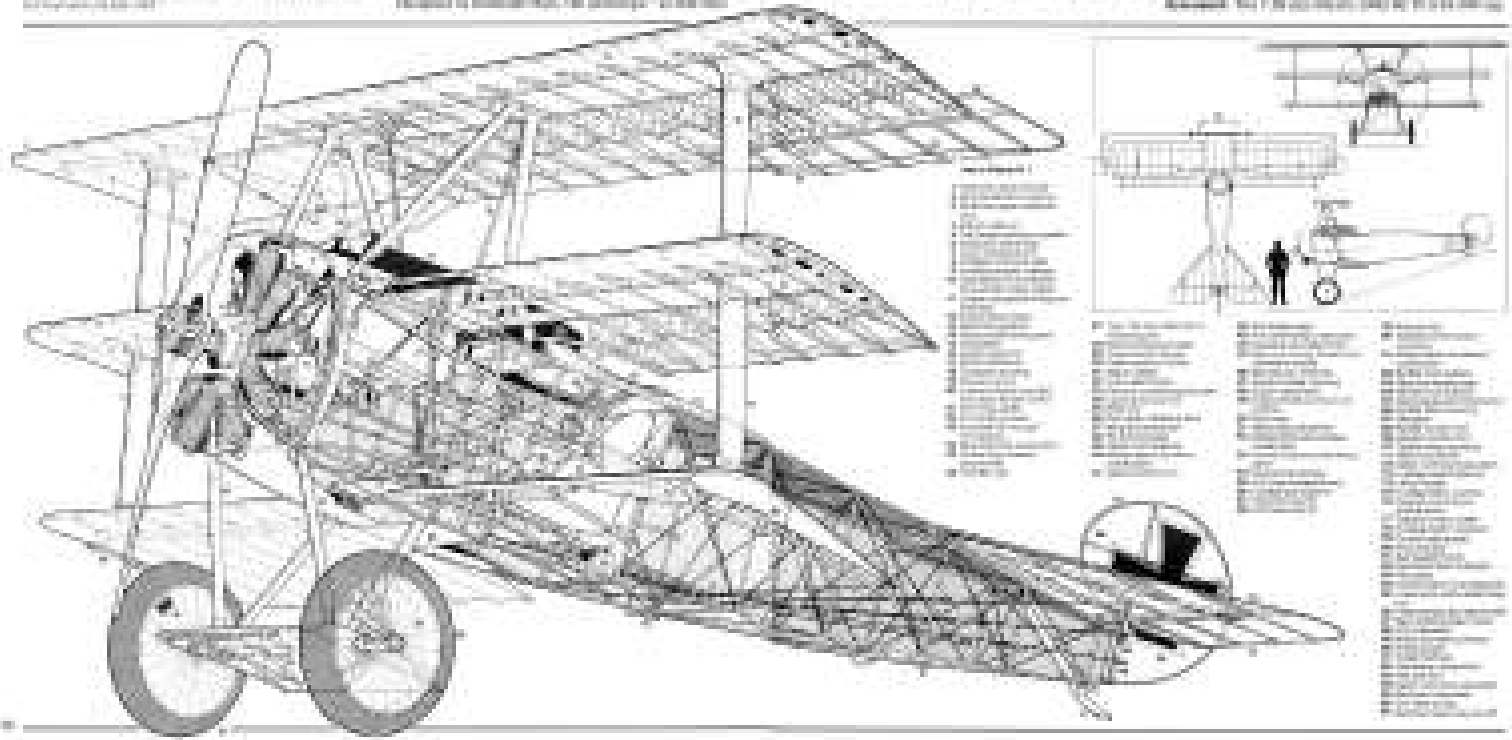
Power Plant: One Oberursel U.0 9-cylinder rotary air-cooled engine rated at 110 hp at 1,250 rpm for take-off.

Performance: Maximum speed, 115 mph (185 km/h) at sea level; climb to 6,560 ft (2,000 m) in 5 minutes 30 seconds; service ceiling, 19,685 ft (6,000 m); endurance, 1 hour 45 minutes.

Weights: Empty, 1,212 lb (550 kg); loaded, 1,653 lb (750 kg).

Dimensions: Span, 23 ft 7 in (7.19 m); length, 19 ft 5 in (5.92 m); height, 9 ft 6 in (2.9 m); wing area, 200.90 sq ft (18.66 sq m).

Armament: Two 7.92 mm (0.312 in) LMG 08/15 Spandau machine guns.



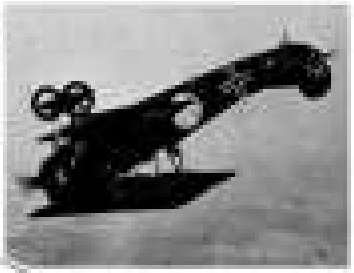
Fokker D VII (December 1917)

The shooting down of Manfred von Richthofen's Albatros D.III on April 21, 1918, had become known as the Red Baron fell from the sky in the worst crisis of the German air service. Almost all the aircraft had entered service during the summer of 1917 and were already outclassed by the Sopwith Camel and SE.5a. Worse, the Albatros D.III's wings were prone to collapse in a steep dive, and the Albatros D.V was not much better. Only the Pfalz D.III and Halberstadt D.II were free of this defect, but they were slower and less maneuverable than the Albatros.

Anthony Fokker had left Germany in 1912 to set up his own aircraft factory in Holland, but when war broke out he returned to Germany and began producing aircraft for the German air service. His D.VII was the first fighter to be ordered into production after the Armistice, and it was the only German aircraft specifically mentioned in the Armistice terms as being required to be surrendered to the Allies. Fokker's D.VII was the best German fighter of the war, and it was the only German fighter that the victorious Allies wanted to keep after the war.

The D.VII was a conventional biplane of wood and fabric construction, with a steel-tube fuselage. It was powered by a 160-hp Mercedes D.IIIa six-cylinder water-cooled inline engine. Armament consisted of two 7.92-mm (0.312-in) fixed, forward-firing machine guns mounted on the fuselage decking in front of the cockpit and synchronized to fire through the propeller arc. Maximum speed was 124 mph (200 km/h) at 6,560 ft (2000 m), and the aircraft could climb to 16,400 ft (5000 m) in 20 minutes. Endurance was 2 hours 30 minutes. The D.VII was extremely maneuverable, and its wings were strong enough to withstand the most violent maneuvers.

Fokker's D.VII was first ordered into production in August 1918, and by the end of the war in November 1918 some 1,000 had been delivered. Production was continuing at the rate of 400 per month when the Armistice was signed. Fokker's D.VII was the best German fighter of the war, and it was the only German fighter that the victorious Allies wanted to keep after the war.



Above: The Fokker D.VII was the best German fighter of the war, and it was the only German fighter that the victorious Allies wanted to keep after the war.

SPECIFICATION: Fokker D.VII

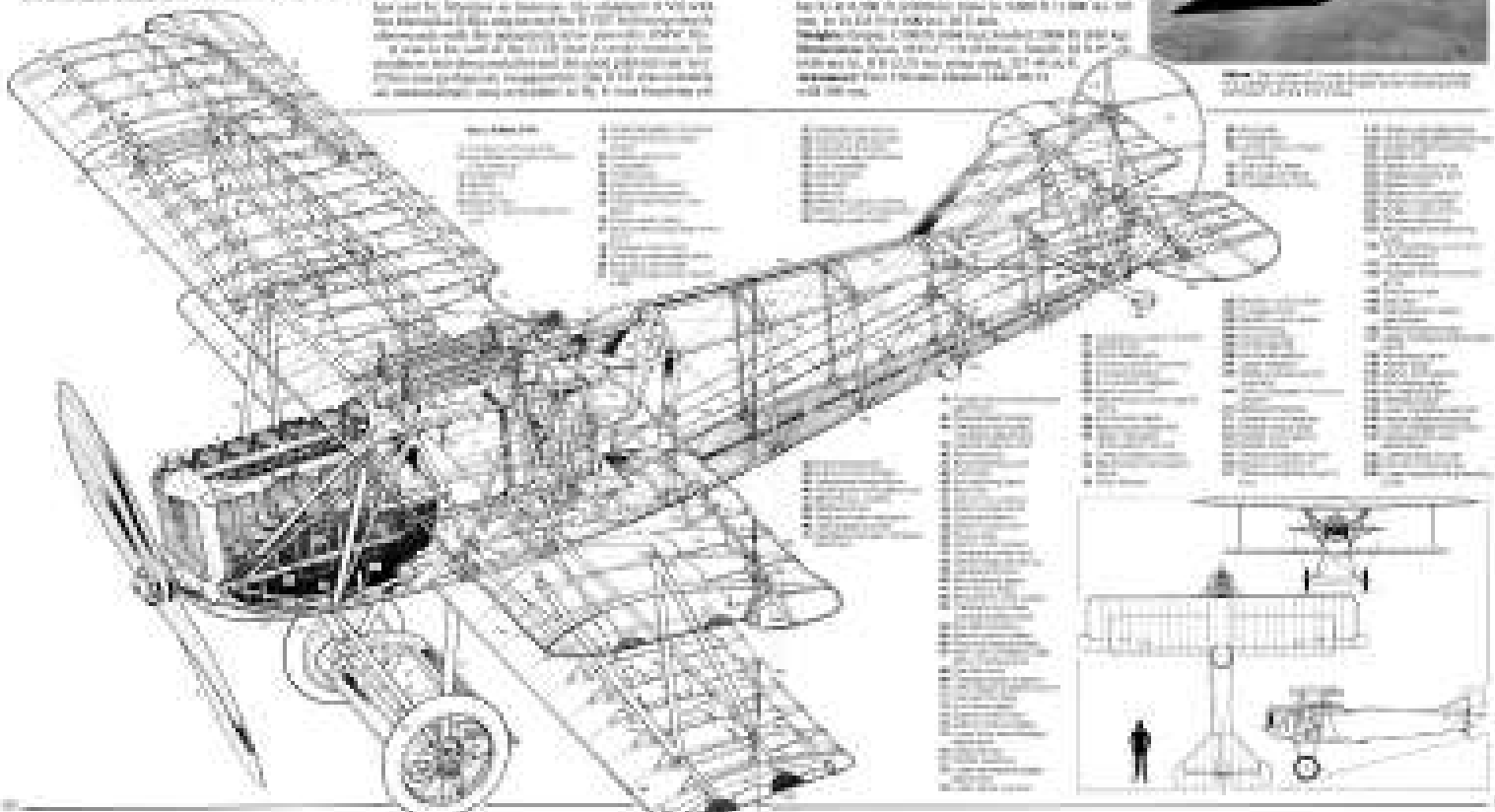
Power Plant: One Mercedes D.IIIa six-cylinder inline water-cooled engine rated at 160 hp at 1,400 rpm for takeoff and 145 hp at 1,400 ft (1000 m). Fuel/lubricant consumption: Maximum fuel 31.5 Imp gal (143 l).

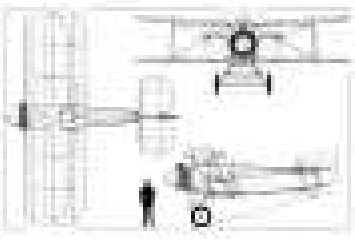
Performance: Max speed 124 mph (200 km/h) at 6,560 ft (2000 m); max speed 118 mph (190 km/h) at 13,120 ft (4000 m); time to climb to 16,400 ft (5000 m) 20 minutes; time to climb to 19,685 ft (6000 m) 30 minutes; service ceiling 22,965 ft (7000 m); endurance 2 hours 30 minutes; range 186 miles (300 km); take-off run 492 ft (150 m); landing run 656 ft (200 m).

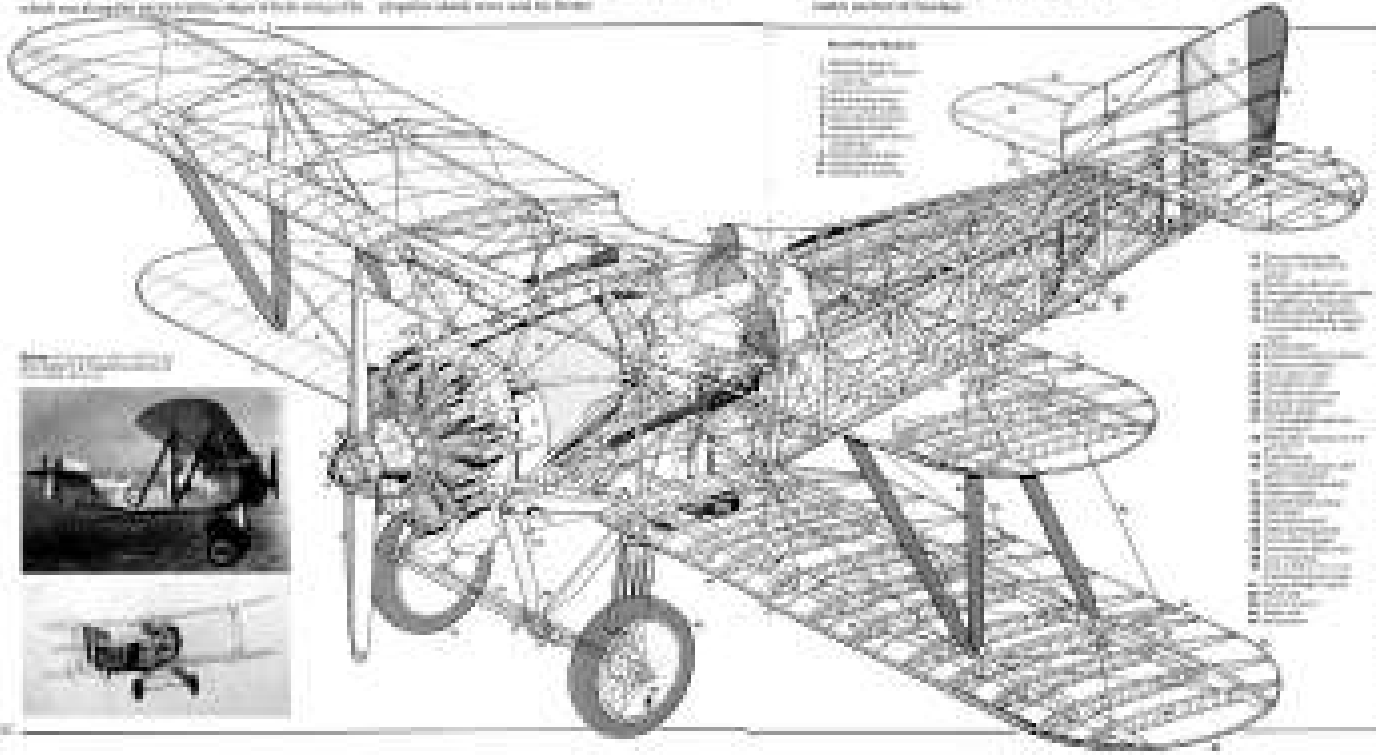
Weights: Empty 1,984 lb (900 kg); loaded 2,646 lb (1200 kg).

Dimensions: Span 29 ft 2 in (8.90 m); length 22 ft 4 in (6.80 m); height 9 ft 2 in (2.80 m); wing area 226.4 sq ft (21.00 m²).

Armament: Two 7.92-mm (0.312-in) fixed, forward-firing machine guns with 1,000 rounds.







Bristol Bulldog (Mks IIA/IV)

Above: A Bristol Bulldog IIA of 43 Squadron, RAF Tangmere, 1931. The Bulldog was the RAF's first all-metal fighter and was the first aircraft to be fitted with a gas-operated synchronised machine gun.

The second-to-last RAF fighter biplane of the interwar period, both of which had very similar designations, was the Bristol Bulldog, which first flew in May 1927. The Bulldog was a development of the Bristol Bulldog prototype, which had been ordered in 1926 to specification F.9/26 for the Air Ministry's new single-seat fighter. The Bulldog prototype was powered by a Bristol Jupiter VIIF engine and had a maximum speed of 156 mph (251 km/h). The Bulldog II, which first flew in January 1929, was powered by a Jupiter VIIIF engine and had a maximum speed of 174 mph (280 km/h). The Bulldog IIA, which first flew in May 1929, was powered by a Jupiter VIIIF engine and had a maximum speed of 174 mph (280 km/h). The Bulldog IIA was the last Bulldog to be built.

The Bulldog was a single-seat, single-engine, all-metal biplane with a fixed undercarriage and a tailwheel. It had a wingspan of 33 ft 9 in (10.29 m), a length of 25 ft 3 in (7.70 m), and a height of 9 ft 10 in (3.00 m). The Bulldog had a maximum speed of 174 mph (280 km/h), a cruising speed of 150 mph (241 km/h), and a range of 300 miles (483 km). The Bulldog had a service ceiling of 28,000 ft (8,534 m).

The Bulldog was armed with two .303 in (7.7 mm) Vickers machine guns, which were mounted on the fuselage sides and were synchronised to fire through the propeller arc. The Bulldog could also carry four 20 lb (9 kg) bombs on underwing racks.

The Bulldog was powered by a Bristol Jupiter VIIIF engine, which was a nine-cylinder radial engine that produced 490 hp (365 kW). The engine was mounted in the nose of the aircraft and was cooled by a large, circular cowling. The engine was started by a hand crank.

The Bulldog was flown by a single pilot, who sat in an open cockpit. The cockpit was equipped with a basic set of instruments, including an airspeed indicator, an altimeter, a compass, and a turn-and-bank indicator. The pilot also had a radio set, which was used to communicate with other aircraft and with ground stations.

The Bulldog was a popular aircraft with pilots, who appreciated its agility and its ease of handling. It was also a reliable aircraft, and it had a low accident rate. The Bulldog was withdrawn from service with the RAF in 1937, but it continued to serve with the Royal Auxiliary Air Force until 1939.

SPECIFICATIONS: Bulldog IIA

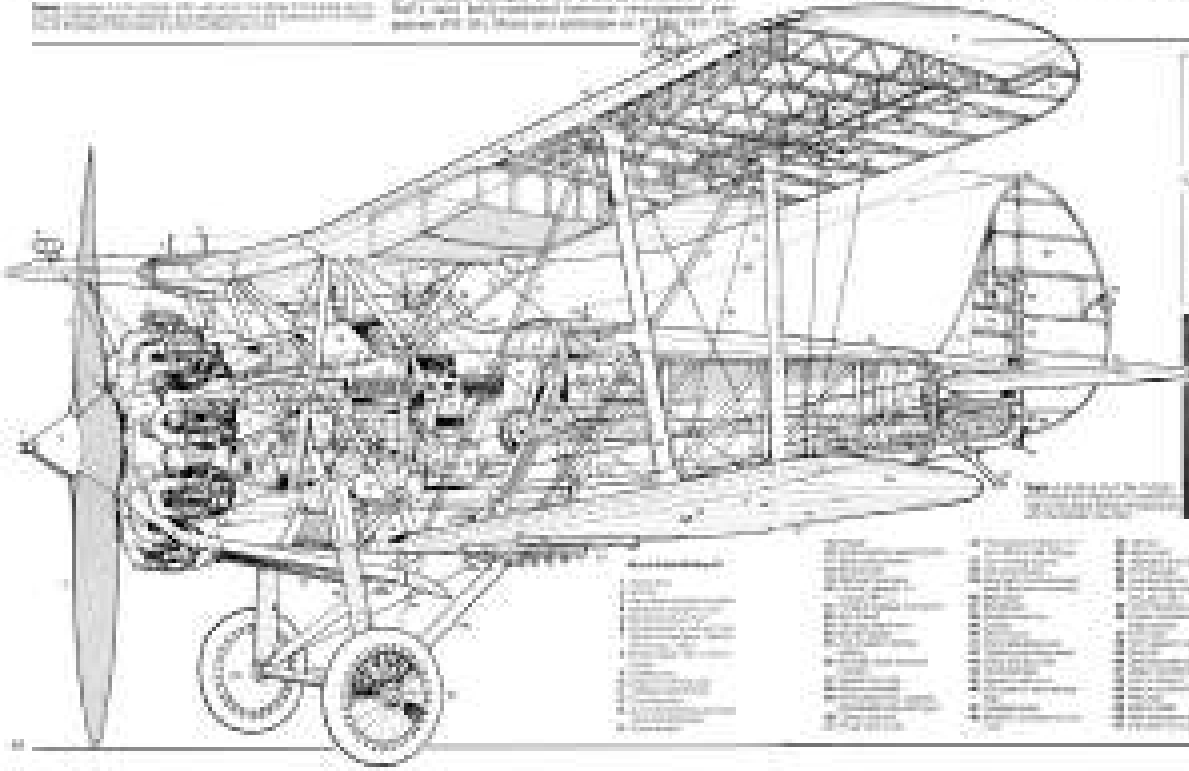
Power Plant: One Bristol Jupiter VIIF radial air-cooled engine rated at 490 hp (365 kW) for take-off and 420 hp (313 kW) at 16,000 ft (4,875 m)

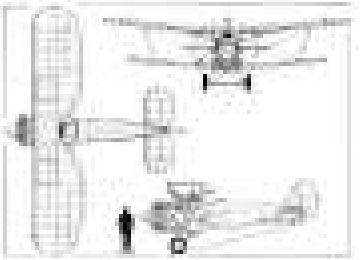
Dimensions: Wingspan 33 ft 9 in (10.29 m); length 25 ft 3 in (7.70 m); height 9 ft 10 in (3.00 m); wing area 348 sq ft (32.3 sq m)

Weights: Empty 2,457 lb (1,115 kg); max loaded 3,447 lb (1,563 kg)

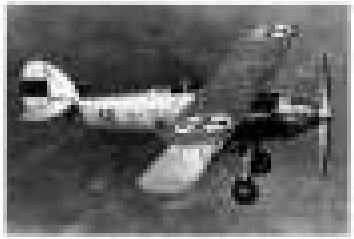
Performance: Max speed 174 mph (280 km/h) at 16,000 ft (4,875 m); cruising speed 150 mph (241 km/h); range 300 miles (483 km); service ceiling 28,000 ft (8,534 m); climb to 10,000 ft (3,048 m) in 5 min 30 sec

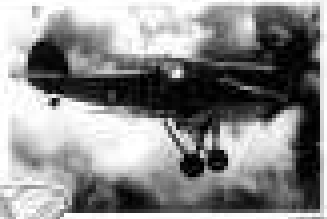
Armament: Two Vickers .303 in (7.7 mm) machine guns with 600 rounds per gun; four 20 lb (9 kg) bombs on underwing racks



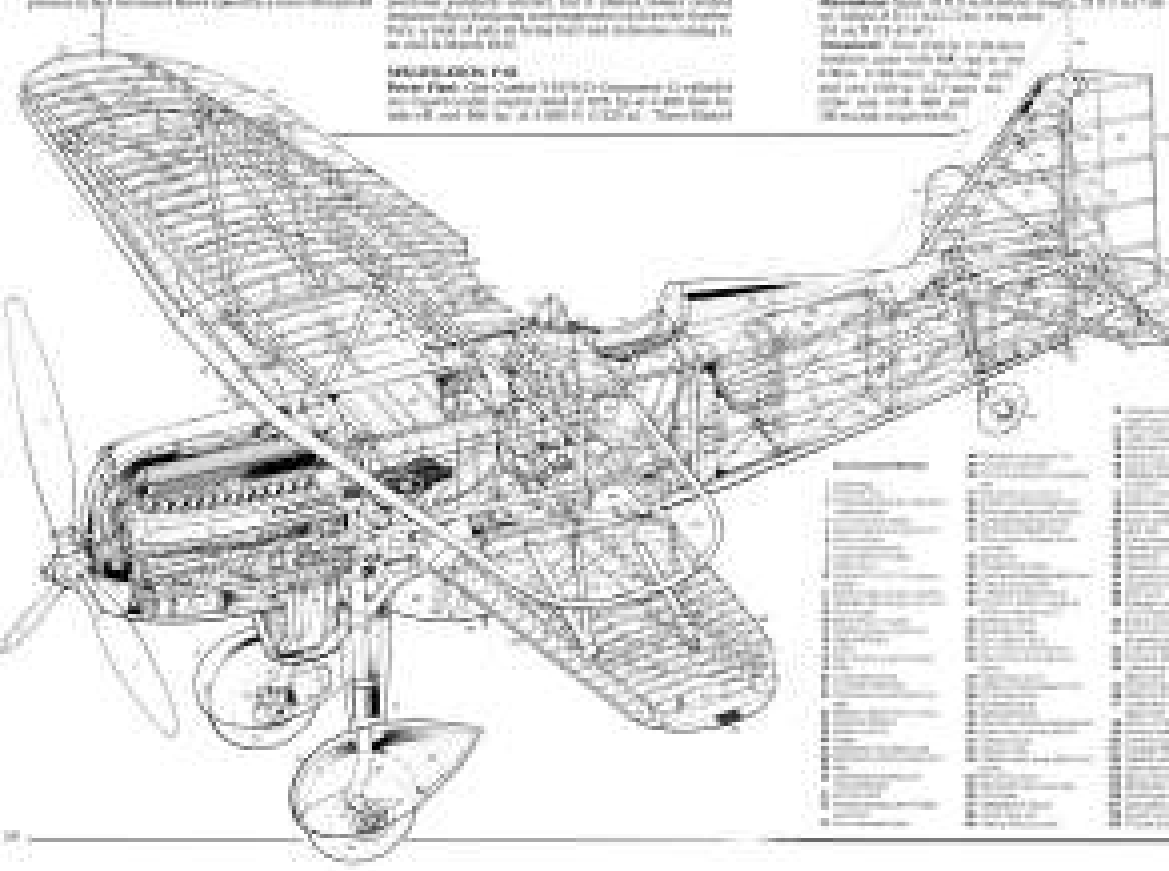


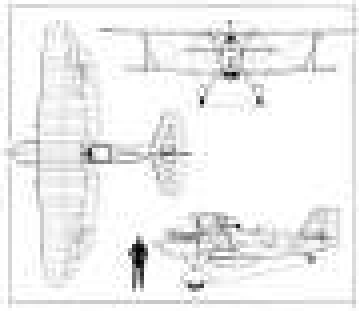
Hawker Fury (March 1929)





Curtiss P-6E (mid 1931)





P.Z.L. P.11c (September 1939)

The success of Polish development and construction of successful aircraft, at the start of their activity, resulted mainly from the work of Wsiewołod Jakimiuk and Stanisław Cywiński. The latter was assistant during the P.1 project, developed by Zygmunt Pulawski and built by the Plage i Laśkiewicz factory in Warsaw, was flown in September 1924. Of advanced construction with "mixed construction" fuselage, wooden wing, the P.1 established new standards in manoeuvrability and climbing. Its short wingspan, however, long wing chord and unbraced fuselage, which was without a cockpit, had undoubtedly the biggest drawback in that it was unable to take off with a full load of fuel. Despite this, the P.1 was ordered in a small series of 10 aircraft, which were delivered to the Polish Air Force in 1926.

Further development of the basic design resulted in the P.7 and P.8 which, powered by more powerful engines, were ordered in a small series of 10 aircraft each. Both types were delivered to the Polish Air Force in 1928. The P.7 and P.8 were the first Polish aircraft to be produced in large numbers, and were the backbone of the Polish Air Force's fighter strength at the beginning of the 1930s. Following the P.7 and P.8 came the P.11, which was the most numerous Polish fighter aircraft of the 1930s. The P.11 was developed from the P.7 and P.8 and was powered by the Polish-built Bristol Jupiter engine. The first prototype P.11 flew in 1931, and the type entered service with the Polish Air Force in 1932. Production of the P.11 series continued until 1934, when the P.11c was introduced. This version had a redesigned fuselage, with a new engine cowling and a modified tail unit. The P.11c was produced in large numbers, and was the most widely used Polish fighter aircraft of the 1930s. It was also exported to Romania and Yugoslavia.

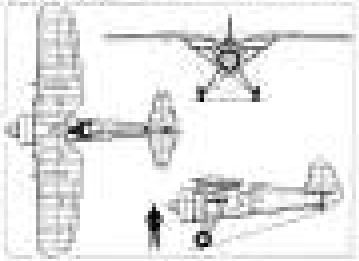
The P.11c was a single-seat, single-engine, all-metal, low-wing monoplane with a fixed, tailwheel undercarriage. It was powered by a 484 kW (650 hp) Bristol Jupiter VIIF.P nine-cylinder radial engine driving a two-blade fixed-pitch propeller. The aircraft had a maximum speed of 330 km/h (205 mph) at 4,000 m (13,120 ft), a range of 1,000 km (620 miles), and a service ceiling of 8,000 m (26,250 ft). It was armed with two 7.7 mm (0.303 in) machine guns mounted in the upper fuselage, firing through the propeller arc.

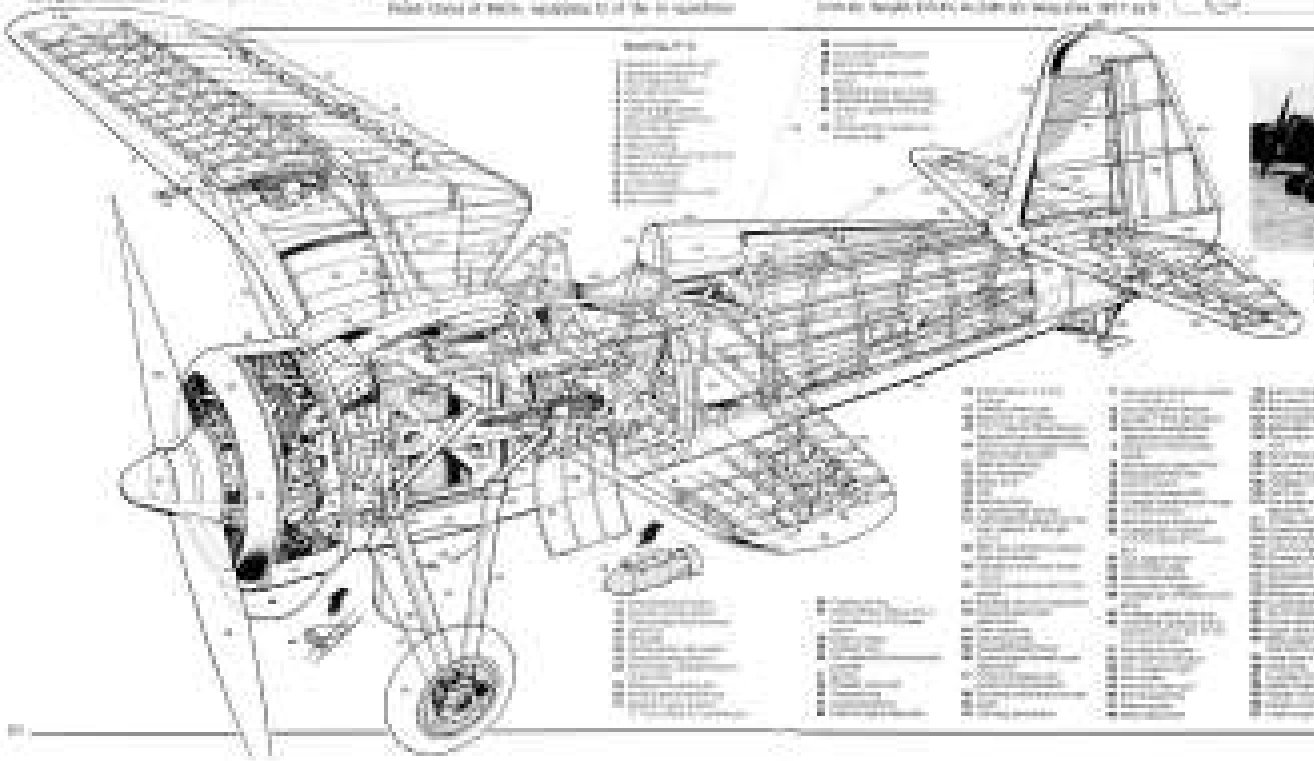
The P.11c was a highly manoeuvrable aircraft, with good climb rate and handling characteristics. It was also relatively easy to maintain and repair, which was important for a small air force like that of Poland. The P.11c was a popular aircraft with its pilots, who appreciated its agility and ease of handling. It was also a reliable aircraft, with few mechanical problems.

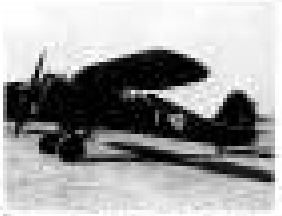
The P.11c saw extensive service during the German invasion of Poland in September 1939. It was used in both the air-to-air and ground-attack roles, and was credited with the destruction of a number of German aircraft. However, the P.11c was outnumbered and outclassed by the German Luftwaffe, and many were lost in combat or on the ground. The P.11c was withdrawn from service after the campaign, and the few that survived were used for training purposes.

Despite its relatively short service life, the P.11c played an important role in the history of Polish aviation. It was the first Polish aircraft to be produced in large numbers, and it established the reputation of Polish aircraft designers for building reliable and manoeuvrable aircraft. The P.11c also served as the basis for the development of the P.24, which was the last Polish fighter aircraft to see combat.

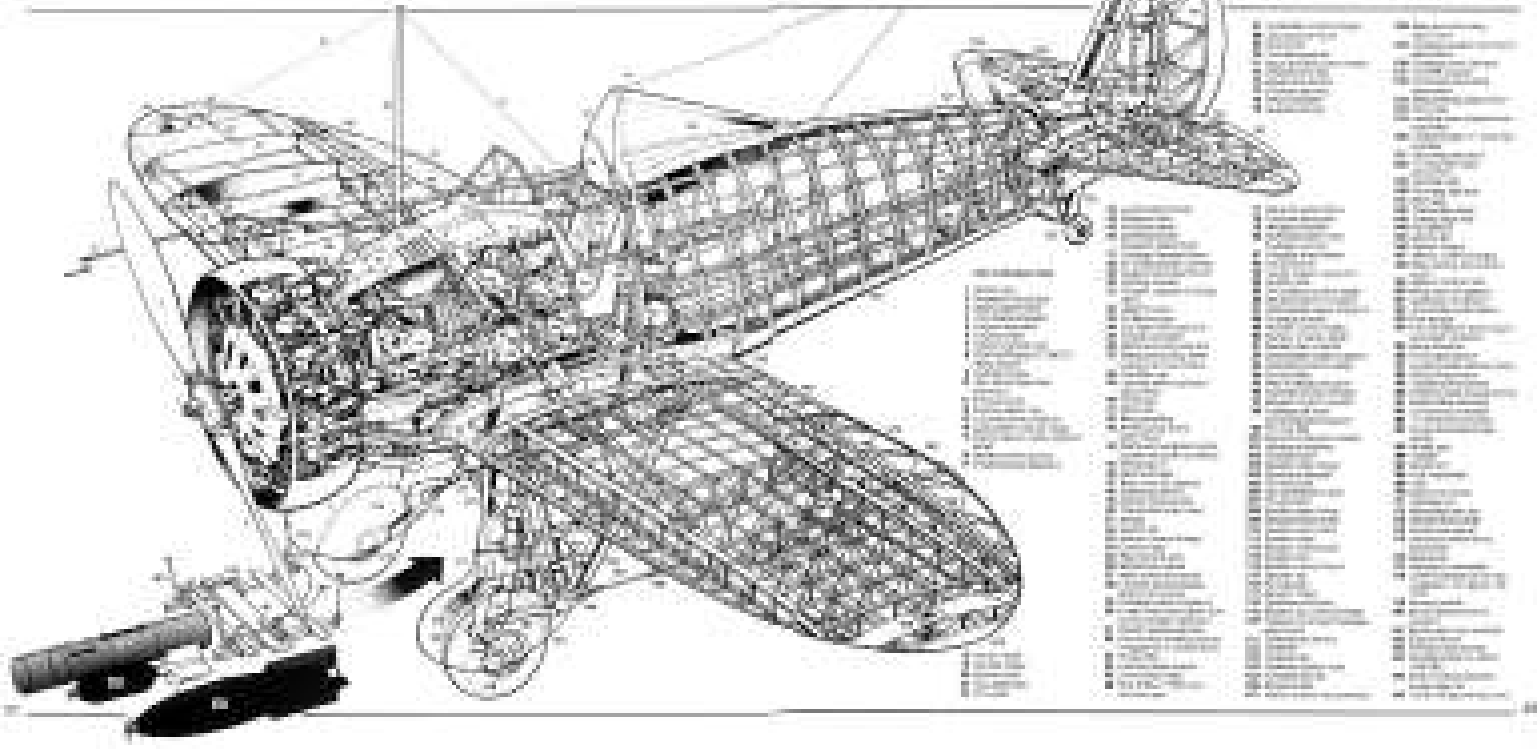
Armament: Two 7.7 mm (0.303 in) machine guns with 500 rounds per gun

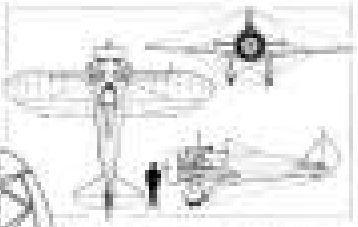




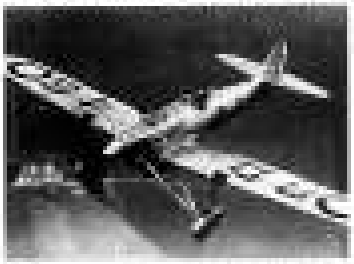


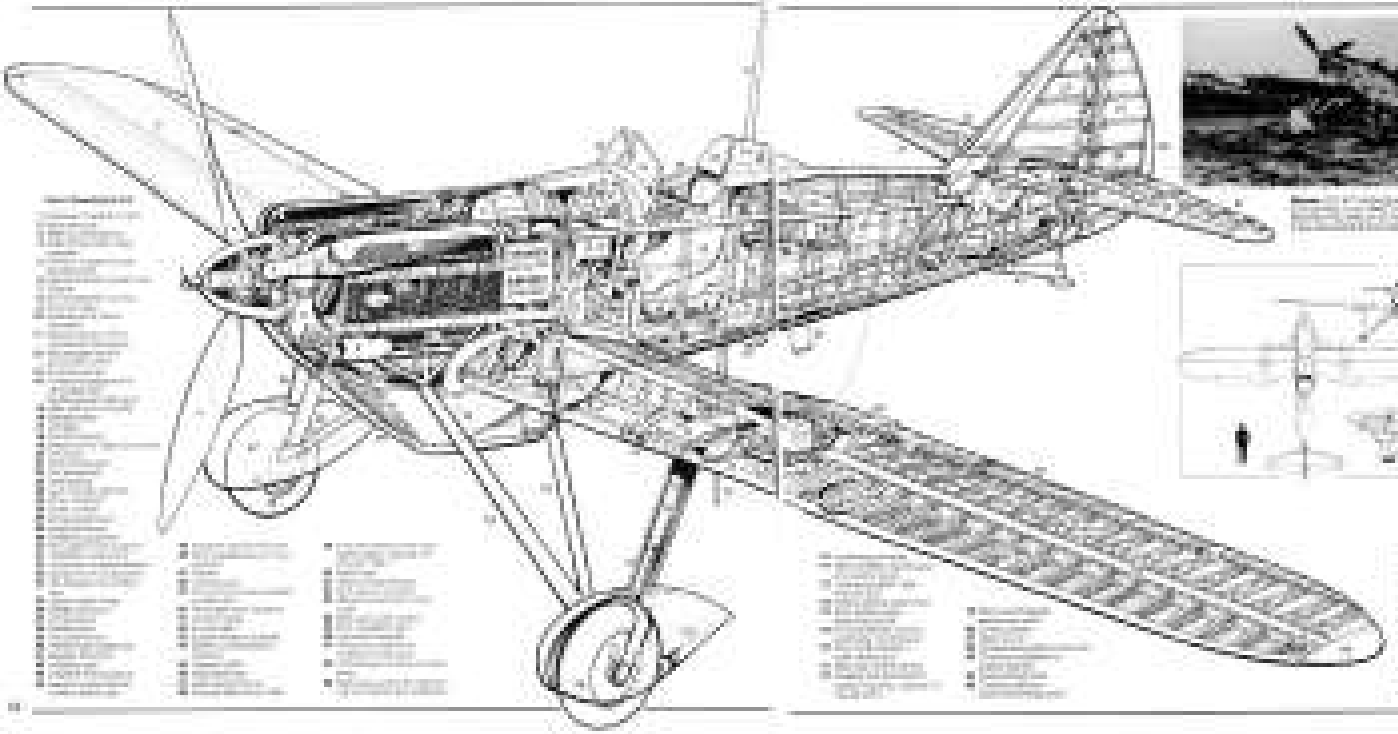
Boeing P-26 (March 1933)



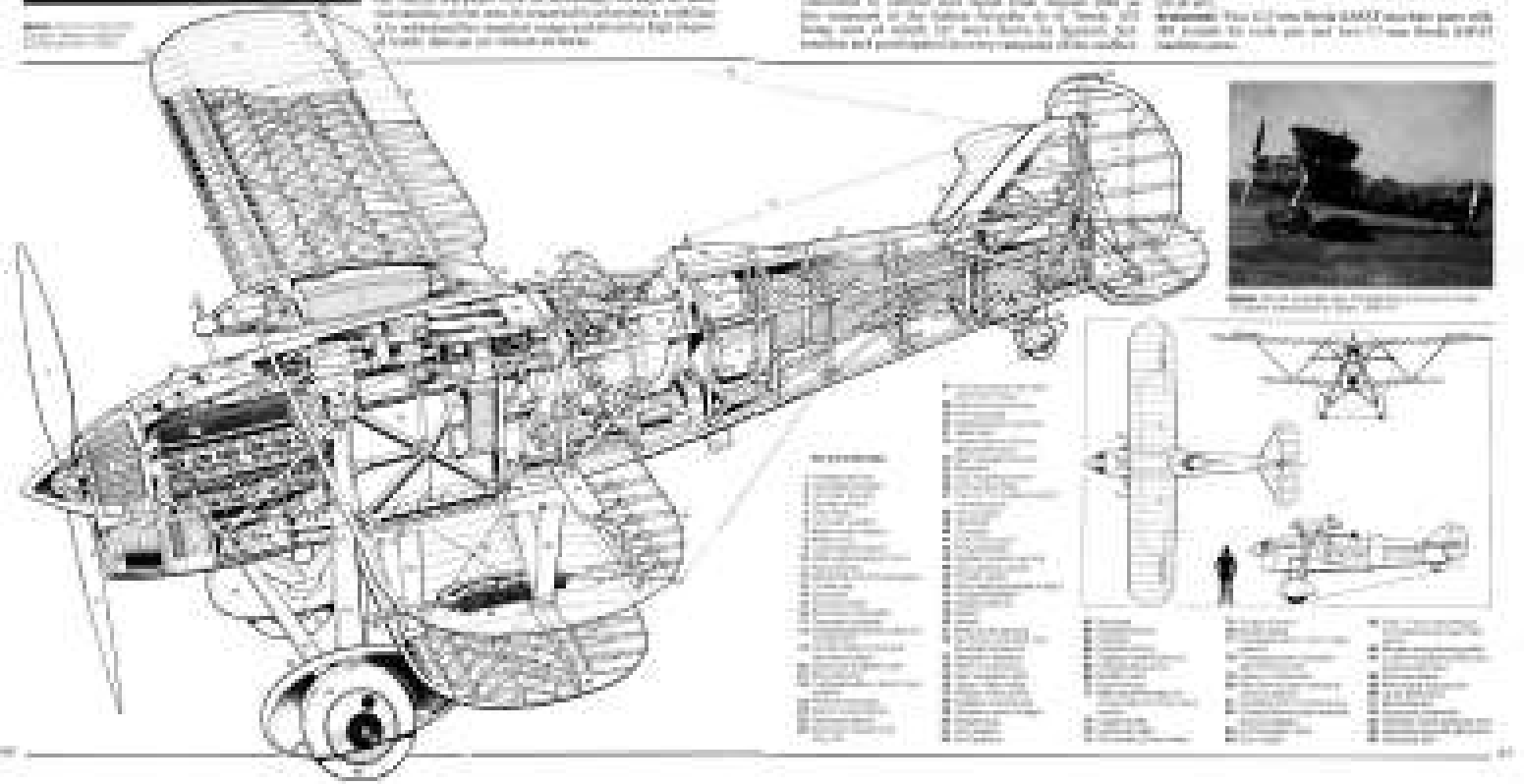


Dewoitine D 500-510 (from 1932)

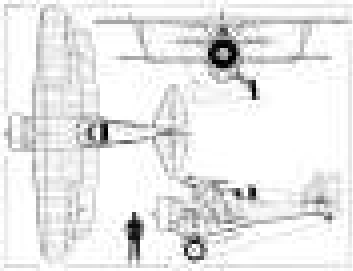


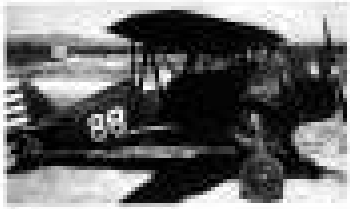


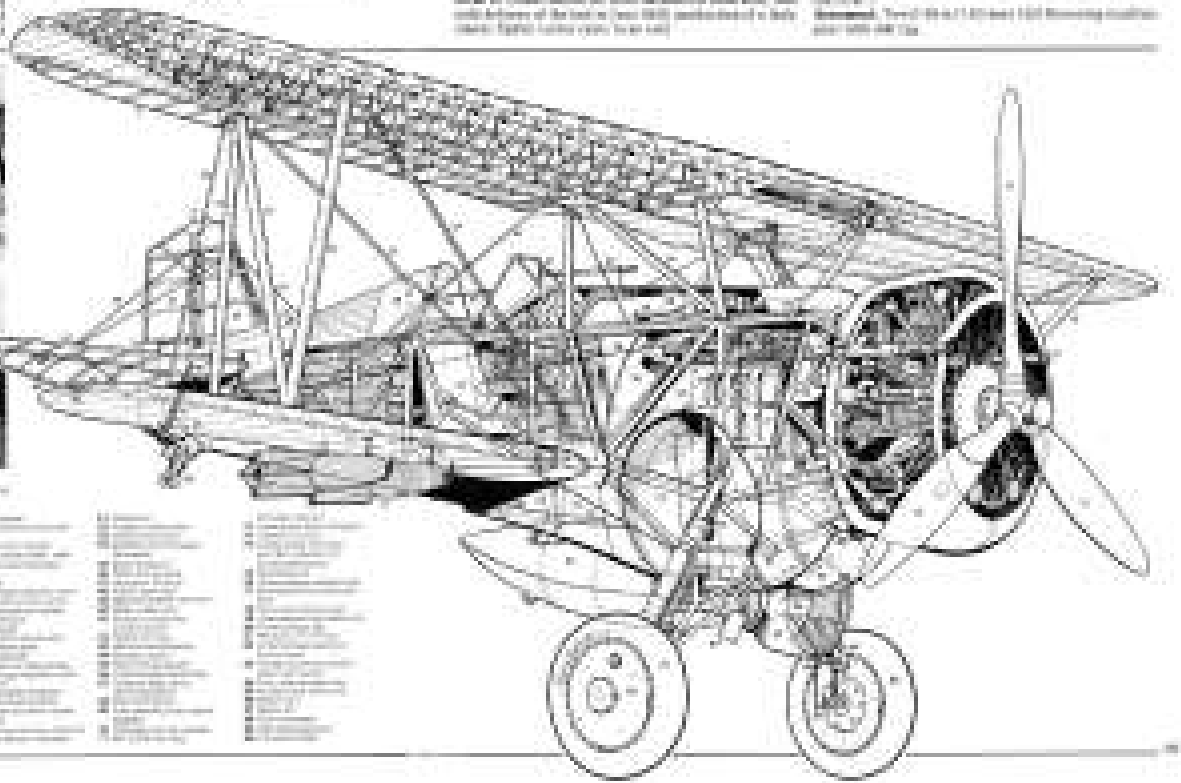
Fiat CR.32 (April 1933)



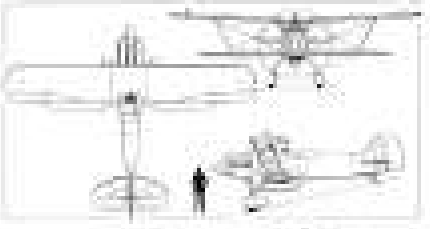
Curtiss Model 68 Hawk III (USA, 1931)





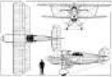


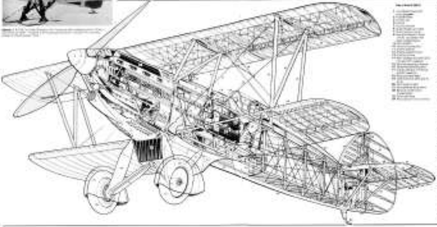
Heinkel He 51 (Version 1935)



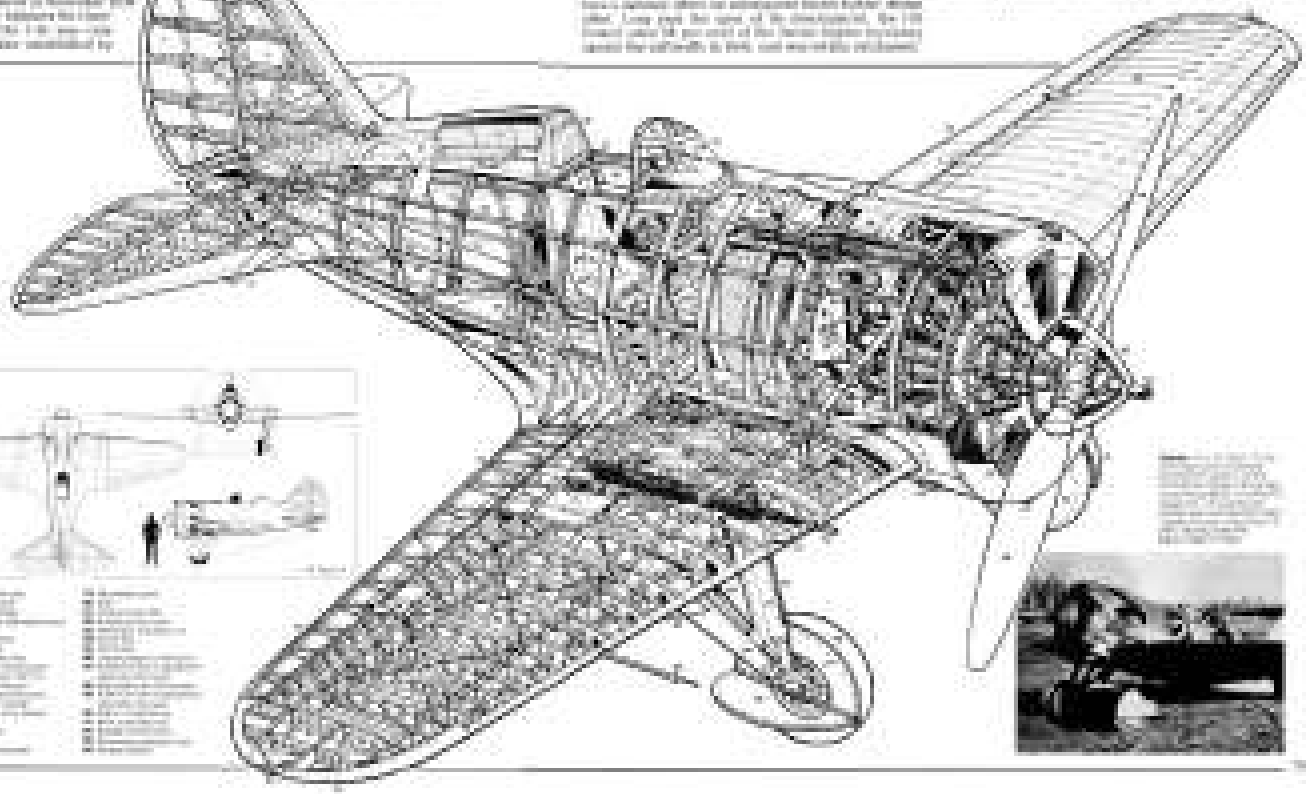
Avia B.534

Czechoslovakia

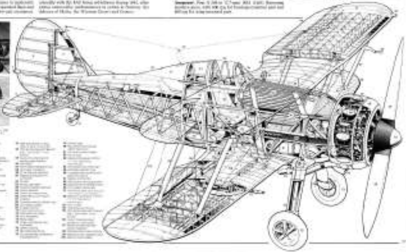




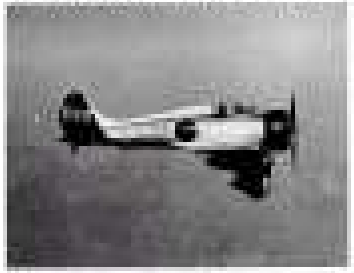
Polikarpov I-16 (December 1933)



Gloster Gladiator



Mitsubishi A5M (February 1939)



Having the distinction of being the world's first service-introduced mono-wing fighter, the Mitsubishi A5M-designed by Jiro Horikoshi-was also one of the most successful. Its speed, manoeuvrability and climb rate were outstanding for its time, and it was the first Japanese fighter to be ordered in quantity. Its successor, the A6M, was the famous Zero.

Development of the A5M began in 1934 to meet a Navy requirement for a carrier-based fighter to replace the Nakajima A4N biplane. Mitsubishi's design team, headed by Horikoshi, was assisted by Kiro Honjo, who had worked on the Nakajima A4N. Their first prototype, the A5M, flew in February 1936, powered by a 580 hp Nakajima Kotobuki 2 nine-cylinder radial engine driving a two-blade fixed-pitch propeller. Armament was two 7.7 mm machine guns mounted in the fuselage sides, and the pilot sat in an open cockpit. Fixed, spatted undercarriage legs were fitted.

Following evaluation, the A5M was ordered into production as the Navy Type 96 Carrier Fighter. Deliveries began in August 1937, and the type remained in front-line service until 1941. Production totalled 1,094 aircraft, including 65 built by Nakajima. Many were exported to China, where they saw extensive combat during the Sino-Japanese War.

Early A5Ms had poor directional stability, which led to a number of accidents. This was corrected by increasing the fin area and adding a dorsal fillet. Other changes included the introduction of a cockpit canopy, flaps and a more powerful engine. The A5M was also built under licence in China by the Central Aircraft Manufacturing Company (CAMCO) at Hangchow, and by the Manchurian Aircraft Manufacturing Company at Mukden.

Mitsubishi A5M-4 (Type 96 Carrier Fighter Model 4)

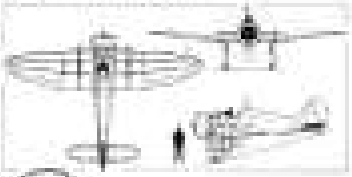
Power Plant: One Nakajima Kotobuki 41 nine-cylinder radial air-cooled engine rated at 710 hp at 2,800 rpm for take-off and 780 hp at 2,800 m (9,185 ft). Three-blade fixed-pitch propeller. Internal fuel capacity 325 litres (71.5 Imp gal) in two fuselage tanks and 100 litres (22 Imp gal) in two wing tanks. Provision for one 250 litre (55 Imp gal) drop tank under fuselage.

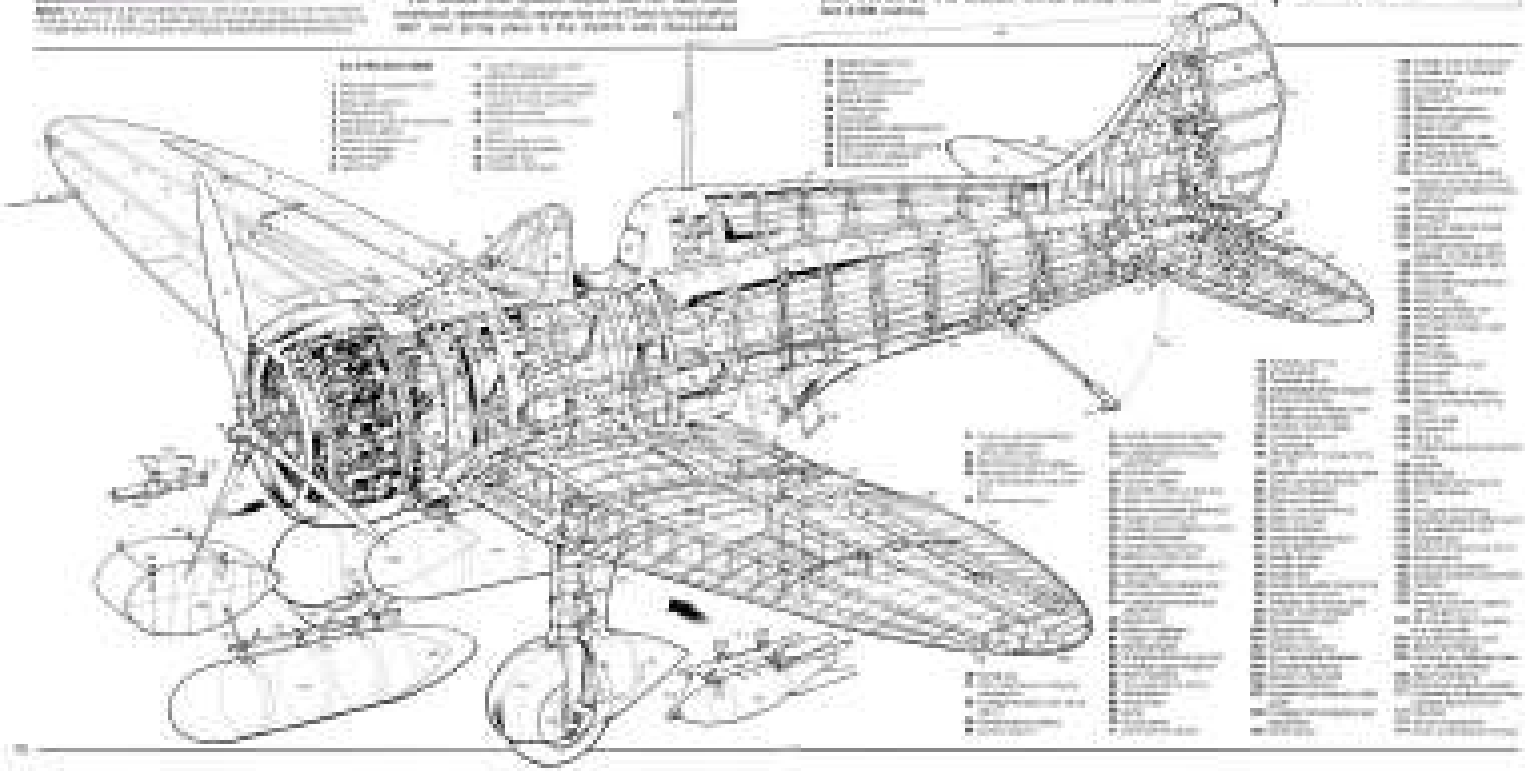
Performance: Max speed 270 mph (435 km/h) at 10,000 ft (3,050 m); cruising speed 184 mph (296 km/h) at 10,000 ft (3,050 m); initial climb 2,300 ft (700 m) per min; time to 10,000 ft (3,050 m) 5 min 30 sec; service ceiling 32,810 ft (10,000 m); range with max fuel 1,144 miles (1,840 km).

Weights: Empty equipped 2,148 lb (1,950 kg); normal loaded (2,600 lb (1,177 kg); max overload 3,086 lb (1,400 kg).

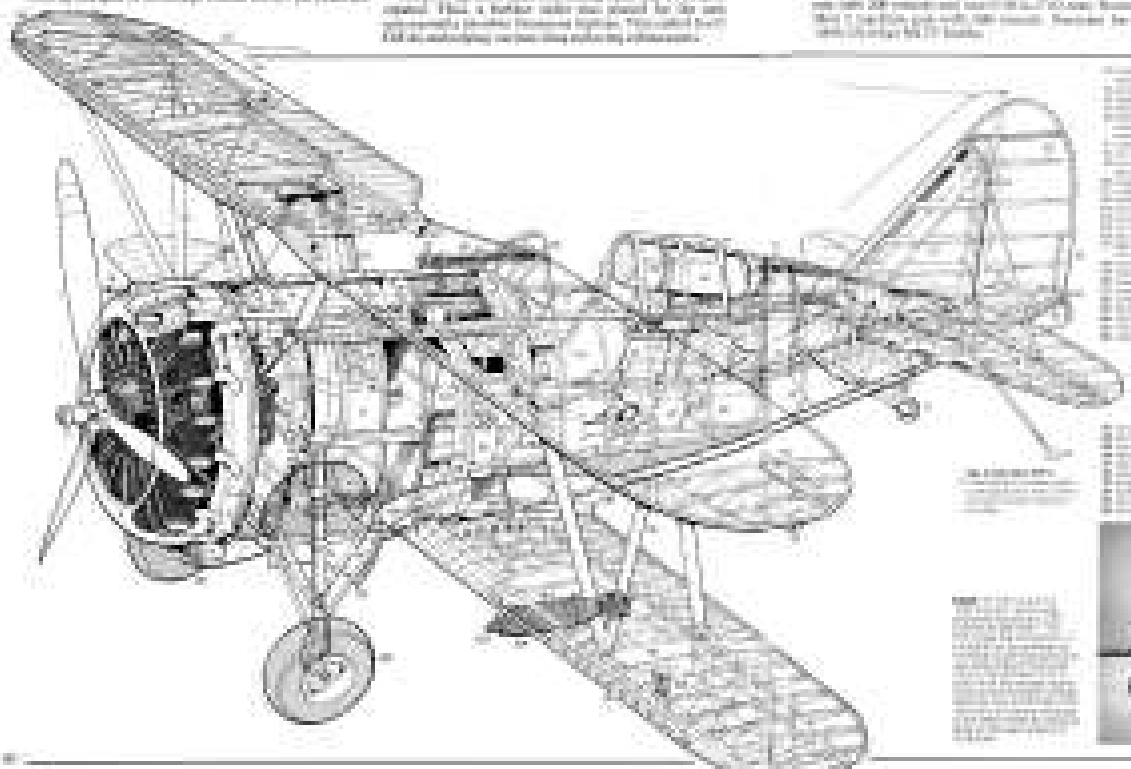
Dimensions: Span 36 ft 1 in (11.00 m); length overall 24 ft 11 in (7.60 m); height 10 ft 10 in (3.31 m); wing area 158.9 sq ft (14.75 sq m).

Armament: Two 7.7 mm Type 89 machine guns with 500 rpg.





Grumman F3F (March 1935)

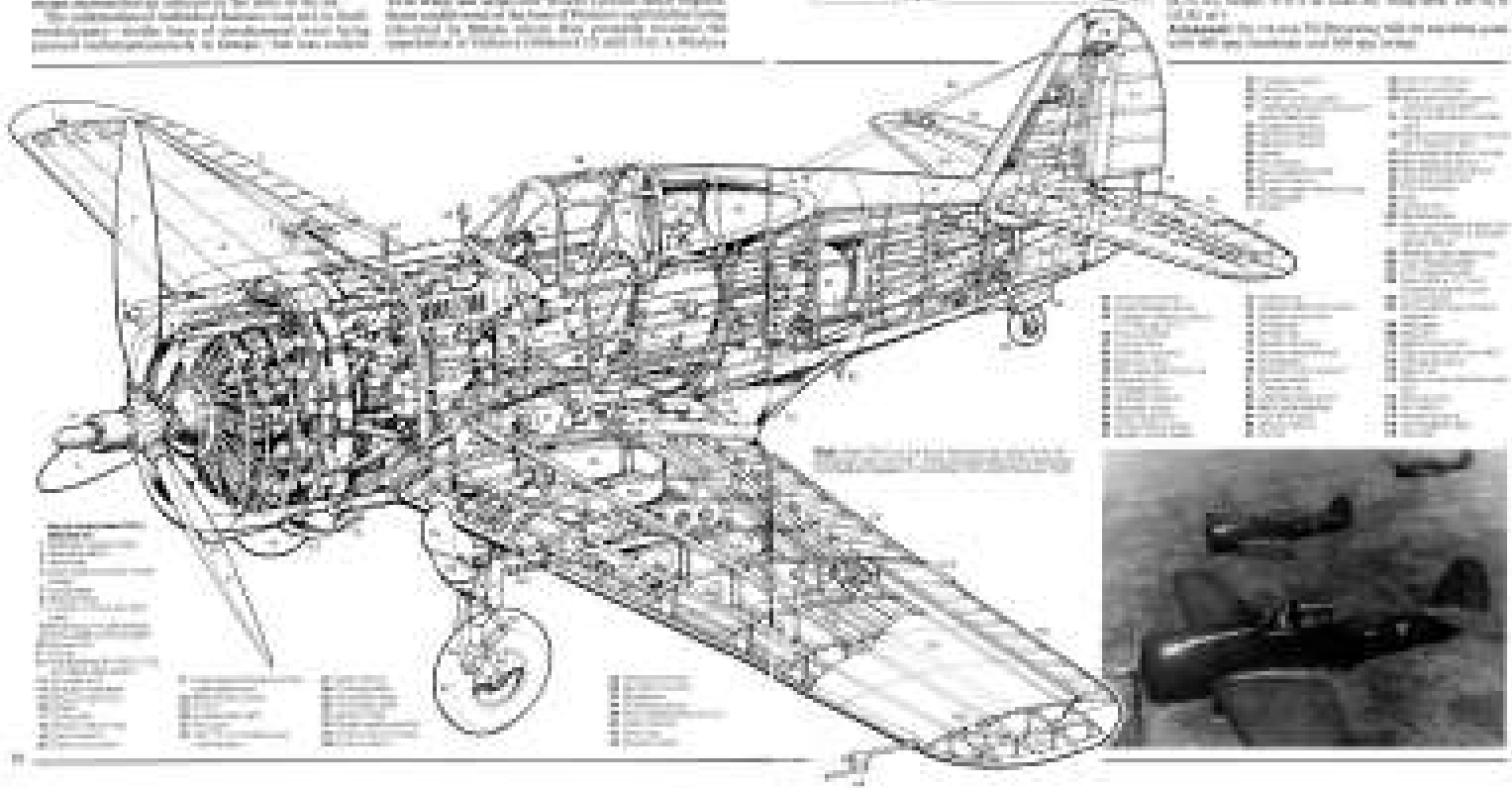


Curtiss Hawk 75A (April 1939)

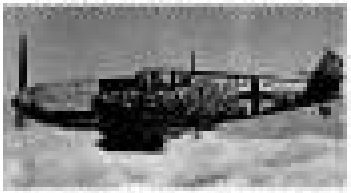
In 1934 for the Swiss Air Force and subsequently for the Chinese Air Force, Curtiss-Wright developed the Hawk 75 fighter, which was a very successful aircraft. Although it was not the fastest fighter of its time, it was very manoeuvrable and had a good rate of climb. The Hawk 75 was also very reliable and easy to maintain. It was a popular aircraft with pilots and was used by many countries around the world.

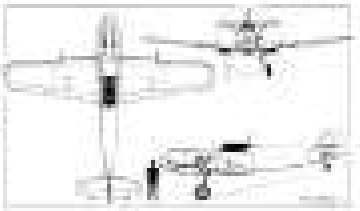
The Hawk 75 was a single-seat, all-metal, low-wing monoplane with a fixed undercarriage and a radial engine. It had a maximum speed of 311 mph (500 km/h) and a range of 1,000 miles (1,600 km). It was armed with four machine guns and could carry a bomb load of 500 lb (227 kg).

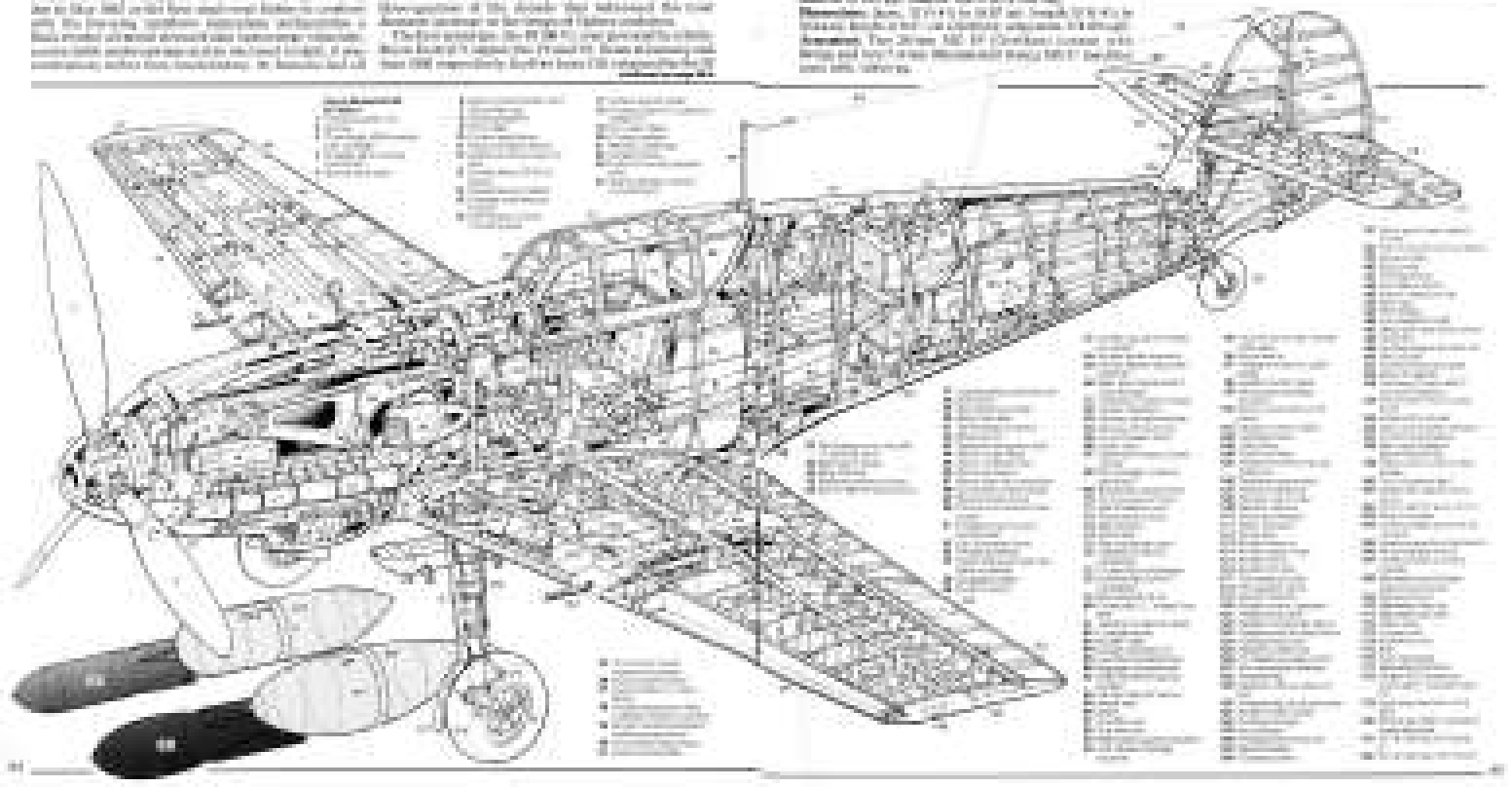
The Hawk 75 was used by many countries around the world. It was popular with pilots and was very reliable. It was also very easy to maintain. It was a good aircraft for its time and it is still remembered today.

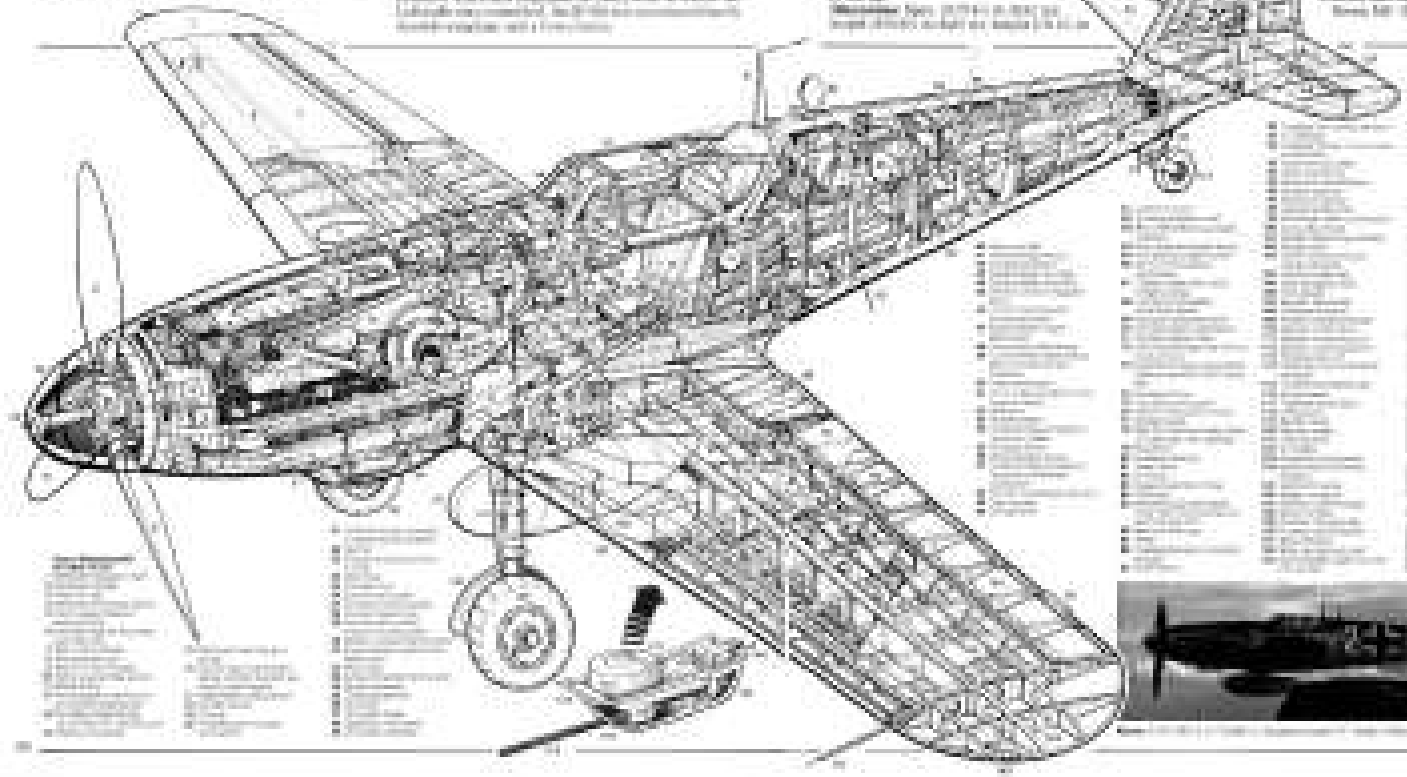


Messerschmitt Bf 109 (1936–1945)

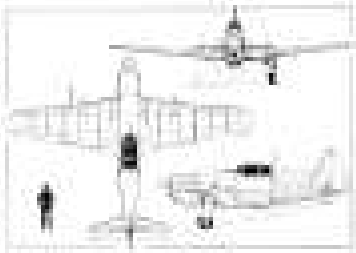


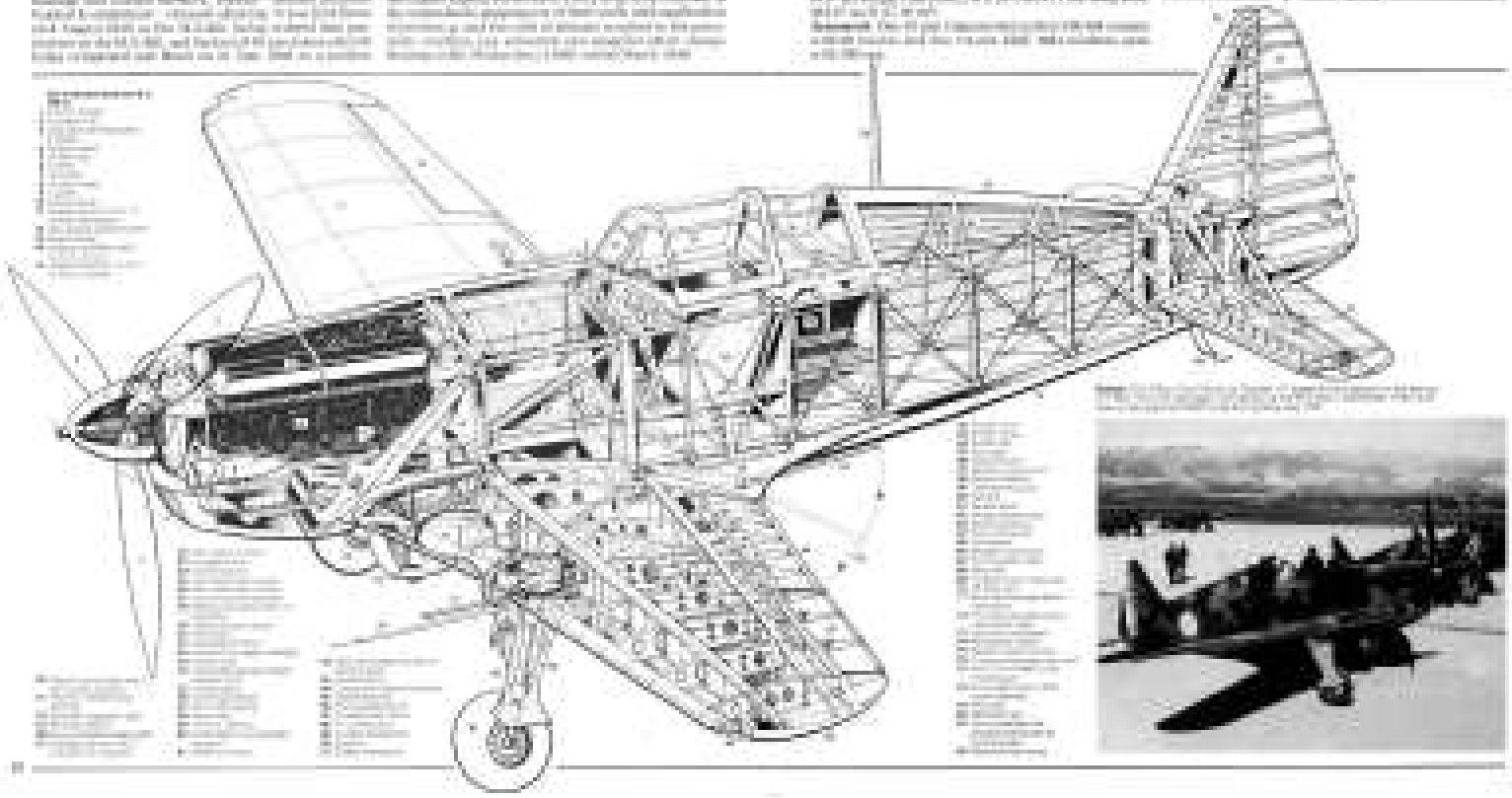




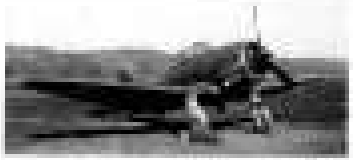


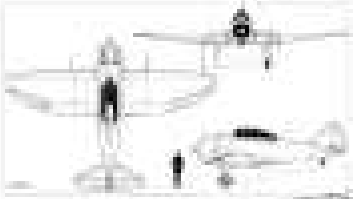
Morane-Saulnier M.S. 406 (August 1939)





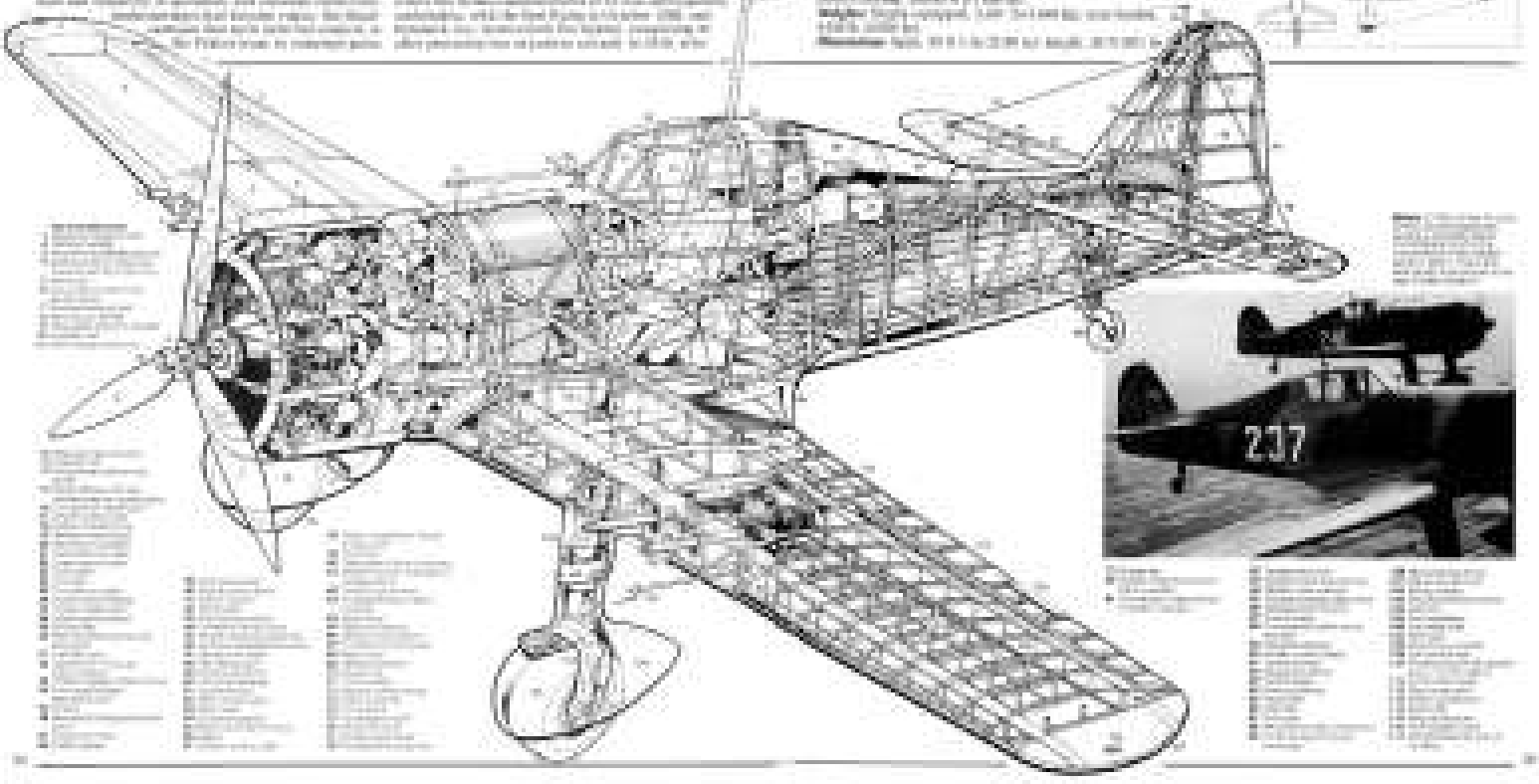
Seversky P-35 (August 1939)

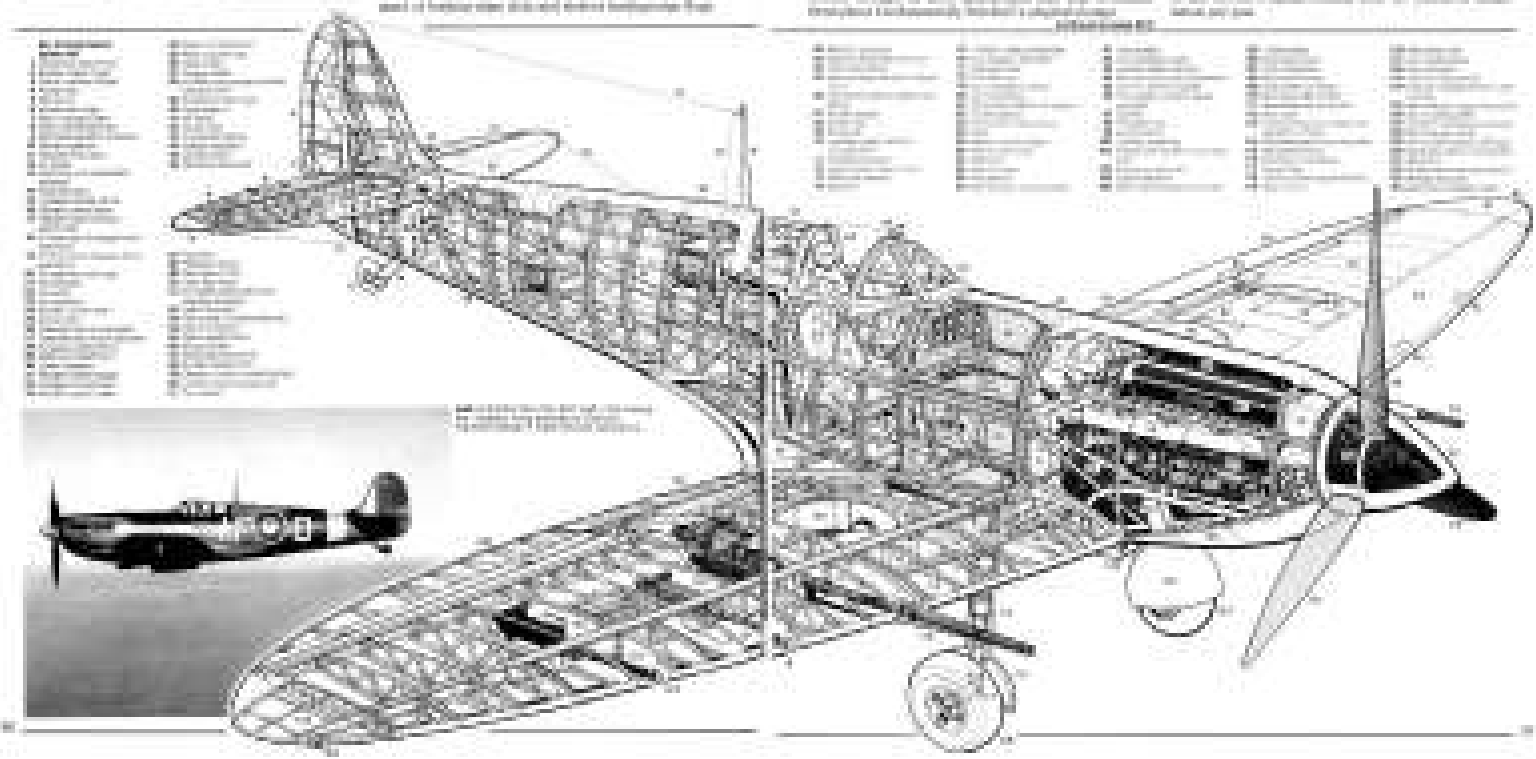




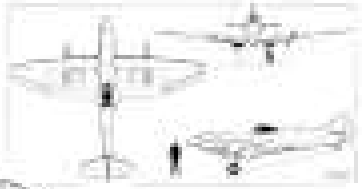
Hawker Hurricane

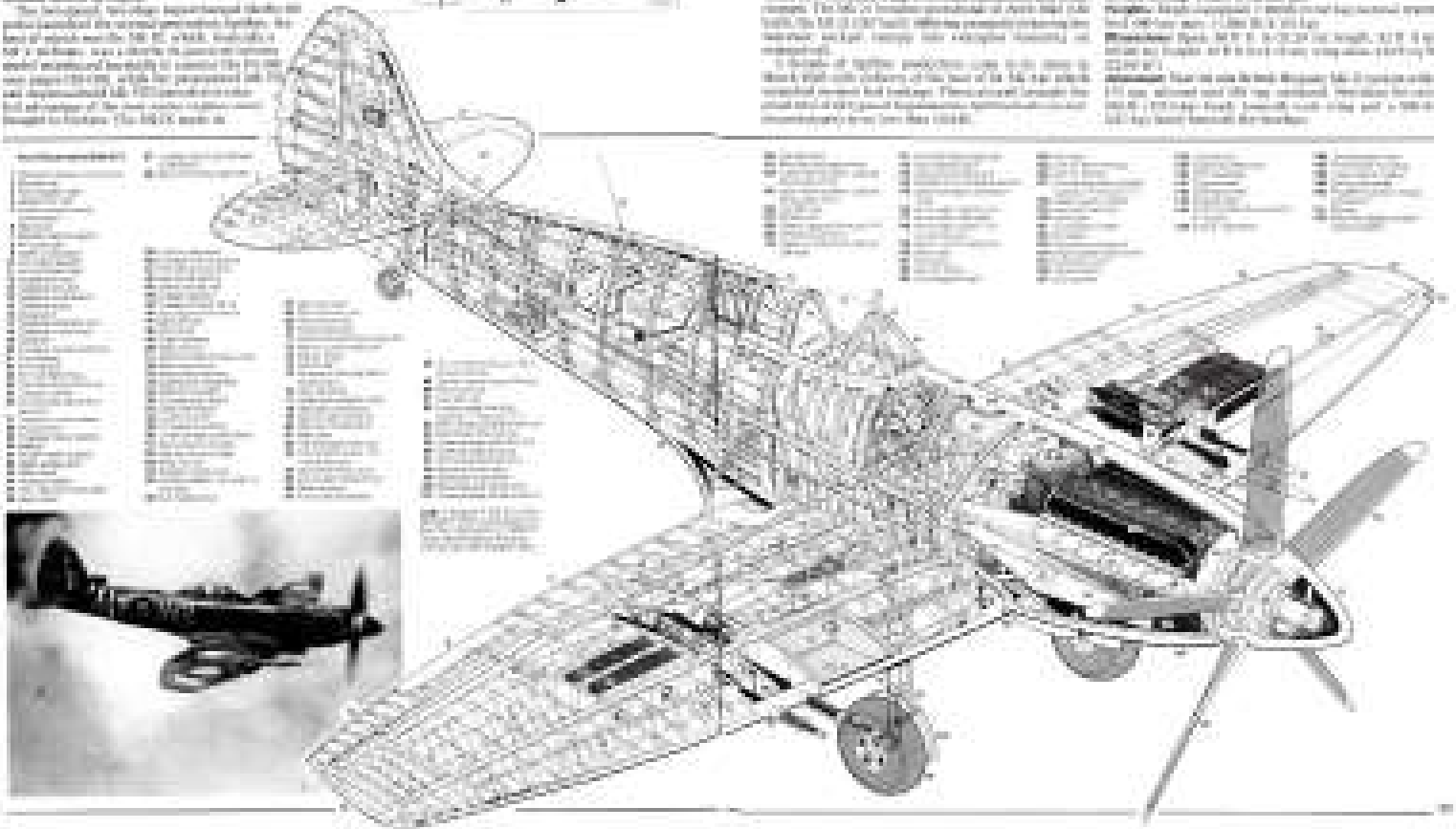
Fokker D XXI (February 1938)



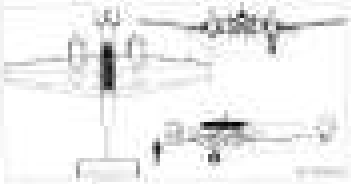


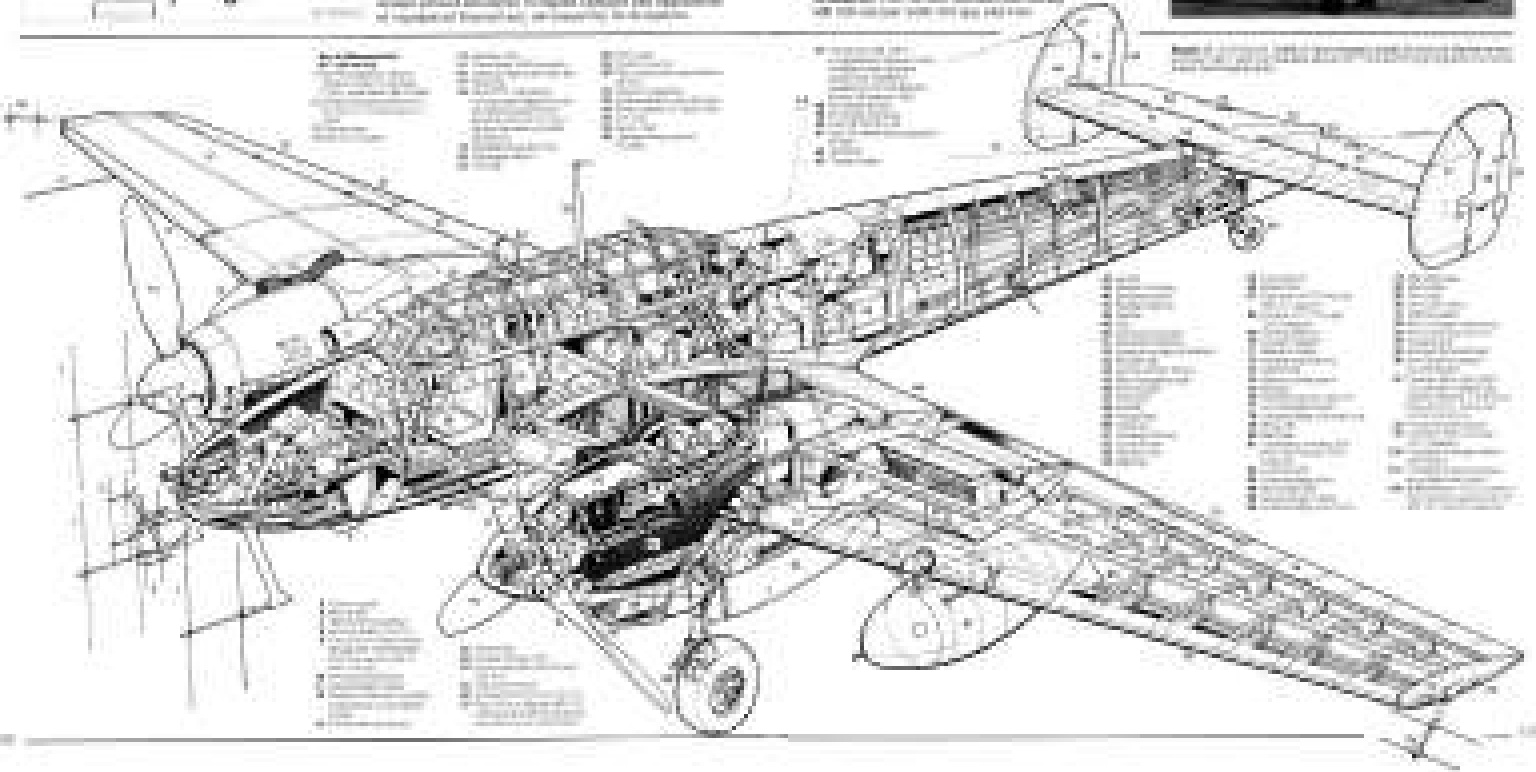
Supermarine Spitfire



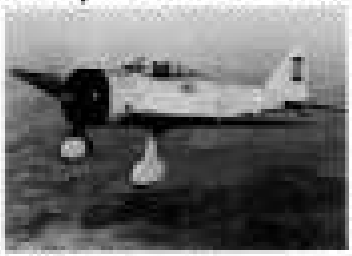


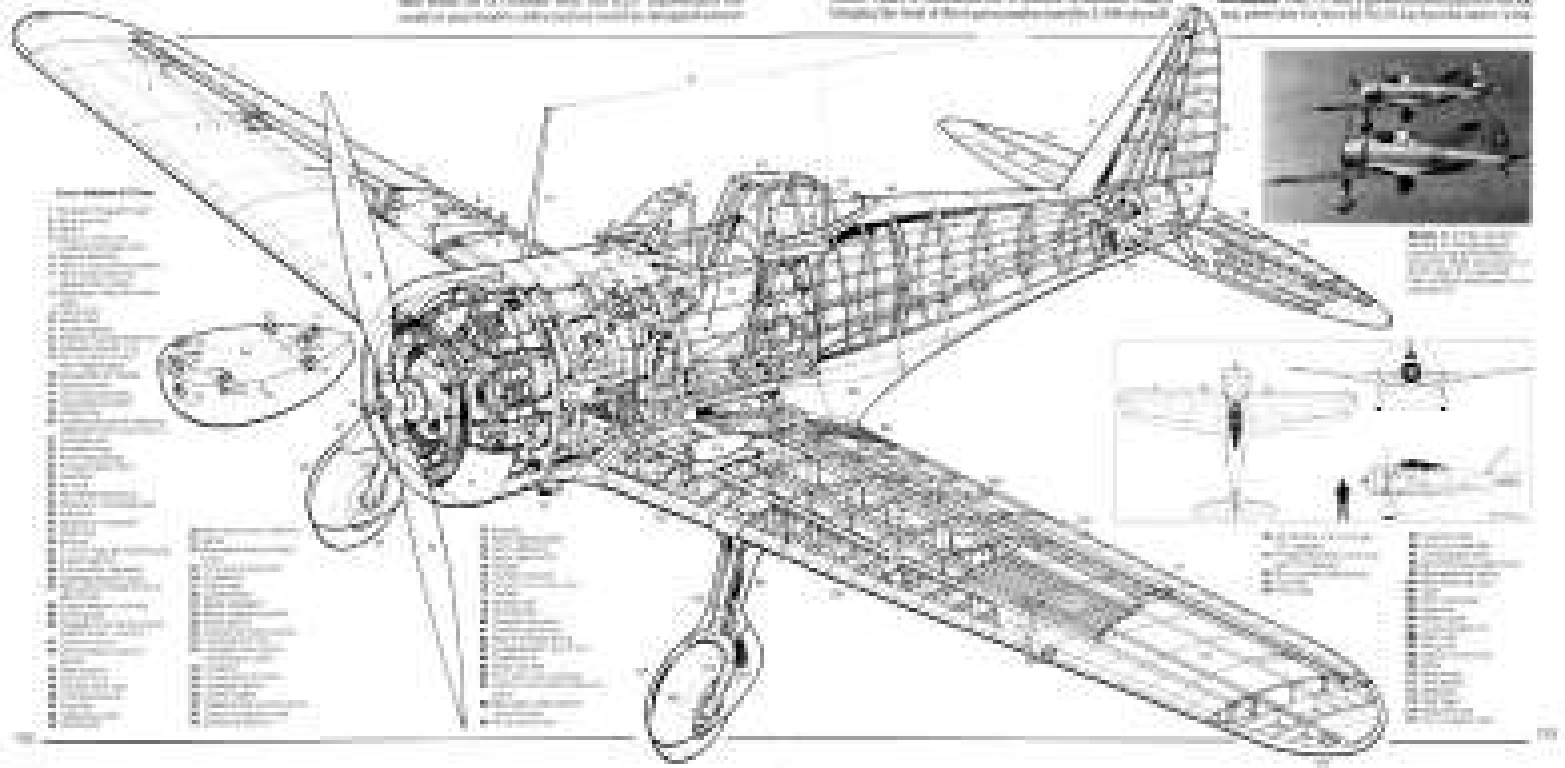
Messerschmitt Bf 110 (Me 410)



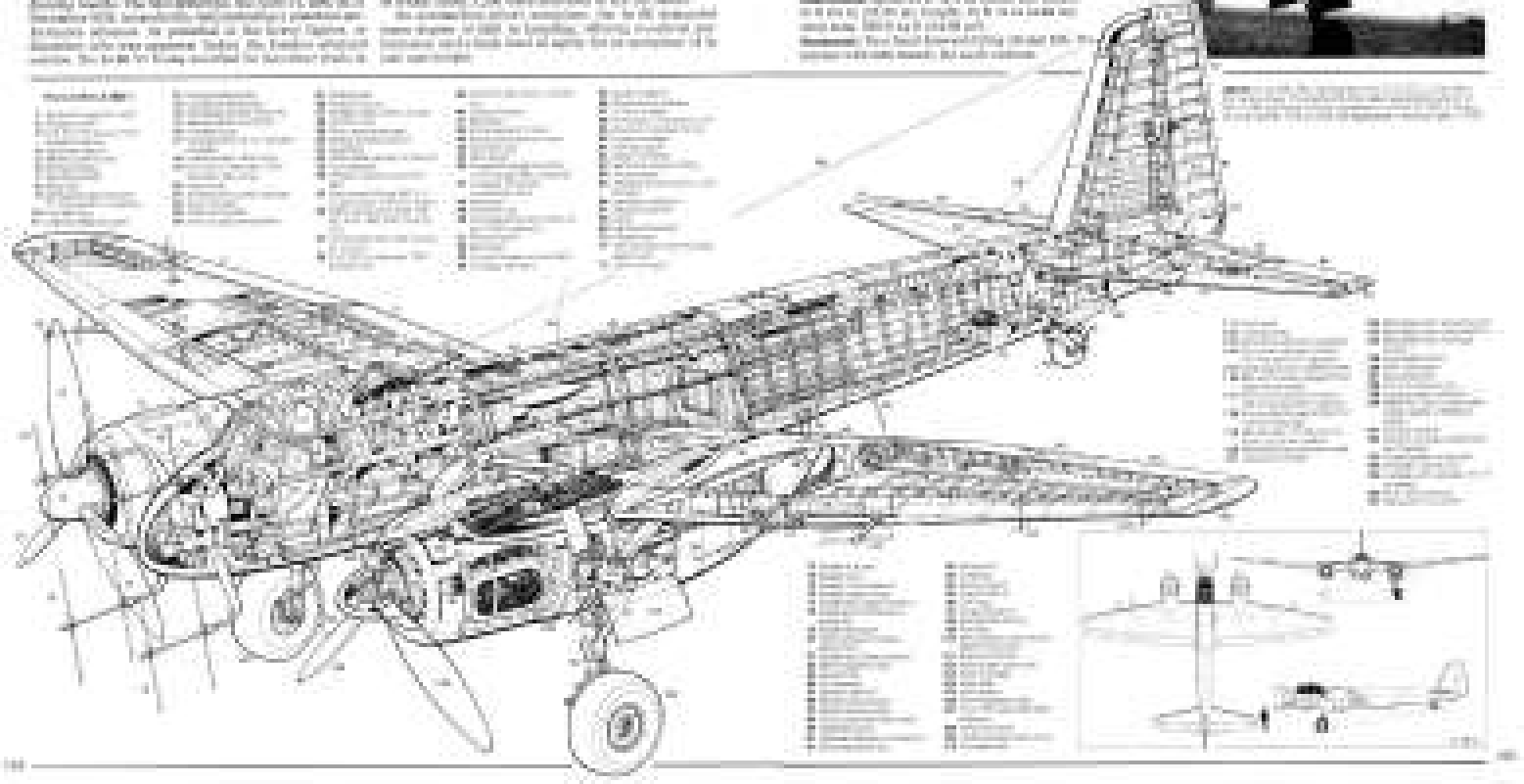


Nakajima Ki.27 (October 1938)





Junkers Ju 88 (December 1938)



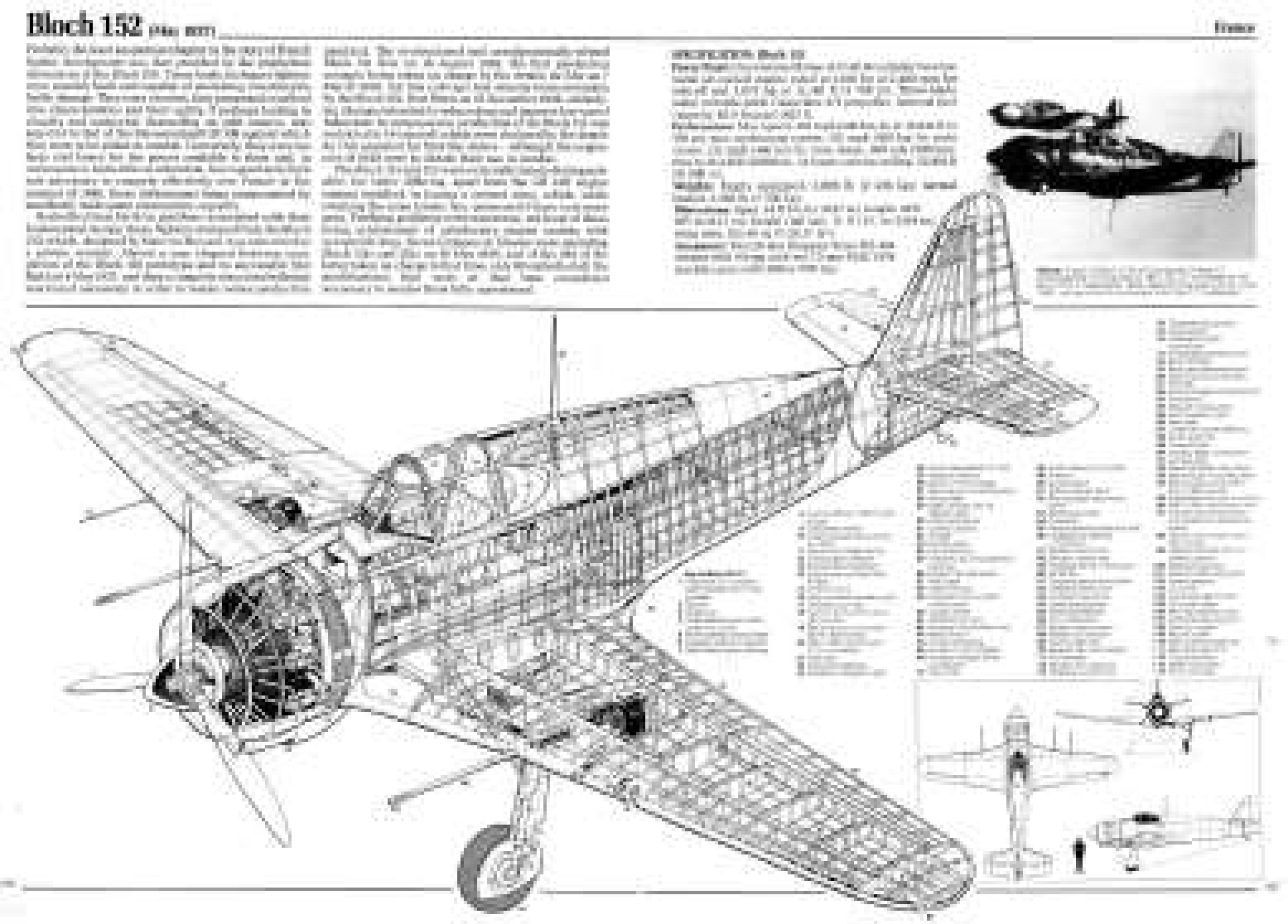
Bloch 152 (Hs 401)

Probably the most successful aircraft flown by the navy of French Indochina, the Bloch 152 was developed from the unsuccessful commercial MB.150 design. Some 1,000 were built, but only a few saw combat during the Japanese takeover of Indochina in March 1945. Others were flown by Vichy French units in Syria, and a number were captured by the Germans when the Armistice was signed in June 1940. Some of these were used by the Luftwaffe, while others were passed on to the Hungarian air force.

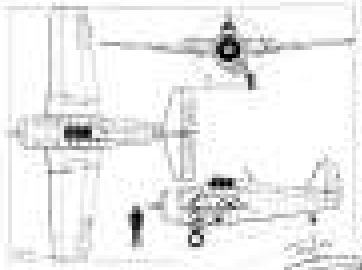
Production of the Bloch 152 was delayed by the need to redesign the rear fuselage and tail unit to overcome directional instability. The prototype first flew on 4 August 1939, but the first production aircraft did not fly until 1 January 1940. Even then, the Bloch 152 was not considered to be entirely satisfactory, and it was not until the fifth production aircraft appeared in March that the type was cleared for service. By the time the Armistice was signed in June 1940, 154 had been delivered to the French air force, and a further 150 were in various stages of completion.

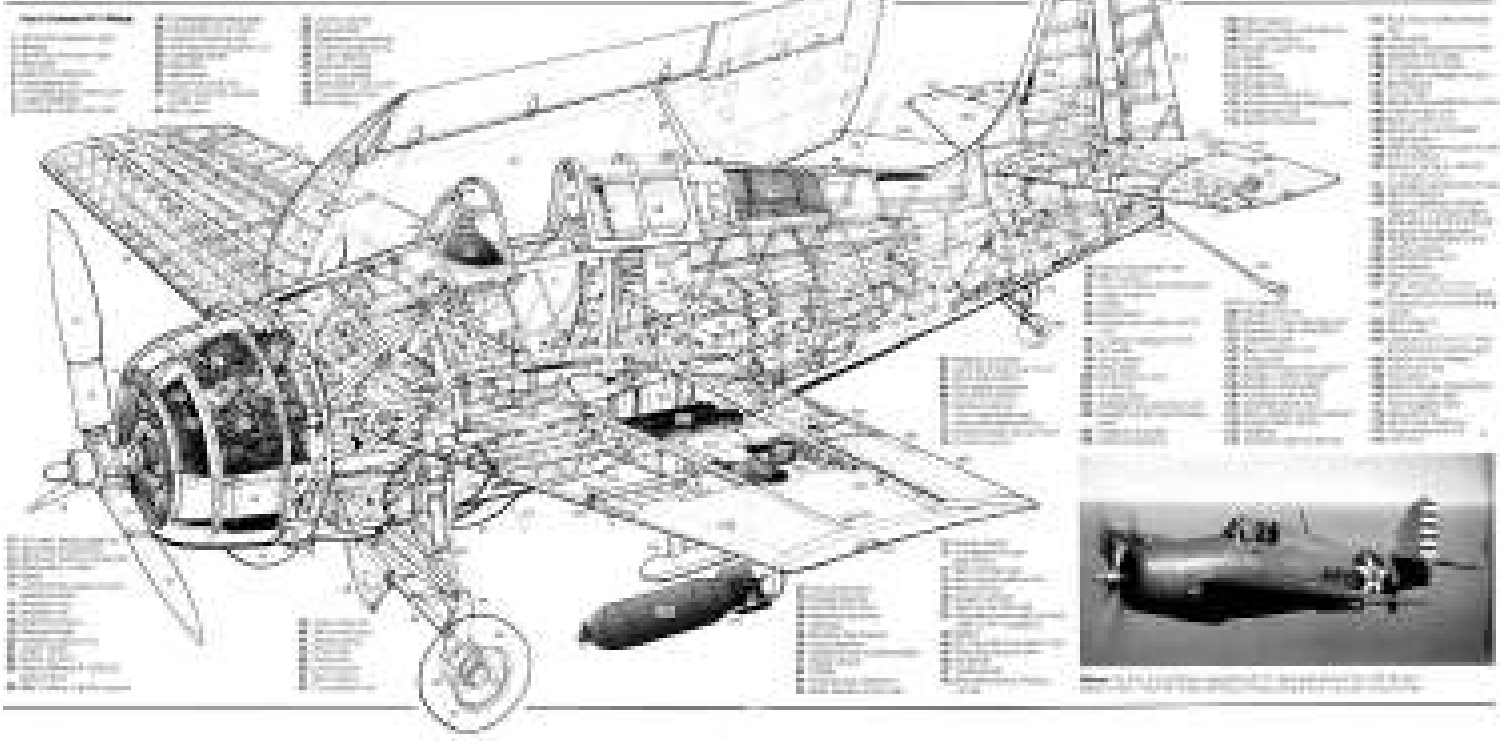
The Bloch 152 was a conventional all-metal cantilever monoplane with a retractable tailwheel undercarriage. The wings were of two-spar construction, with fabric-covered control surfaces. The fuselage was of semi-monocoque construction, with fabric covering over the rear portion. The pilot was provided with an armoured cockpit, and the aircraft was armed with two 20-mm cannon and two 7.5-mm machine guns. Provision was made for a 440-lb (200-kg) bomb load.

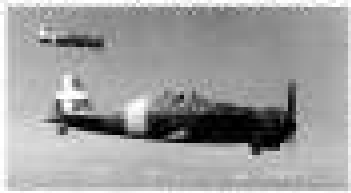
The Bloch 152 was powered by a 1,049-hp Gnome-Rhône 14N-49 radial engine driving a three-bladed propeller. Maximum speed was 323 mph (520 km/h) at 13,125 ft (4000 m), and the aircraft could climb to 16,405 ft (5000 m) in 6 minutes 30 seconds. Range was 497 miles (800 km) at 217 mph (350 km/h) at 13,125 ft (4000 m).

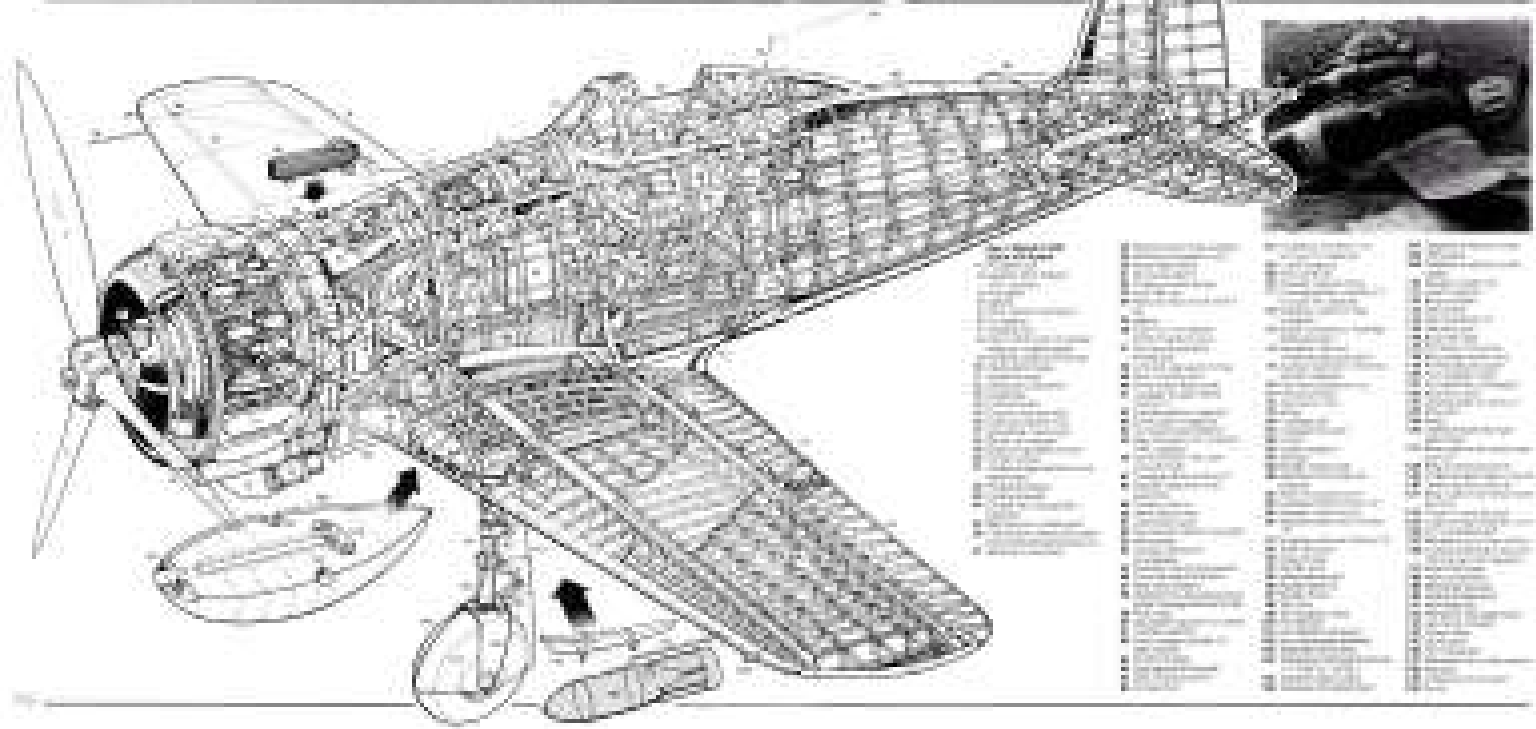


Grumman F4F Wildcat (September 1937)

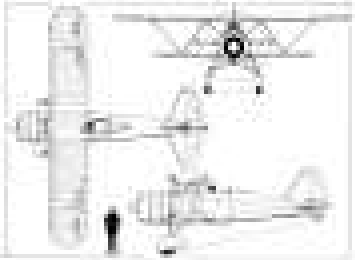


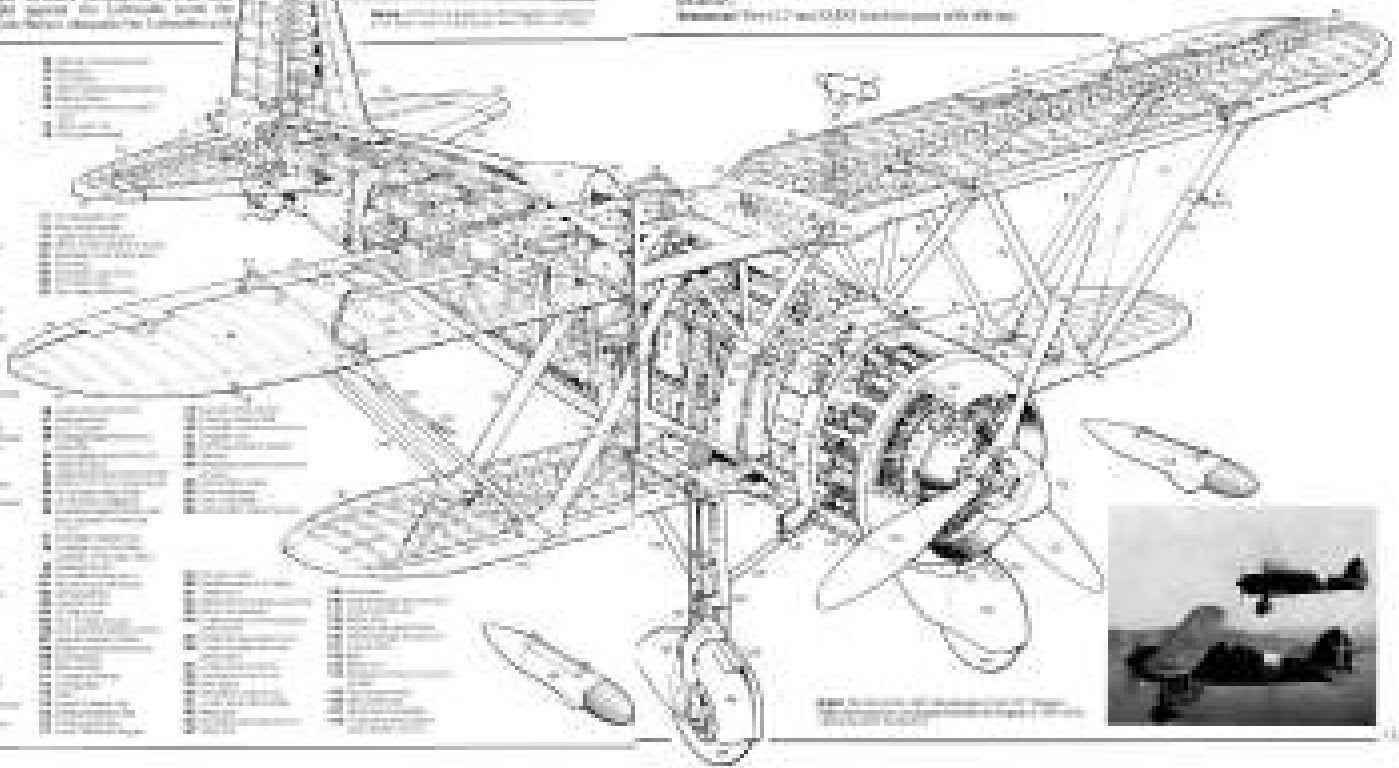




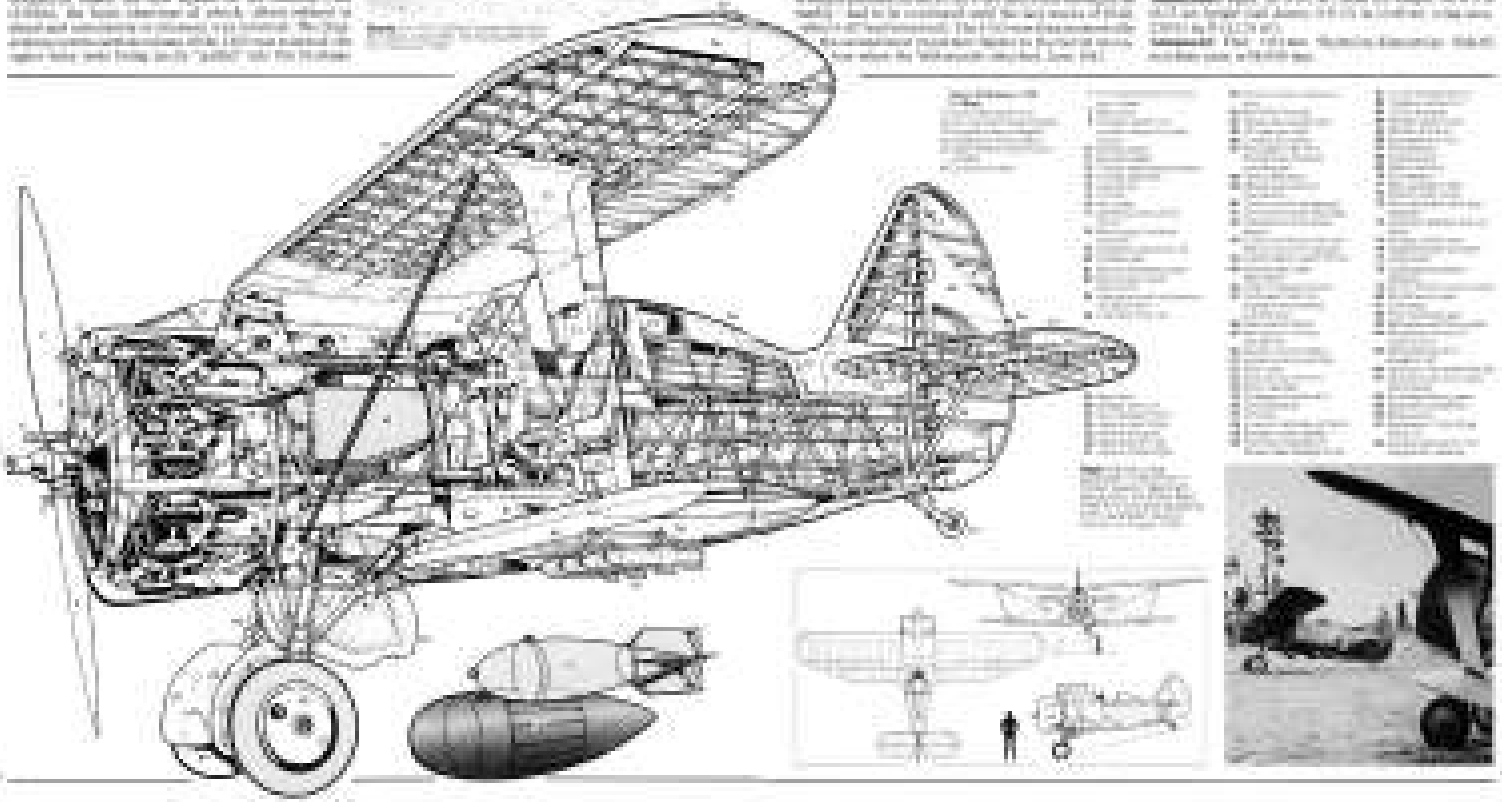


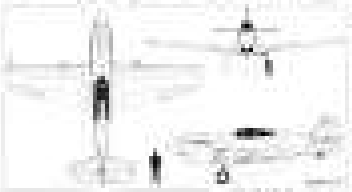
Fiat CR.42 Falco (May 1939)

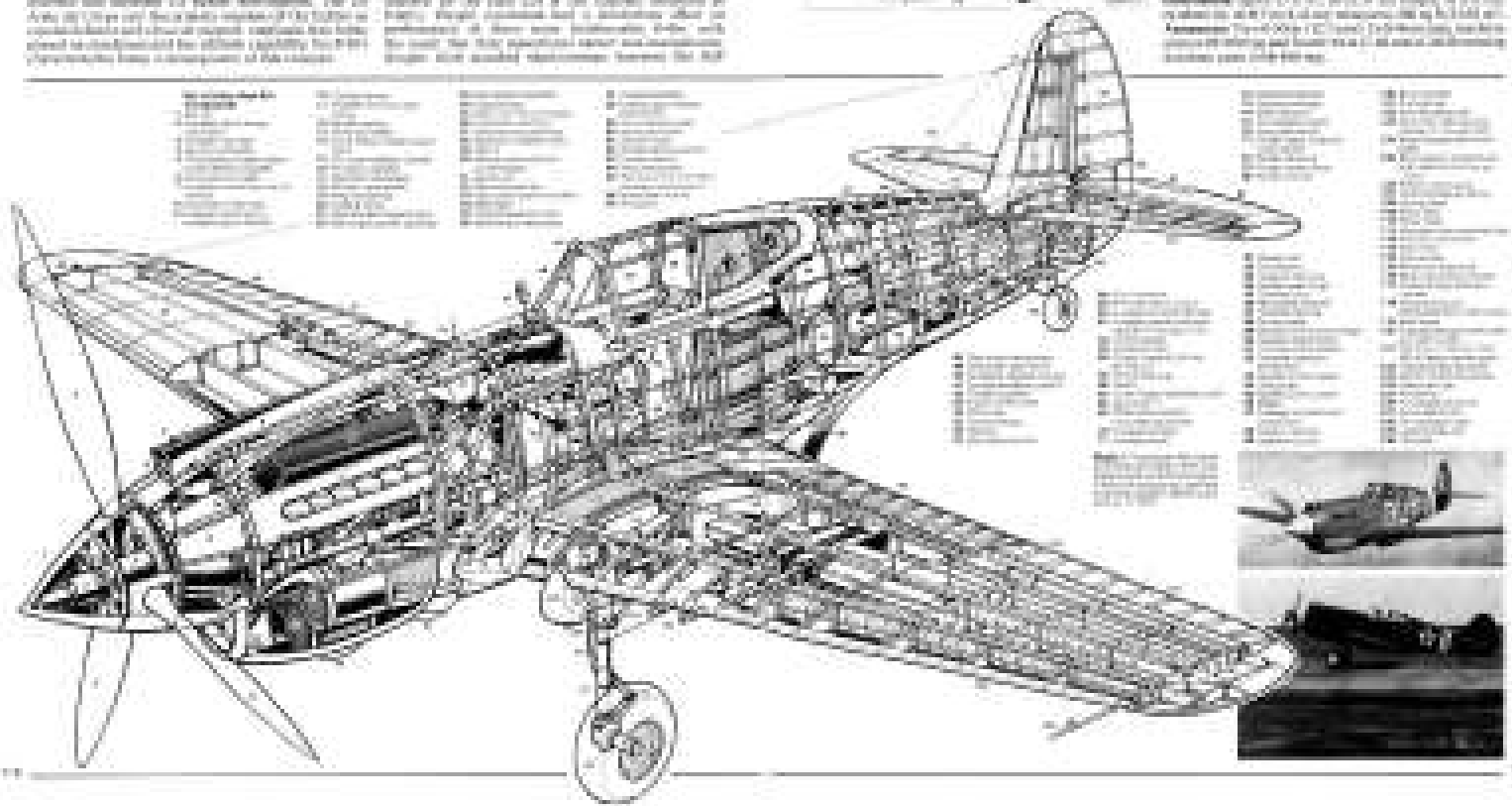


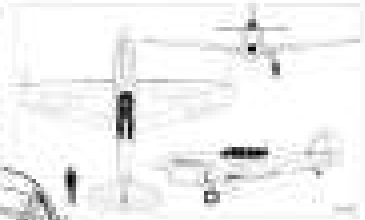


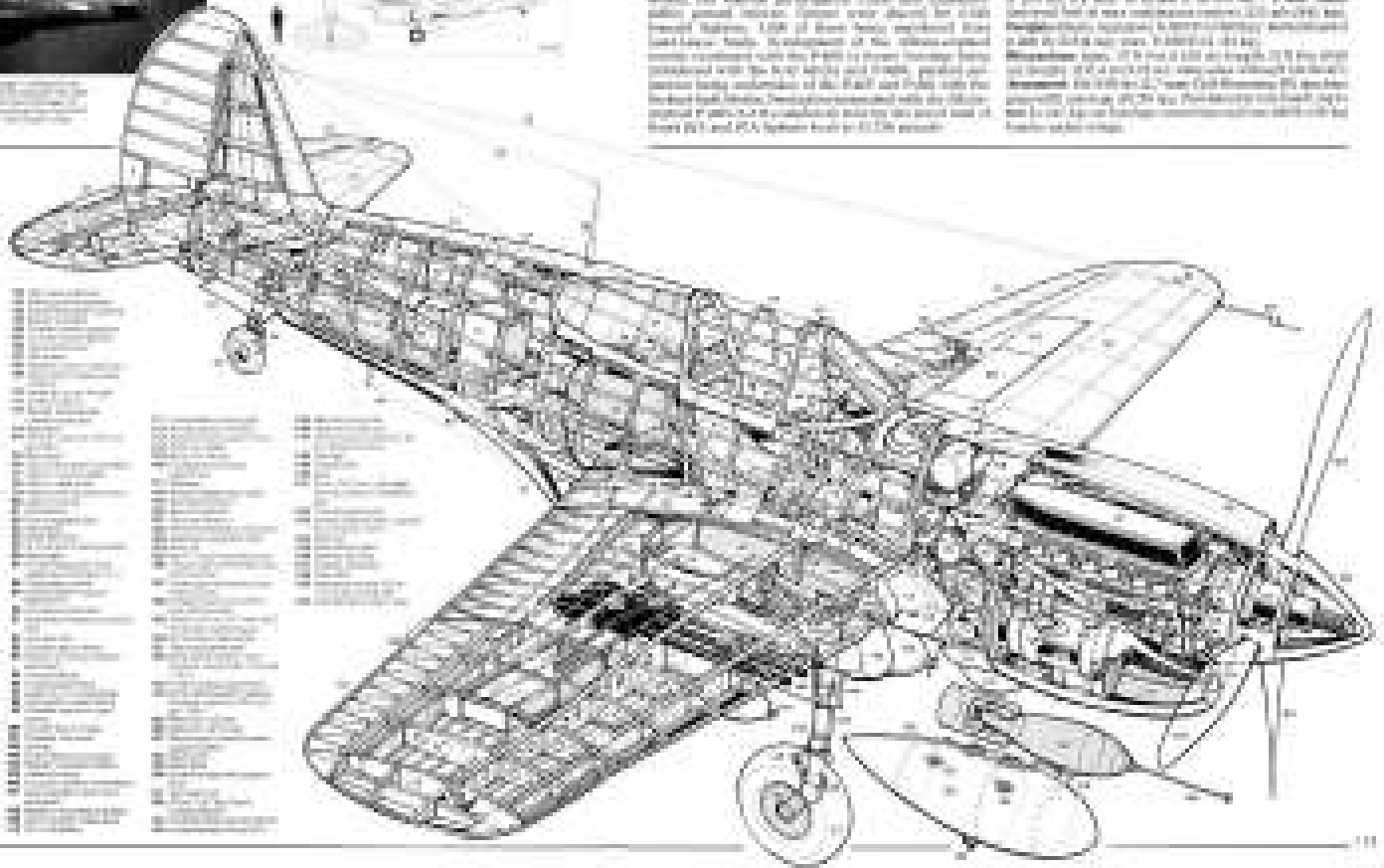
Polikarpov I-153 (gull wing)



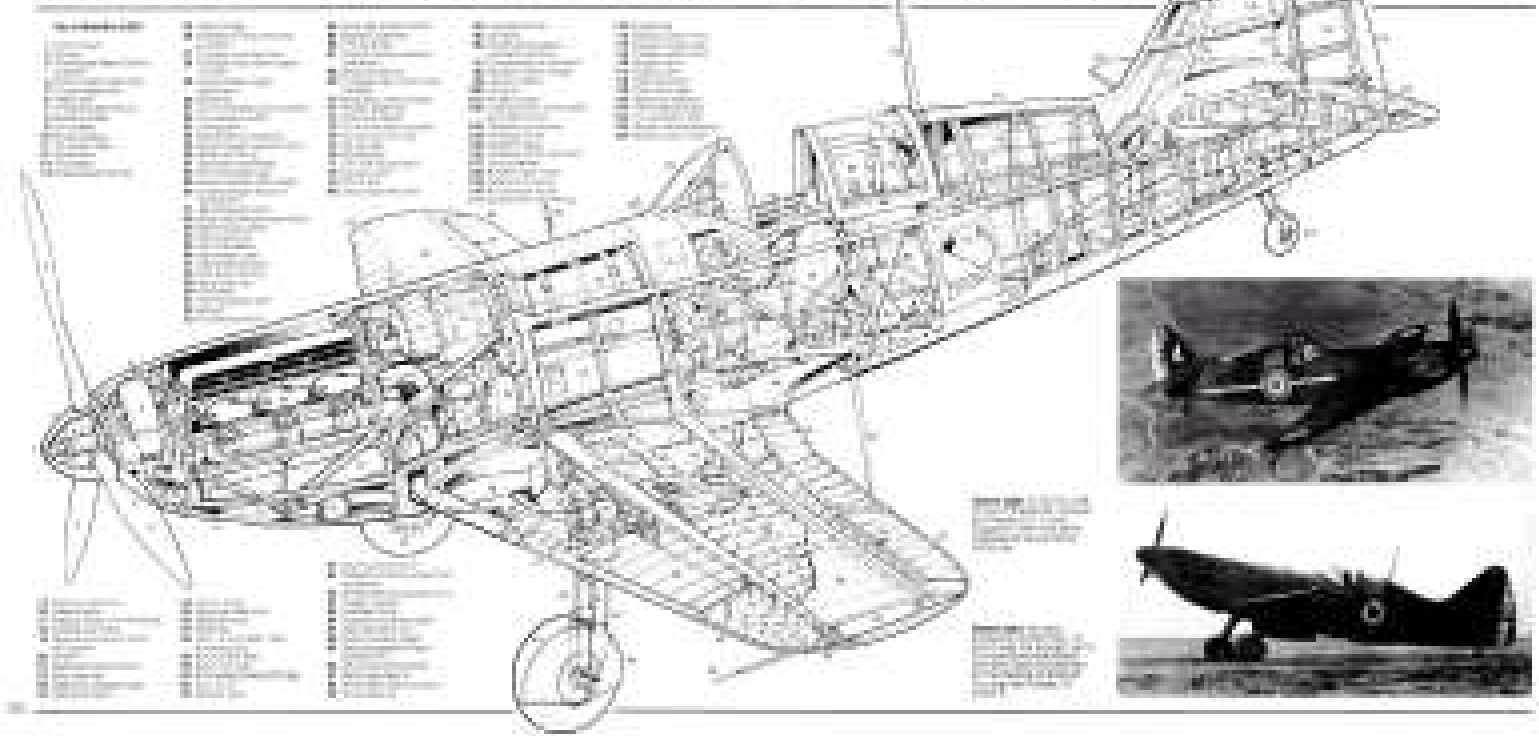


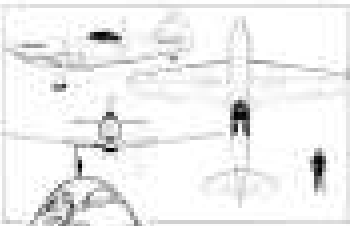




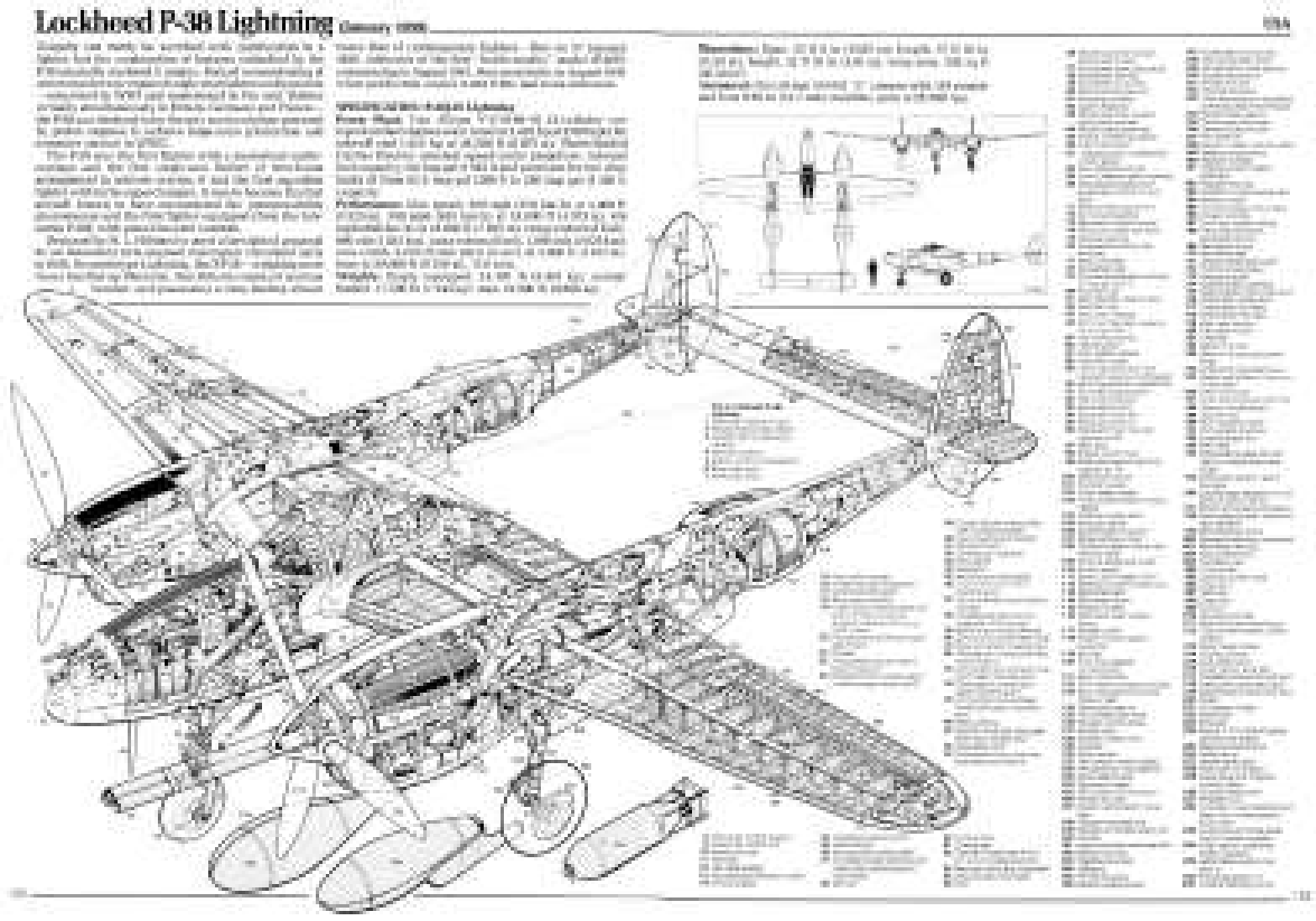


Dewoitine D 520 (October 1938)





Lockheed P-38 Lightning (January 1939)



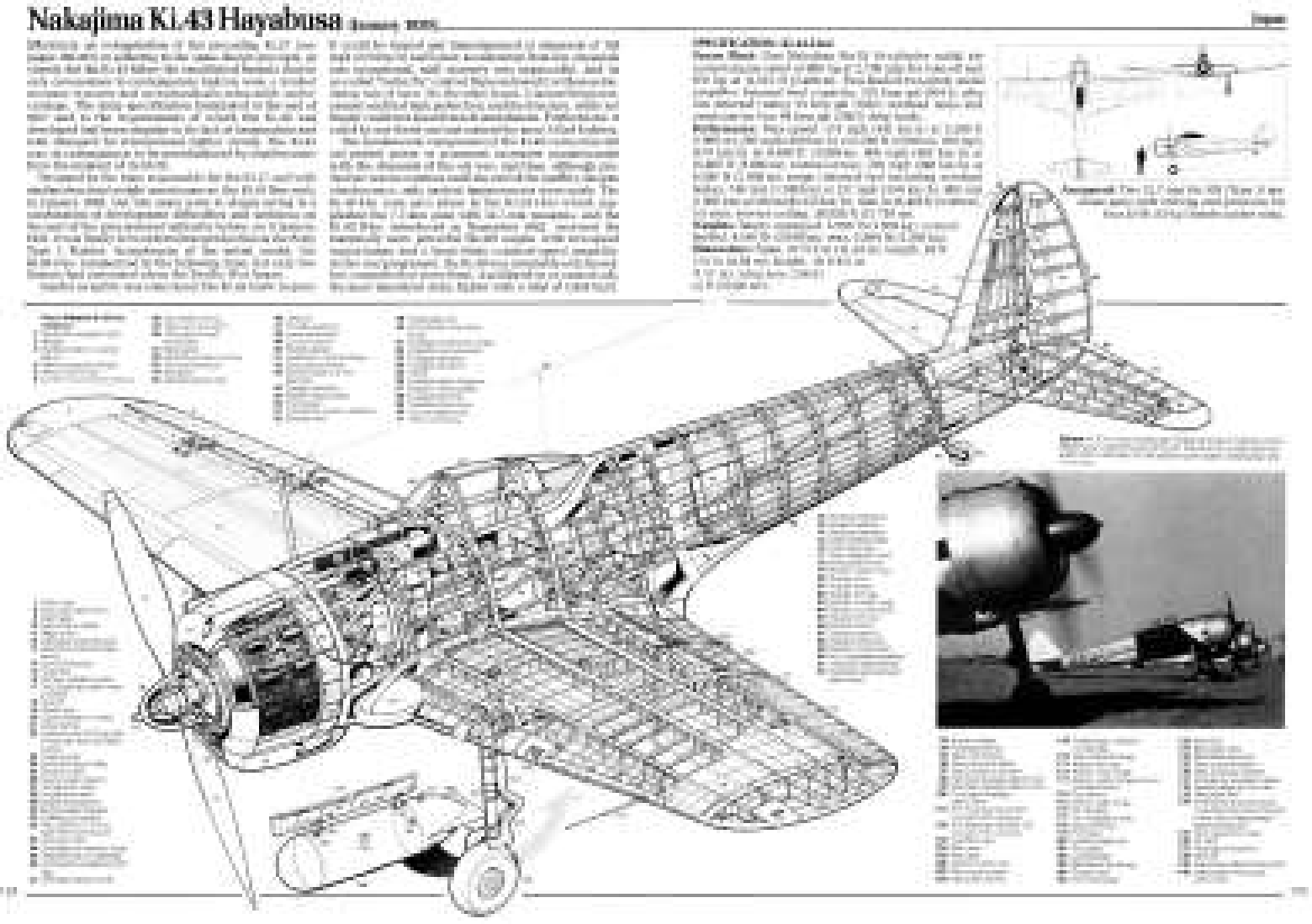
Nakajima Ki.43 Hayabusa (Oscar) 隼

Officially an evolutionary development of the unsuccessful Ki.27 (see pages 388-389), the Ki.43 Hayabusa (Peregrine Falcon) was, in reality, the first of a new generation of Japanese fighters. Designed around the same engine as the Ki.27, it was a much smaller, lighter and more agile aircraft, with a wing loading that was almost double that of its predecessor. Its performance was outstanding, and it was ordered into production as the Army Type 1 Fighter. Nicknamed Oscar by the Allies, it was the most widely used Japanese fighter of the Second World War.

Design of the Ki.43 began in 1937, and the first prototype flew in January 1939. Test pilots praised its manoeuvrability, but criticised its poor stability and lack of protection for the pilot and fuel tanks. Despite these shortcomings, the Army ordered the aircraft into production as the Type 1 Fighter. Nicknamed Oscar by the Allies, it was the most widely used Japanese fighter of the Second World War.

Deliveries to units began in December 1941, and the Ki.43 saw action during the attack on Pearl Harbor. It was soon encountered in large numbers over the Philippines, Malaya and the Dutch East Indies, where its superior manoeuvrability and climb rate gave it a clear advantage over the Allied fighters of the time. However, its lack of armour and self-sealing fuel tanks made it vulnerable to damage, and its relatively low speed and poor diving characteristics became increasingly disadvantageous as the war progressed.

Despite these shortcomings, the Ki.43 remained in production until the end of the war, with a total of 5,919 built. It was also exported to the Soviet Union and Thailand, and was used by the Japanese Army Air Force in the defence of the Japanese home islands against the B-29 Superfortress bombers. The Ki.43 was withdrawn from front-line service in 1945, but a few examples were captured by the Allies and tested in the United States and Britain.



Mitsubishi A6M Reisen (April 1945)

The philosophy of maximising the most vital weight consideration in order to achieve the ideal balance between speed, range and manoeuvrability fighter specification, which called for the Navy Ministry in late 1937 was simple. To the extent that it pursued to the development of a new aircraft that would be the Zero Fighter. Within little more than two years of the specification's issue the Zero Fighter, known by the Allies as the Zero, was in service with the Imperial Japanese Navy. It was to be the greatest fighter aircraft of the Pacific War. It was to be the first aircraft to be designed with the pilot in mind. It was to be the first aircraft to be designed with the pilot in mind. It was to be the first aircraft to be designed with the pilot in mind.

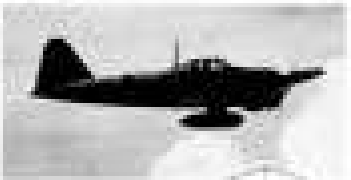
Introduced in to service with the Imperial Japanese Navy Air Service in April 1940, the A6M was a natural development of the Navy Type 96 Carrier Fighter. In late 1940, the Navy issued a specification for a new fighter to replace the Type 96. The new fighter, designated A6M, was to be a carrier-based fighter with a range of 1,200 miles and a speed of 300 mph. The Mitsubishi A6M was the first aircraft to be designed with the pilot in mind. It was to be the first aircraft to be designed with the pilot in mind. It was to be the first aircraft to be designed with the pilot in mind.

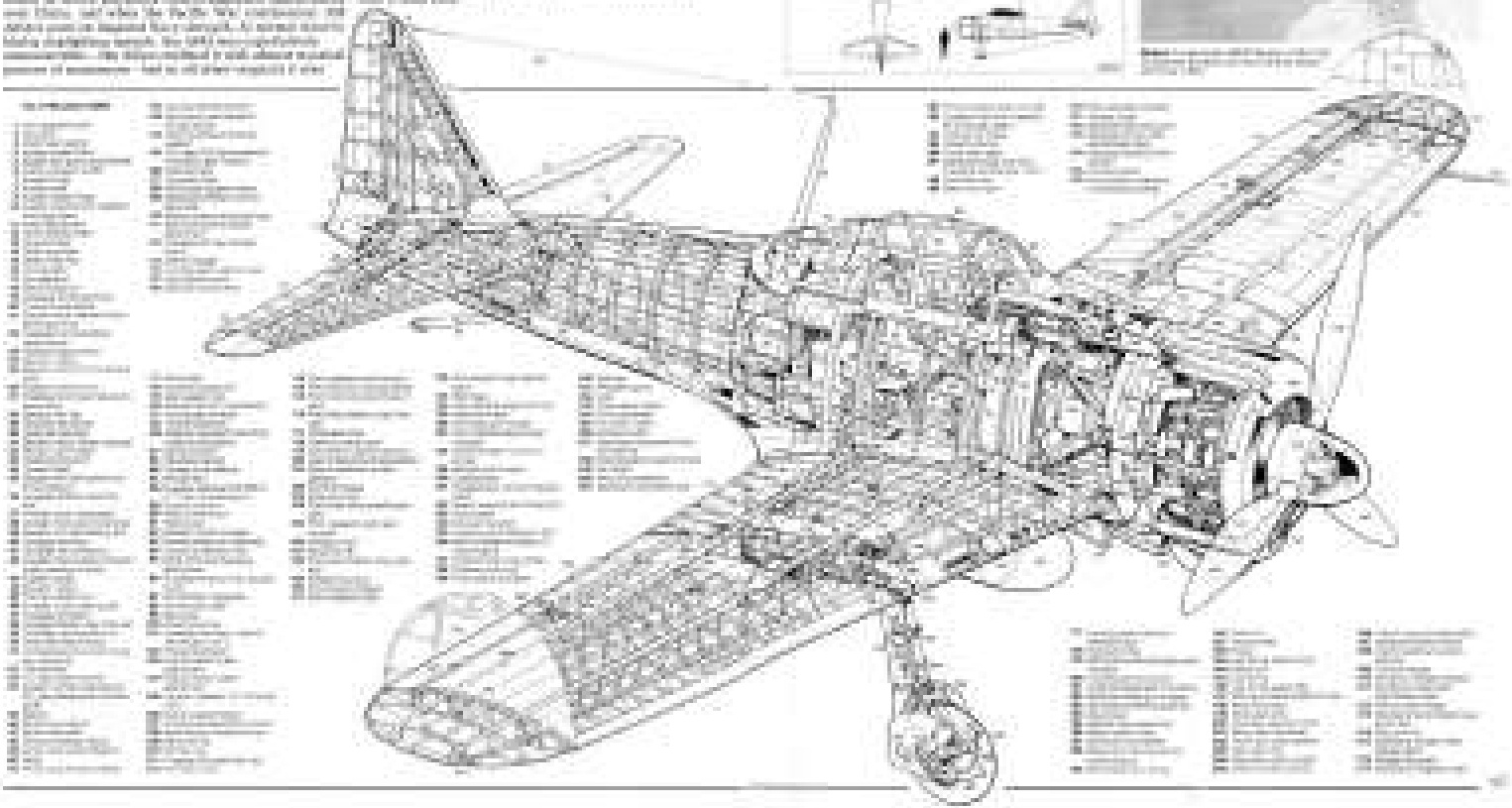
Performance: Max speed, 316 mph (508 km/h) at 14,830 ft (4,520 m); cruising speed 207 mph (333 km/h); range (with two 132 lb (60 kg) bombs) 1,930 miles (3,105 km); service ceiling 33,790 ft (10,300 m); rate of climb 2,625 ft/min (800 m/min); take-off run 1,312 ft (400 m); landing run 1,640 ft (500 m).

Weights: Empty, equipped 3,704 lb (1,680 kg); normal loaded 5,313 lb (2,410 kg); max overload 6,164 lb (2,796 kg).

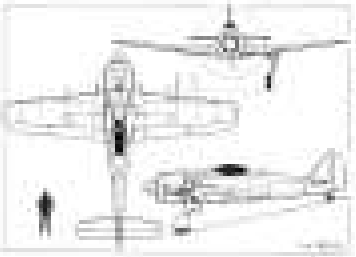
Dimensions: Span 39 ft 4½ in (12.00 m); length 29 ft 9¼ in (9.07 m); height 10 ft 0 in (3.05 m); wing area 229.8 sq ft (21.30 m²).

Armament: Two 20 mm Oerlikon Type 99 Mk 2 (Model 1) cannon with 60 rpg and two 7.7 mm Type 97 machine guns with 500 rpg.

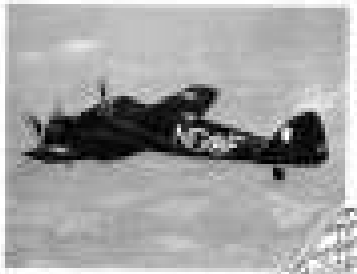


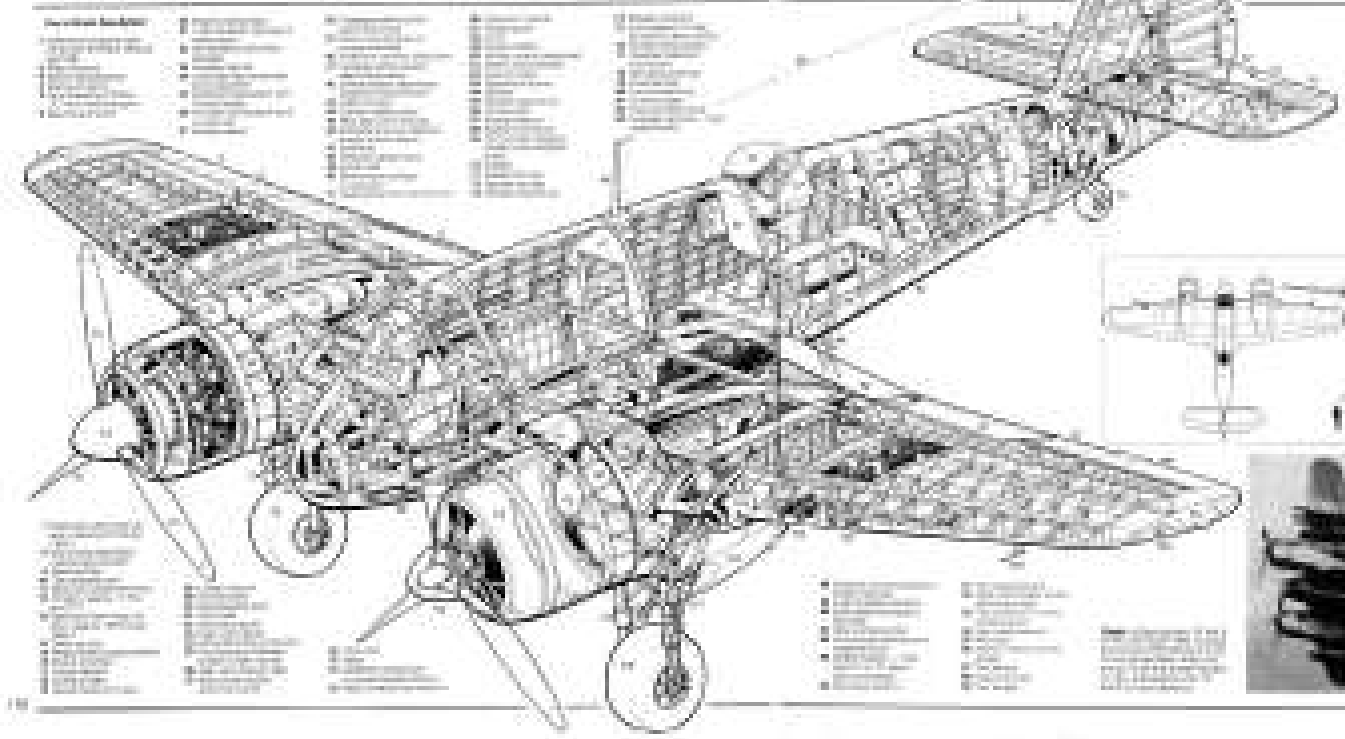


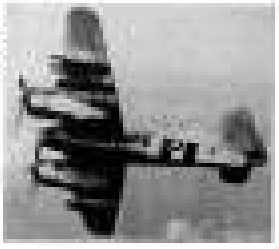
Focke-Wulf Fw 190 [illegible]



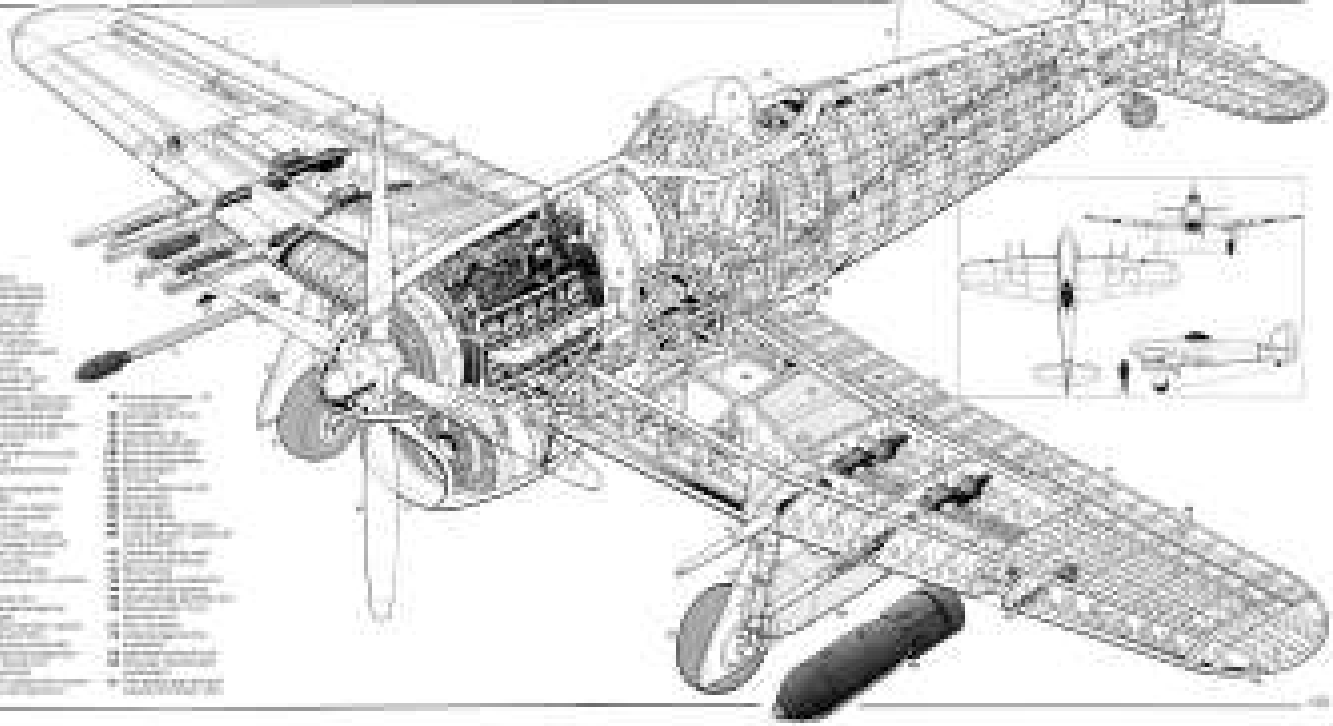
Bristol Beaufighter (July 1939)



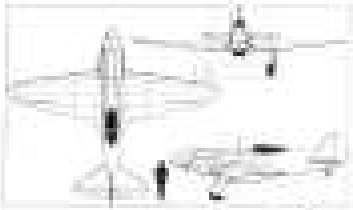


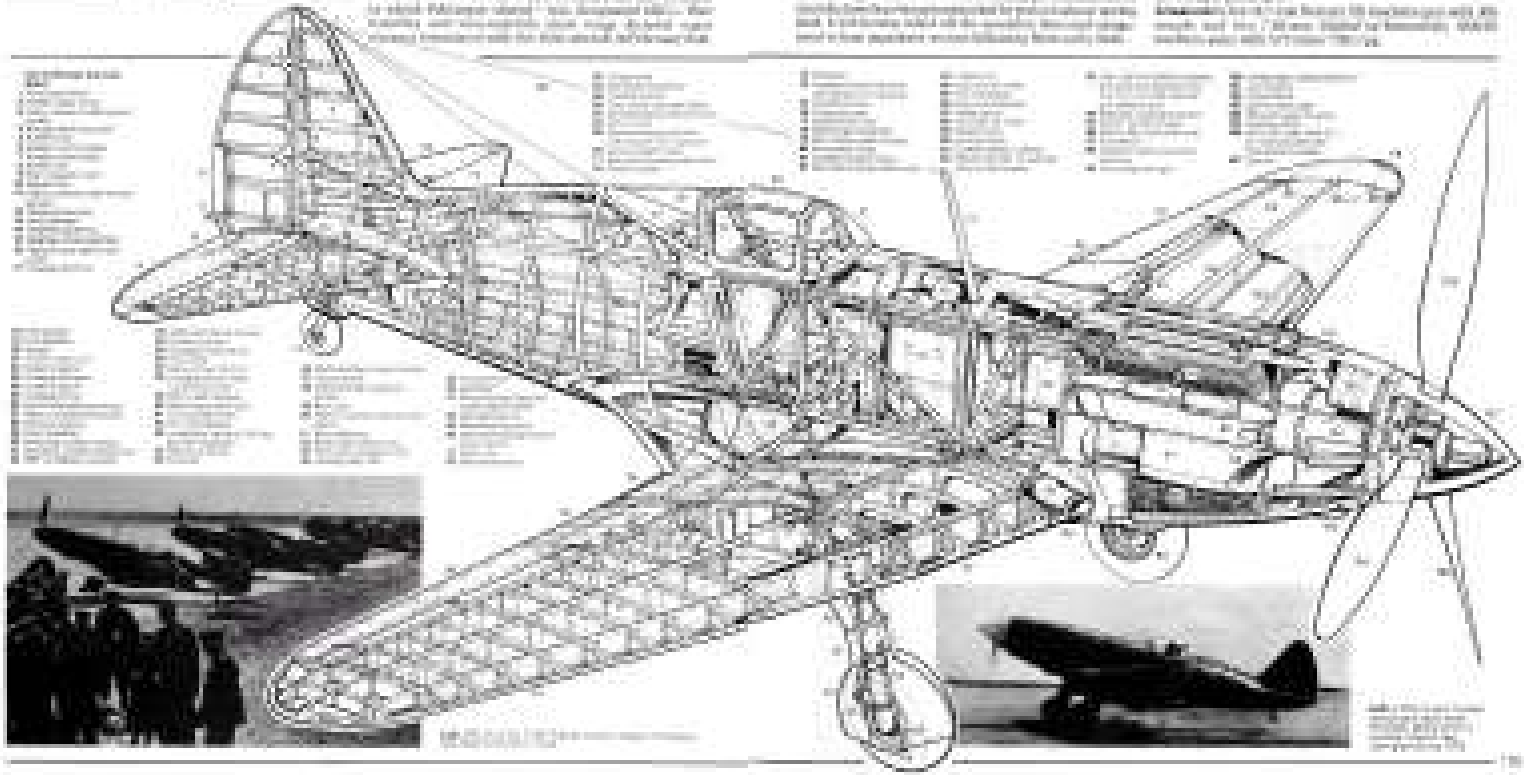


Hawker Typhoon (February 1943)

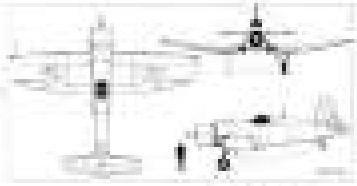


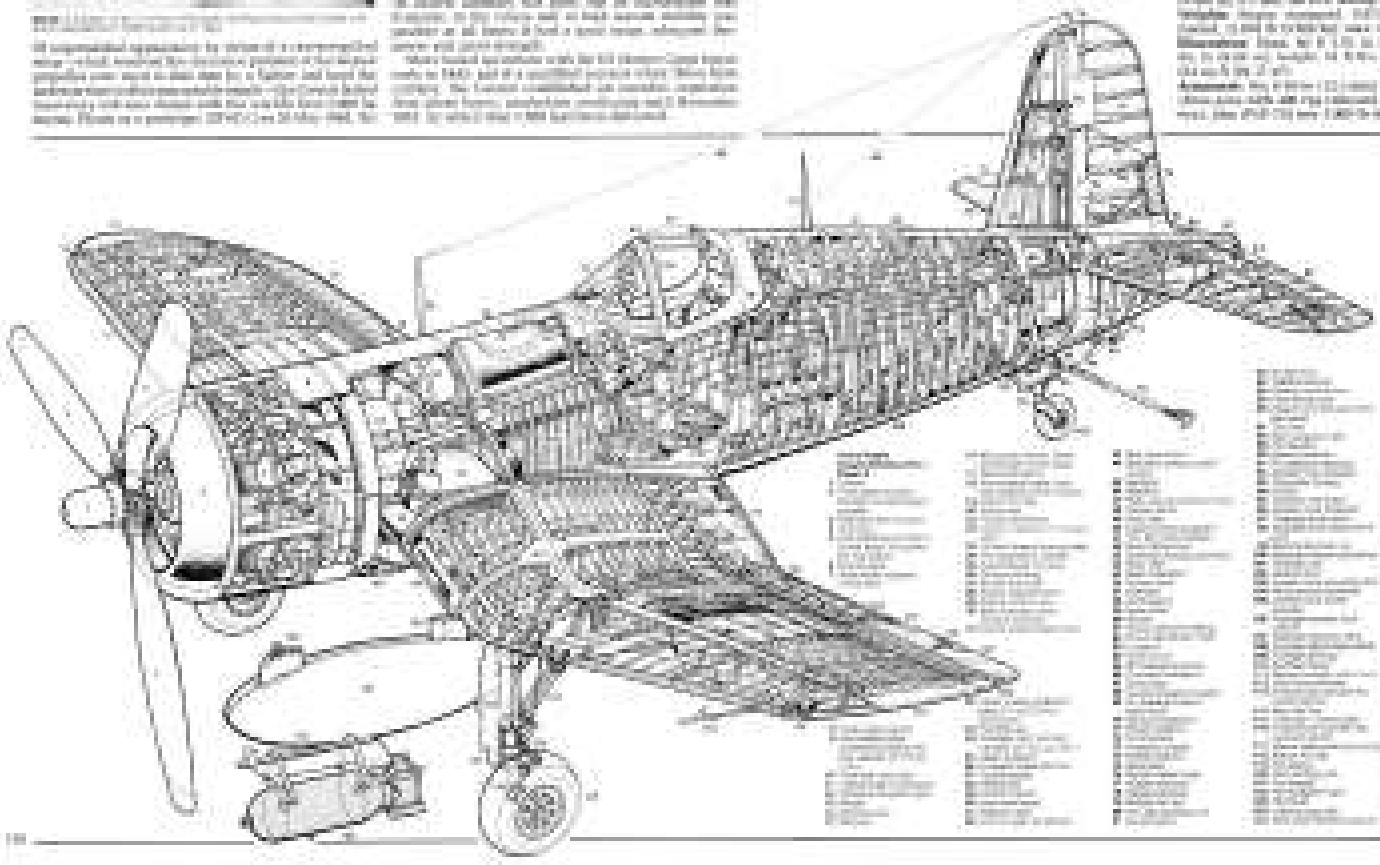
Mikoyan-Gurevich MiG-3 (Izd 9)



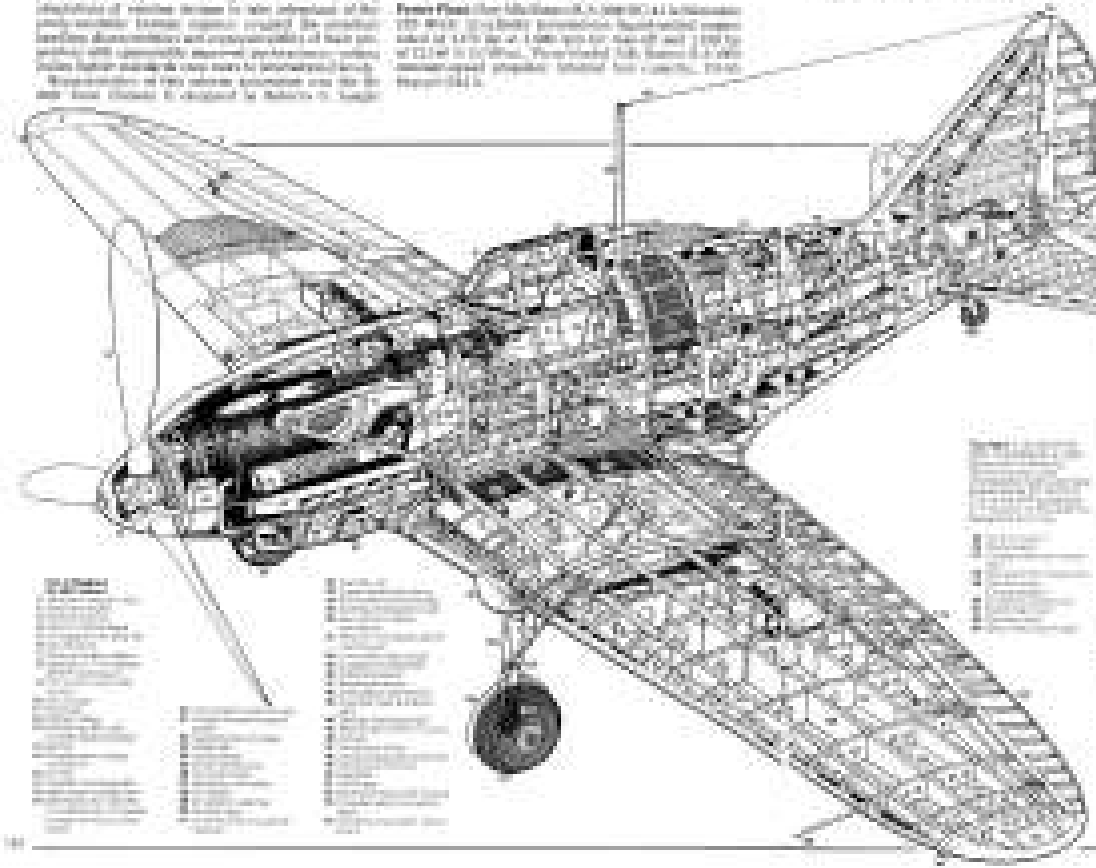


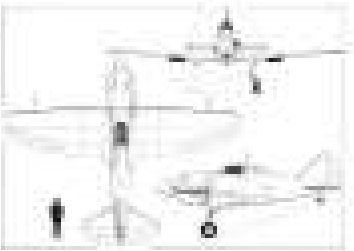
Vought F4U Corsair (May 1938)

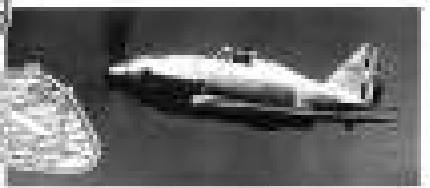




Reggiane Re 2001 Falco II Italy 1940

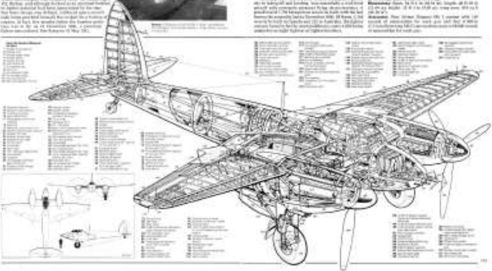






North American P-51 Mustang (October 1945)

De Havilland Mosquito (November 1940)



SPECIFICATION: Mosquito F Mk II

Power Plant:

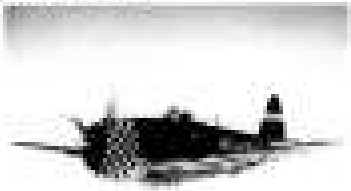
Performance:

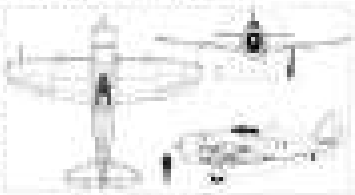
Weights:

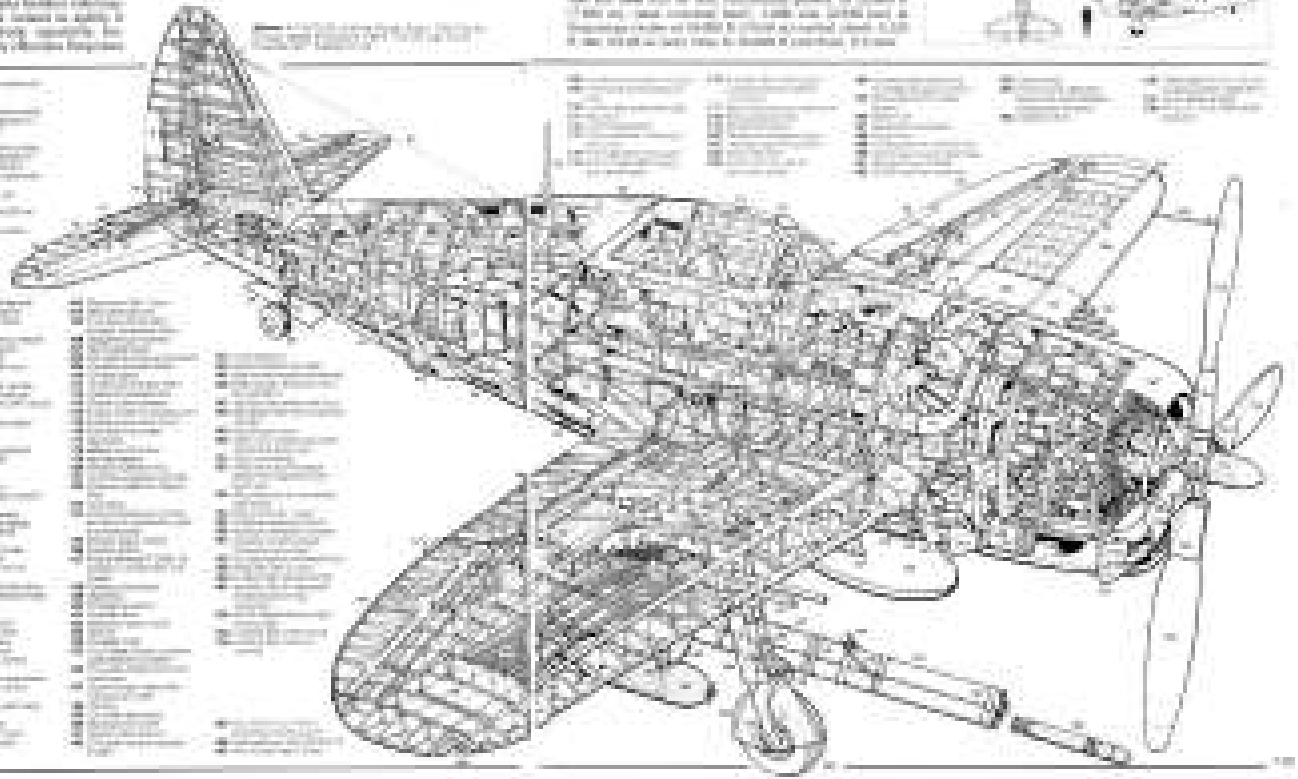
Dimensions:

Armament:

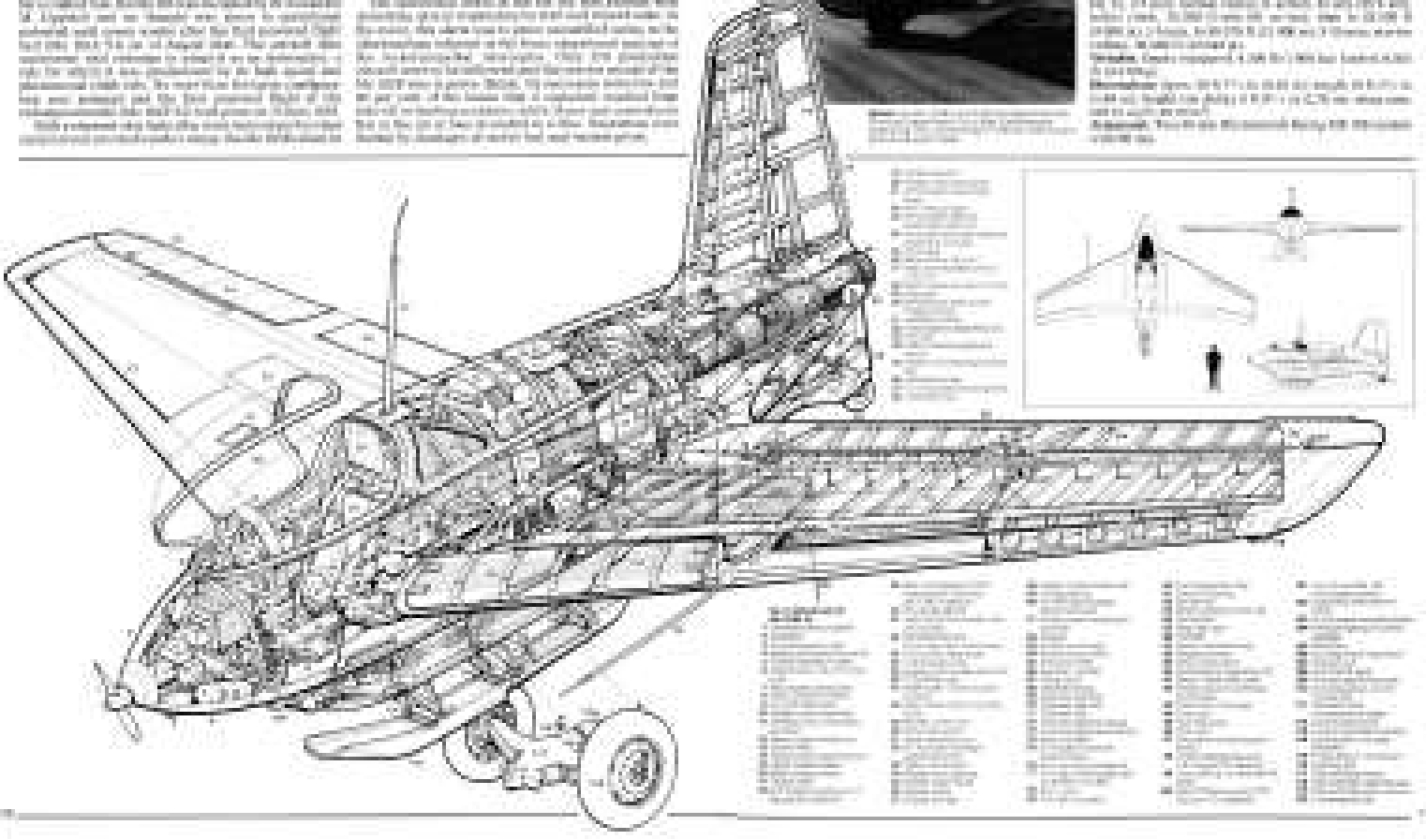
Republic P-47 Thunderbolt (May 1944)







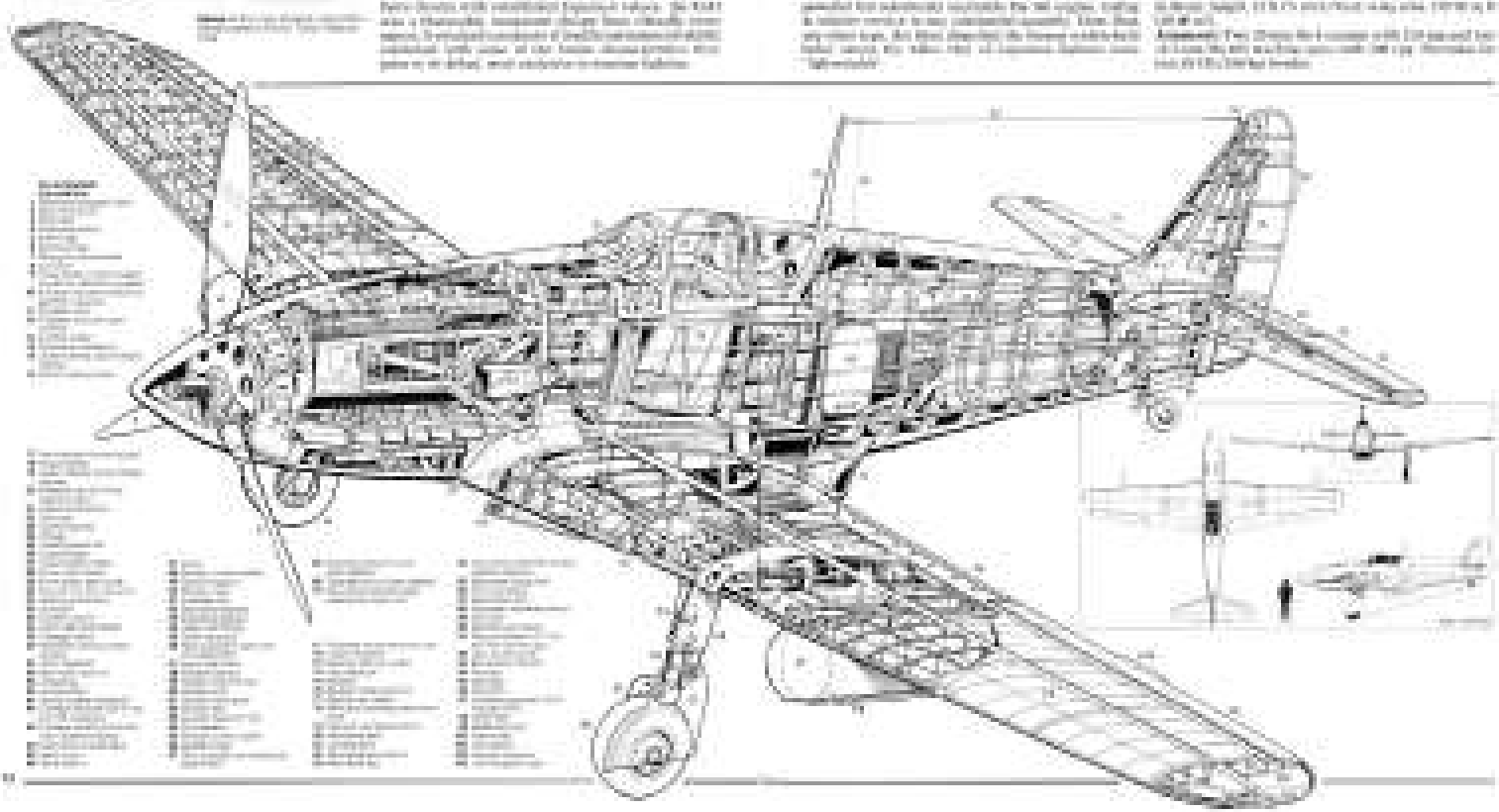
Messerschmitt Me 163 (August 1941)



Kawasaki Ki.61 Hien (December 1941)

The all-new Japanese Army interceptor Ki.61 of the 244th Hien (Swallow) squadron poised on runway in light snow, Hokkaido, Japan, in mid-winter the final segment of the above photographed series of the preparations of pilots and crew of this first operational Japanese fighter equipped with liquid-cooled engine and retractable undercarriage.

Probably of all the aircraft of warplanes of combat with the Soviet Air Force the Kawasaki Ki.61 Hien (Swallow) occupied a unique position. Although it was not the most powerful, most manoeuvrable, most heavily armed or most heavily armoured aircraft in the world, it was the only one which combined all of these characteristics in a single airframe. Its performance was not outstanding in any one respect, but it was good in all respects. It was a well-balanced aircraft which could be flown by pilots of average skill and experience, yet which could also be flown to the limit of its performance by experienced pilots. It was a reliable aircraft which could be maintained in the field by ground crews of average skill and experience, yet which could also be maintained by experienced ground crews to the highest standards of efficiency. It was a versatile aircraft which could be used for a variety of roles, yet which could also be used for a single role to the exclusion of all others. It was a modern aircraft which could be produced in large numbers by mass-production methods, yet which could also be produced in small numbers by craftsmen. It was a simple aircraft which could be flown by pilots of average skill and experience, yet which could also be flown to the limit of its performance by experienced pilots. It was a reliable aircraft which could be maintained in the field by ground crews of average skill and experience, yet which could also be maintained by experienced ground crews to the highest standards of efficiency. It was a versatile aircraft which could be used for a variety of roles, yet which could also be used for a single role to the exclusion of all others. It was a modern aircraft which could be produced in large numbers by mass-production methods, yet which could also be produced in small numbers by craftsmen.



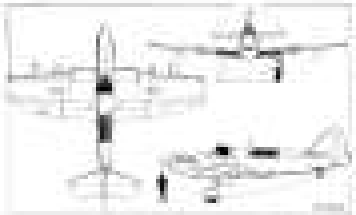
Fairey Firefly (December 1942)

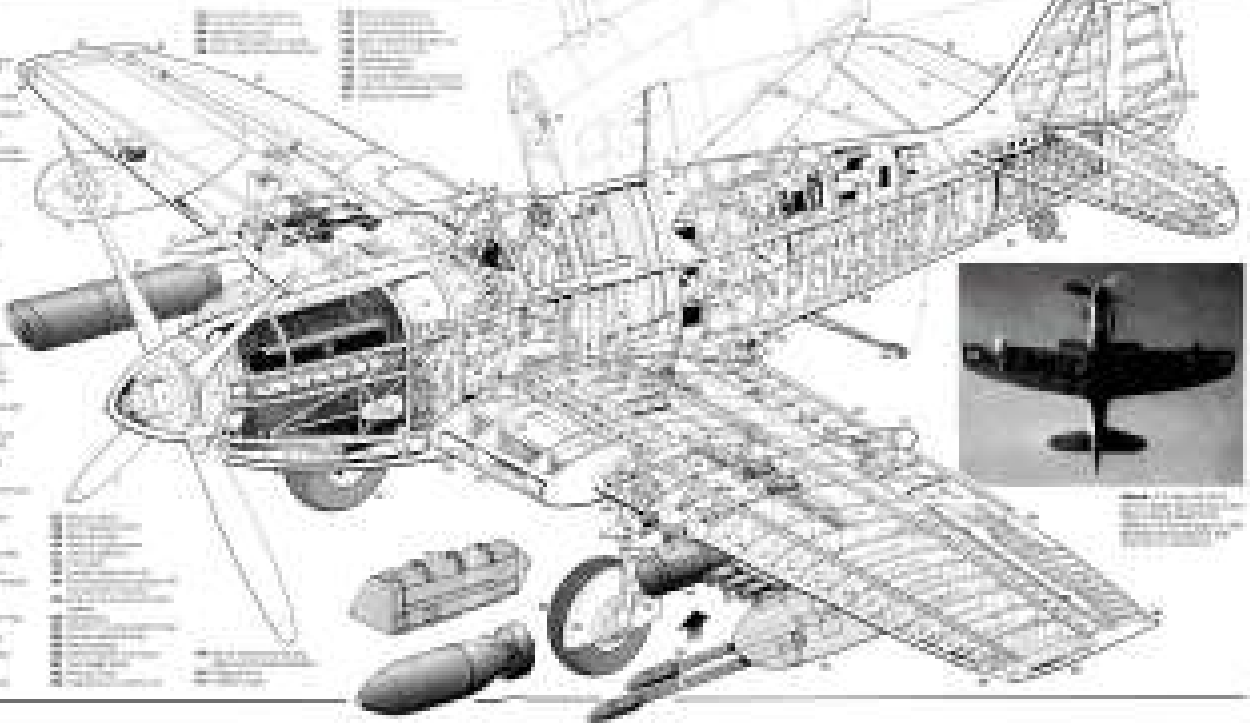
Carrying forward into naval service combined reconnaissance/fighter development by the same, the Firefly was developed for general reconnaissance duties in addition to its primary role as a fighter. Operational use was confined to the Pacific theatre, where it served with distinction. Considered as a useful and versatile aircraft, the Firefly was also used by the Royal Australian Air Force and Royal New Zealand Air Force after the war. Production ceased in 1955, by which time 1,702 had been built.

Fairey Aviation Company, Limited, Hayes, Middlesex

Fairey Aviation Company, Limited, Hayes, Middlesex

Fairey Aviation Company, Limited, Hayes, Middlesex



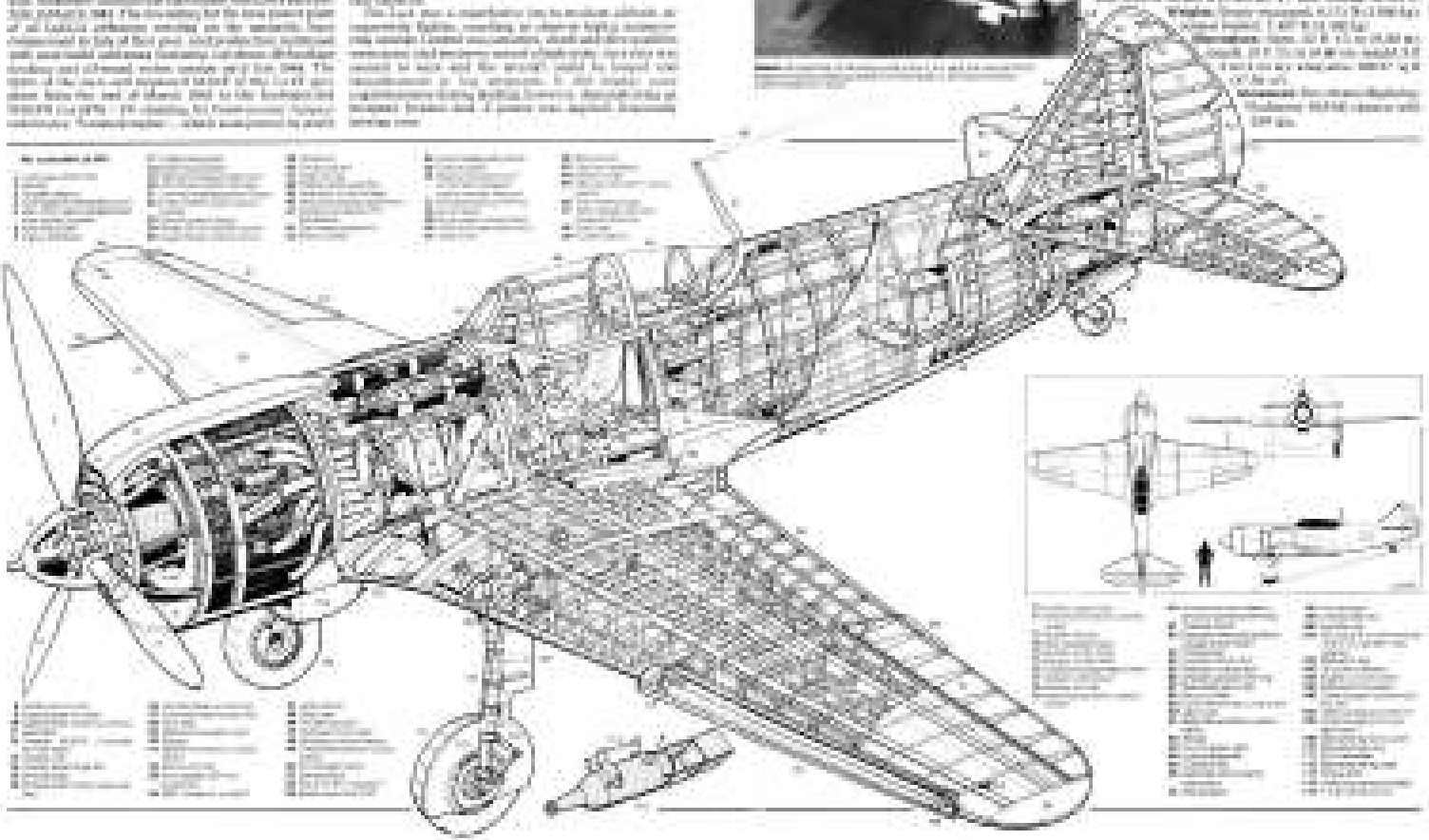


Lavochkin La-5 (March 1942)

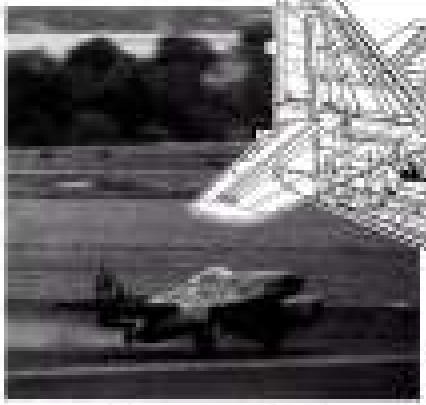
The leading role on all medium sized engines of a fighter aircraft designed exclusively for a liquid-cooled inline engine (Liquid or a model of this) engines that had been delivered. Without the knowledge of the Soviet Union's engineers, but such tailor-built machine engines have allowed aircraft. The most outstanding feature of the concept was the use of single row construction as a result of overcoming the inevitable compromise between these two design features created by Semyon A. Lavochkin.

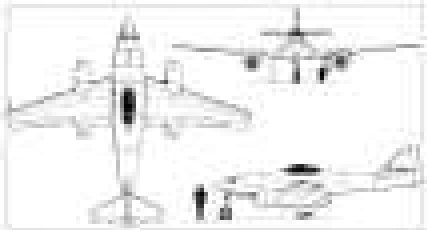
The adaptation of the Lavochkin airframe for the American radial engines from the manufacturer's of Lavochkin's design bureau, Shvetsov, resulted in the well-known and effective La-5, which entered in 1942. The conversion for the new powerplant of an existing prototype entailed on the aerodynamic lines compromised to fully of this good, and produced first-rate aircraft with good handling characteristics. Combination of fuselage armament and of forward engine cowling and fuel tank. The speed of the new aircraft prompted a redraft of the La-5 and above those the need of March 1942 to the fuselage and wings of the La-5FN. The modified La-5 FN was powered by a Shvetsov M-82 engine with a single-stage, two-speed supercharger. Armament was increased by providing two 20-mm ShVAK cannon with 200 rounds per gun. Fuel capacity was increased by the addition of a 100-litre (22-Imp gal) tank behind the pilot's seat. Production of the La-5FN began in the autumn of 1942 and by the end of the year 1,182 had been built. Deliveries continued throughout 1943, by which time 2,496 had been built. Deliveries continued throughout 1943, by which time 2,496 had been built.

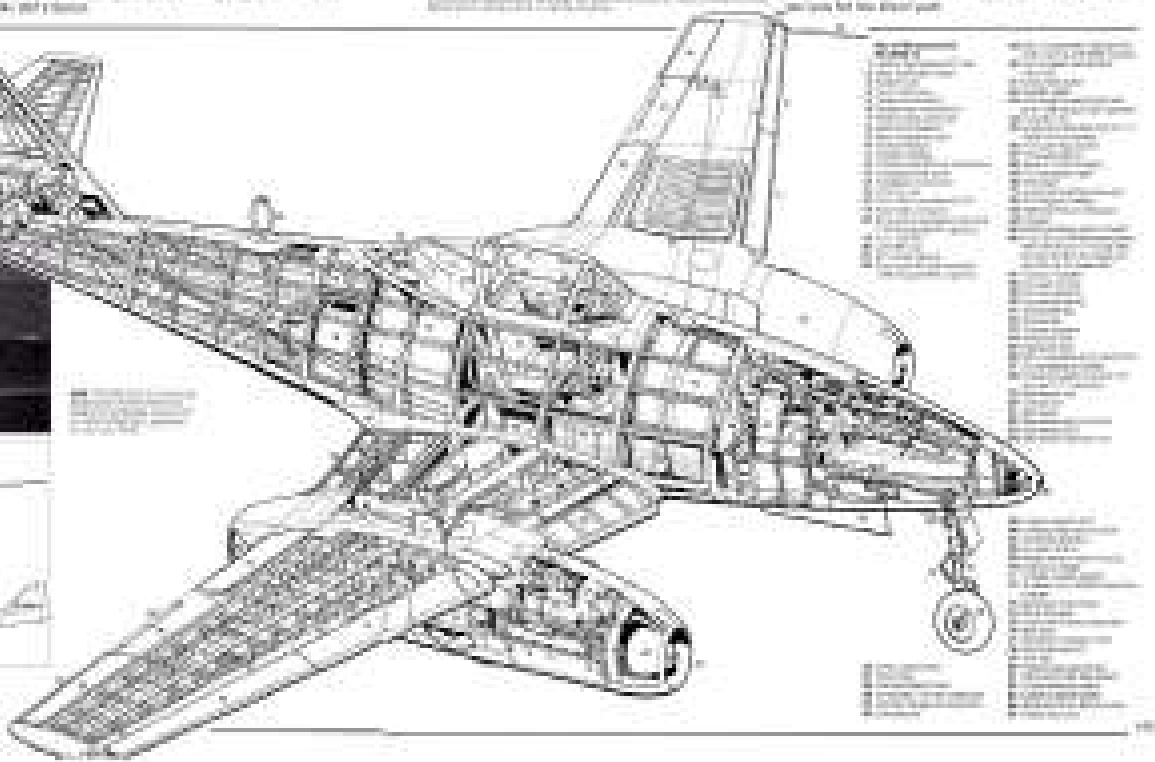
The La-5 was, incidentally, the last aircraft to be designed by Lavochkin. He died in 1960. The La-5 was produced in large numbers and was used by the Soviet Air Force and by the Soviet Union's allies. The La-5 was also used by the Soviet Union's allies. The La-5 was also used by the Soviet Union's allies.



Messerschmitt Me 262 (March 1945)







Northrop P-61 Black Widow (May 1945)

Until the advent on operations in 1944 of the P-61, all fighters developed for the mass-raid interceptor task had been armed with a variety of weapons of varying effectiveness. The P-61 was the first aircraft designed from the outset to have four remotely-controlled, power-operated turrets mounting a total of eight 0.50-in machine guns, and the first to have a gun-sighting system which could be used by the pilot or by a gunner in the rear cockpit. Its performance was also superior to that of any previous fighter, and it was the first aircraft to be designed specifically for the night-fighter role, with the most advanced radar then available.

The P-61 originated in specifications issued by the US Army Air Corps in 1940 for a night fighter armed with guns and radar. Two prototypes were ordered from the Northrop Aeronautical Corporation, which had already built a number of all-wing aircraft, and the first of these flew on May 26, 1942, powered by two 1,200-hp Pratt & Whitney R-2800-10 Double Wasp engines. Armament was to be four 20-mm cannon in a dorsal turret, but this was later deleted in favour of a battery of four 0.50-in machine guns in a similar turret, and the first 13 production aircraft were completed as YP-61 service test aircraft with this armament. Deliveries of the P-61A began in October 1944, and the first unit to become operational was the 348th Fighter Group in the Pacific theatre in November. Subsequent production aircraft were the P-61B, with more powerful engines and increased fuel capacity, and the P-61C, with further increased performance. Production totalled 706 aircraft, and the last aircraft were delivered in May 1946.

Above: A P-61 Black Widow of the 348th Fighter Group, based on Iwo Jima in the Pacific theatre in 1945, in flight over Japanese territory.

SPECIFICATION: P-61B Black Widow

Power Plant: Two Pratt & Whitney R-2800-65 Double Wasp 18-cylinder two-row radial air-cooled engines each rated at 2,000 hp at 2,800 rpm for take-off and 2,250 hp at 2,800 rpm at 5,800 ft (1,768 m). Three-blade Curtiss Electric propellers. Internal fuel capacity 1,706 US gal (6,457 l) in fuselage and wing tanks, plus provision for two 165 US gal (625 l) or two 310 US gal (1,173 l) drop tanks.

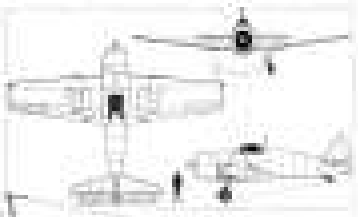
Performance: Max speed 366 mph (589 km/h) at 30,000 ft (9,145 m), 323 mph (520 km/h) at sea level; max cruising speed 280 mph (451 km/h) at 20,000 ft (6,095 m); initial climb rate 2,800 ft (853 m) per min; service ceiling 41,000 ft (12,495 m); range with max internal fuel 2,000 miles (3,220 km), with two 165 US gal drop tanks 2,240 miles (3,605 km), with two 310 US gal drop tanks 2,803 miles (4,510 km).

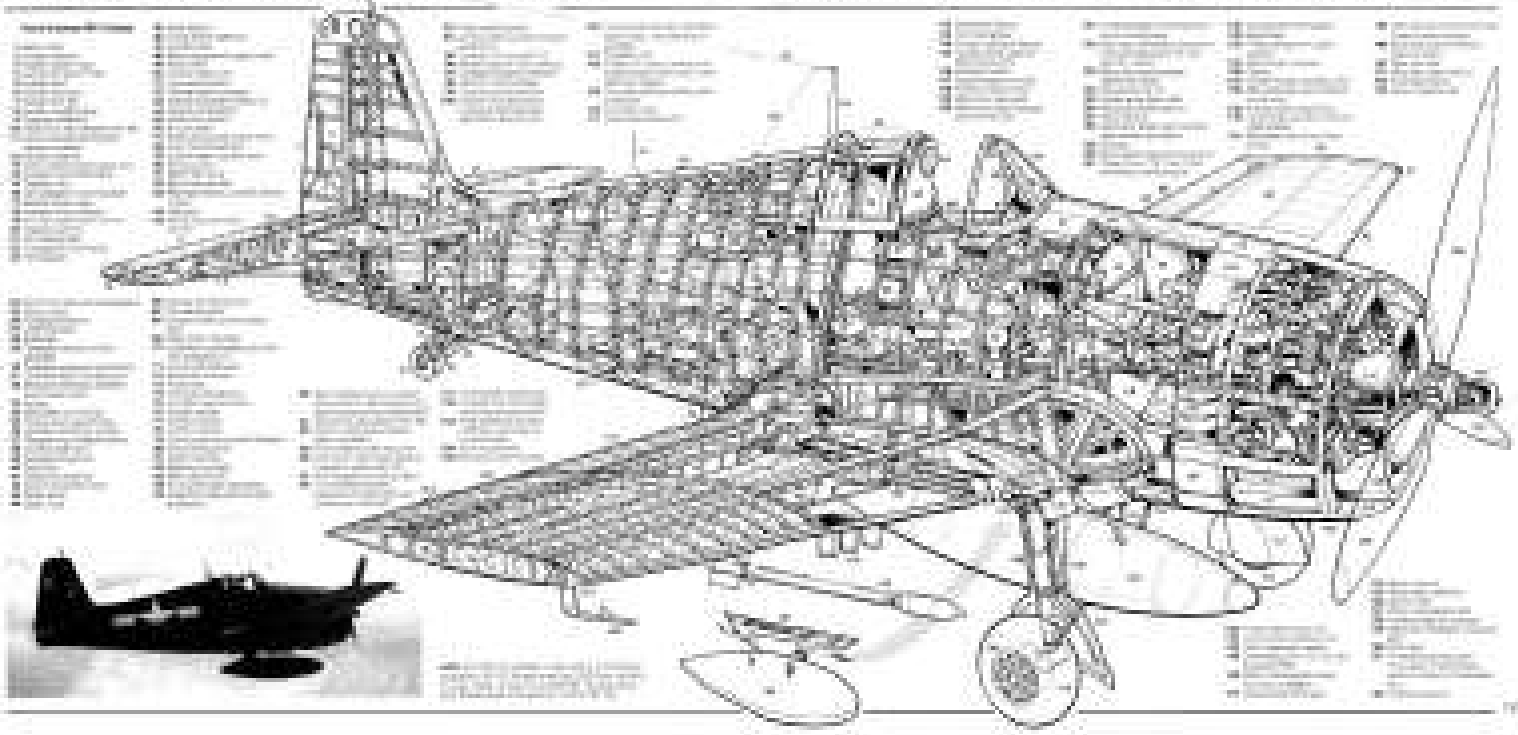
Weights: Empty equipped 29,846 lb (13,540 kg); normal loaded 38,000 lb (17,237 kg); max overload 42,000 lb (19,051 kg).

Dimensions: Span 66 ft (20.12 m); length 49 ft 7 in (15.11 m); height 14 ft 8 in (4.47 m); wing area 662.00 sq ft (61.50 m²).

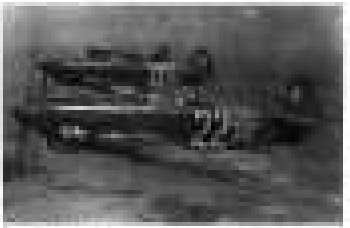
Armament: Four remotely-controlled dorsal turrets each mounting four 0.50-in (12.7-mm) Colt-Browning MG in total 2,800 rpg.

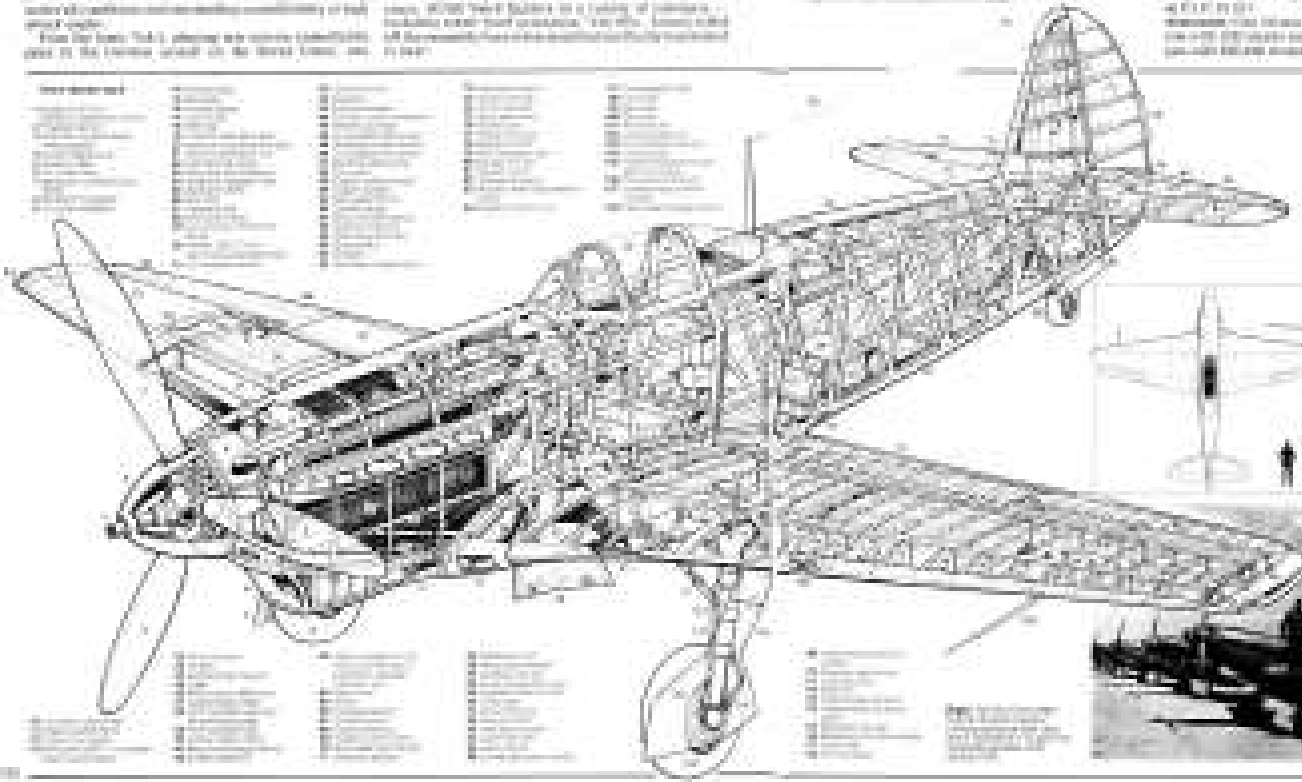
Grumman F6F Hellcat (late 1943)

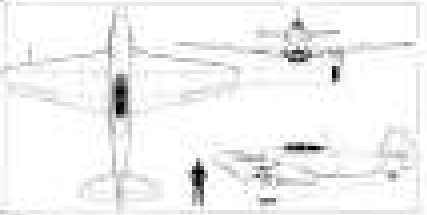


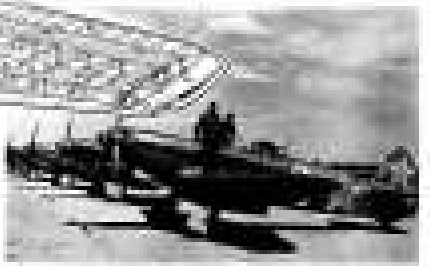


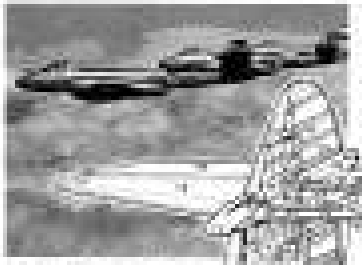
Yakovlev Yak-9 (July 1942)

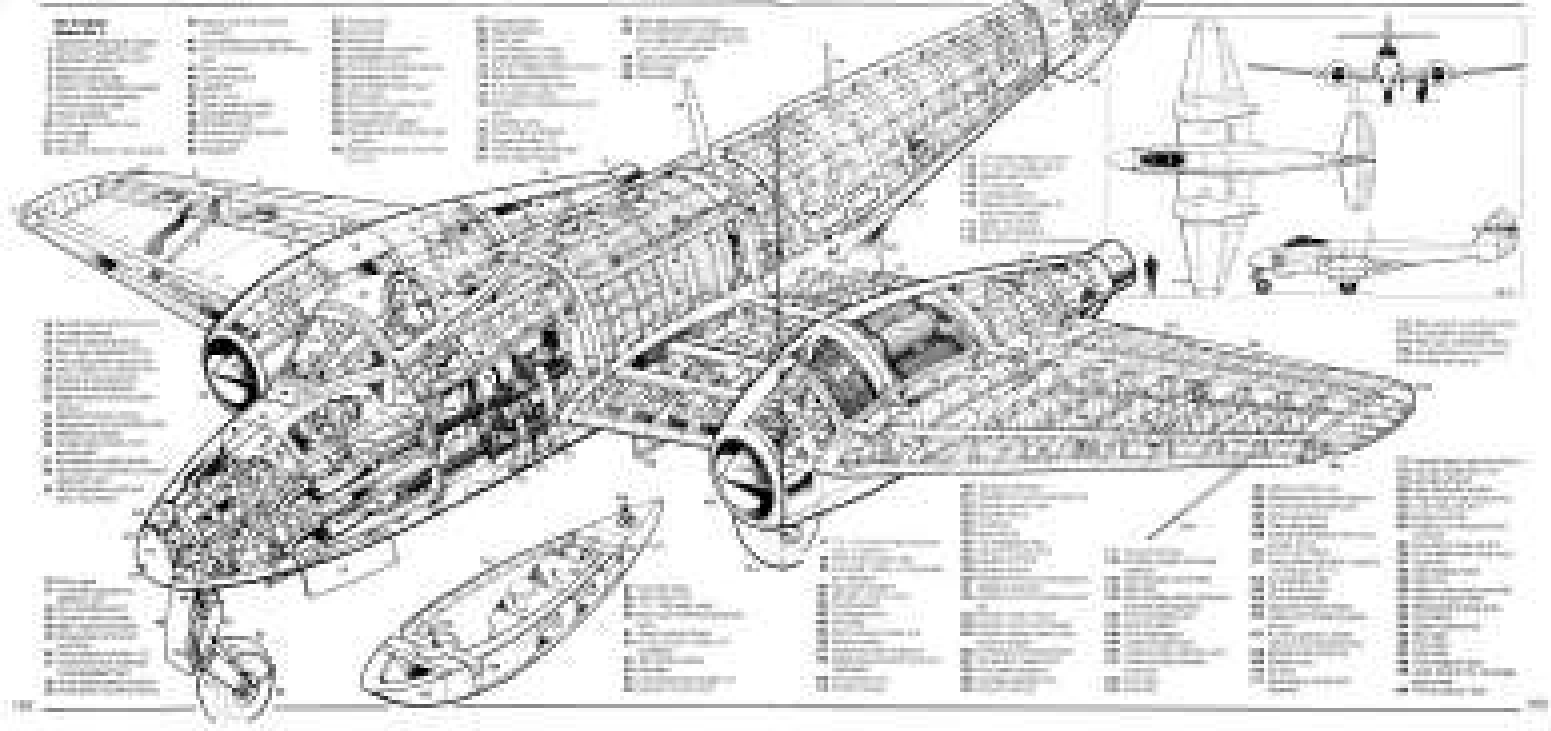




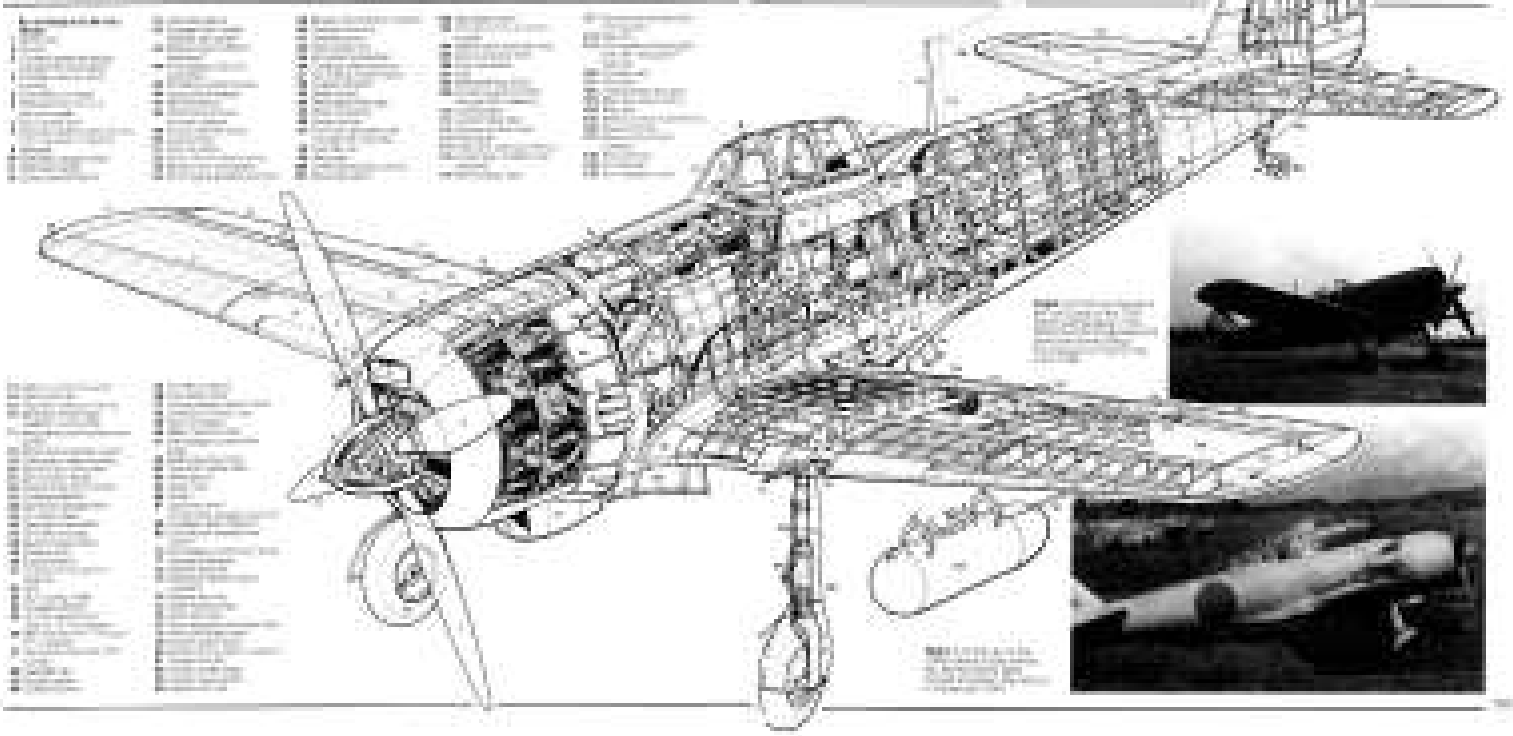




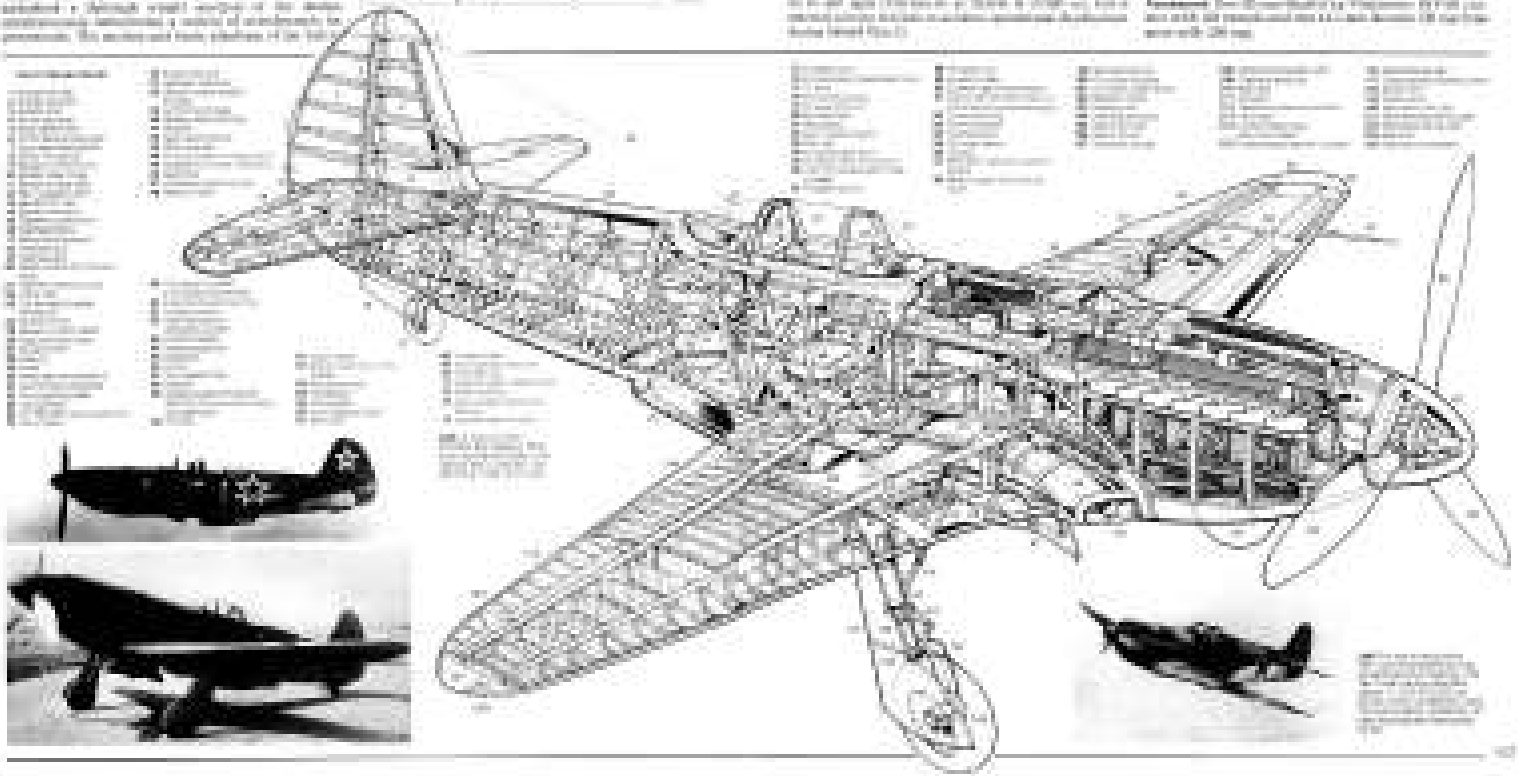




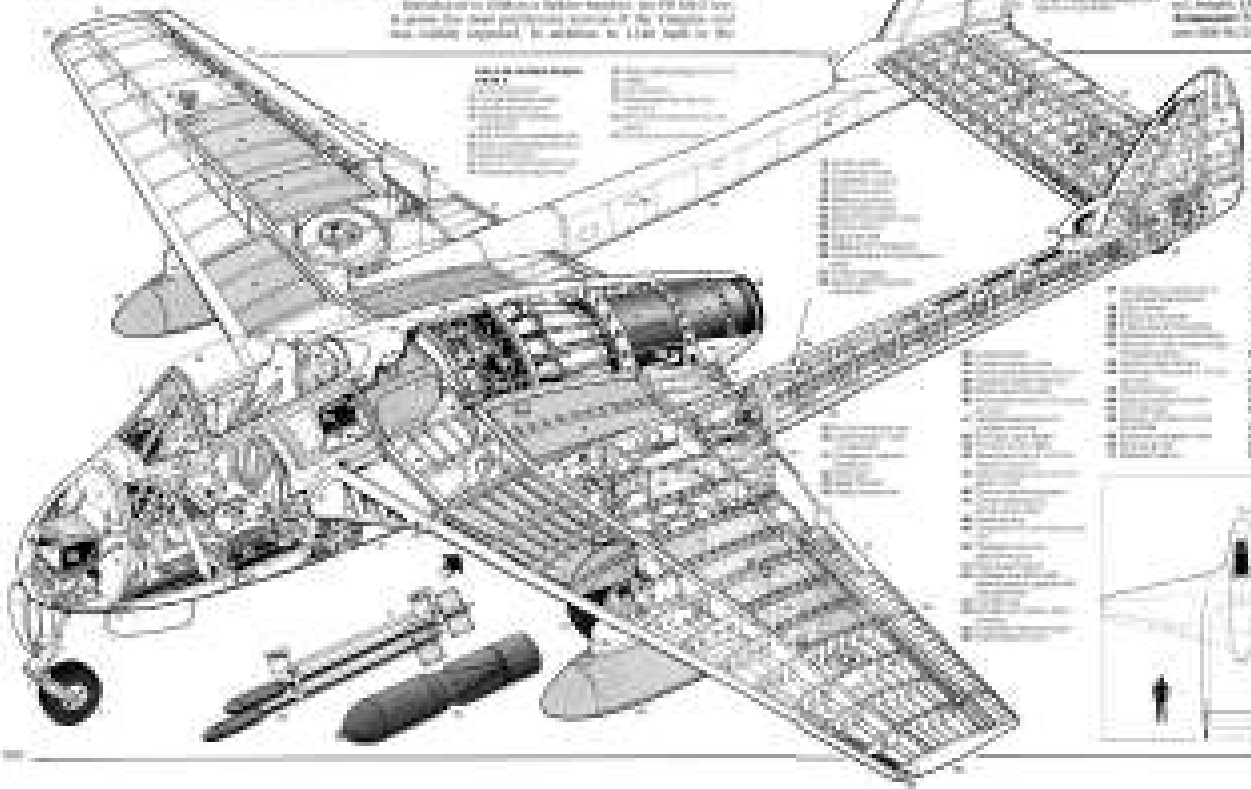
Nakajima Ki.84 Hayate (April 1945)



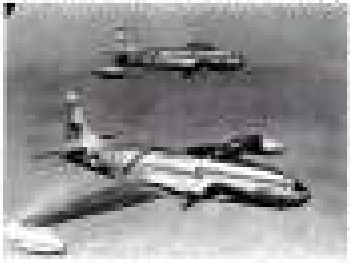
Yakovlev Yak-3 (Yak-9U)



De Havilland Vampire (September 1945)



Lockheed F-80 Shooting Star (January 1944)



Above: A P-80 in flight, showing the wing-tip fuel tanks.

Since only one aircraft was initially ordered, the contract for the XP-80A for the Army Air Forces (AAF) was nevertheless an outlay that would test the mettle of the company. In order to meet the deadline, Lockheed's chief engineer, Clarence L. "Kelly" Johnson, decided to use the straight wing and tail surfaces of the P-38 Lightning, but eliminate the twin booms and tail unit. The pilot would sit in a pressurized cockpit in the nose, and the engine would be a single Allison J33 turbojet, which would be fed by a nose intake. The fuselage would be of semi-monocoque construction, and the wing would be a simple, tapered design with a laminar-flow section. Armament would be six 0.5-in machine guns in the nose.

The XP-80A was completed in 143 days from the go-ahead, and on 8 January 1944, Milo Burcham took it on its first flight from Muroc Dry Lake, California. Despite a number of problems, the aircraft proved to be a success, and the AAF ordered 500 P-80As on 30 June 1944. The first production aircraft flew on 15 November 1944, and the first unit to receive the P-80 was the 412th Fighter Group, which began conversion training in January 1945. Production aircraft were powered by the 2,270-lb (1,030-kg) thrust J33-A-9 engine, and were armed with six 0.5-in machine guns and could carry two 1,000-lb (454-kg) bombs on underwing pylons.

The P-80 saw combat in Korea from June 1950, and with the introduction of the MiG-15 over Korea was redesignated as the fighter-bomber role until 1953. Many were supplied to other countries after the Korean conflict.

SPECIFICATION: P-80A-1 Shooting Star

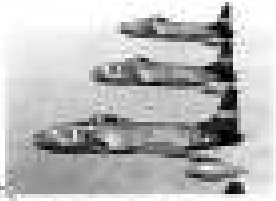
Power Plant: one 4,600-lb (2,087-kg) thrust Allison J33-A-23 turbojet

Performance: Max speed 558 mph (898 km/h) at 35,000 ft (10,670 m); initial climb rate 4,580 ft (1,396 m) per min; service ceiling 46,000 ft (14,020 m); range 1,380 miles (2,220 km)

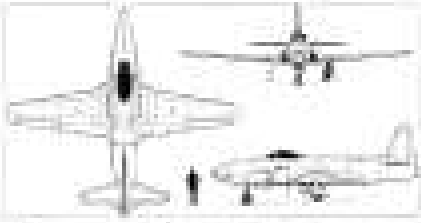
Weights: Empty 8,420 lb (3,819 kg); loaded 14,500 lb (6,577 kg)

Dimensions: Span 38 ft 10½ in (11.84 m); length 34 ft 5 in (10.49 m); height 11 ft 4 in (3.45 m); wing area 237 sq ft (22.02 sq m)

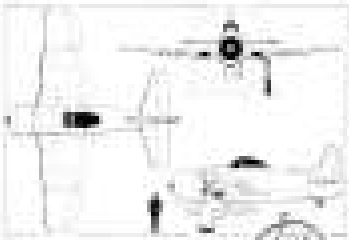
Armament: six 0.5-in (12.7-mm) machine guns in the nose; provision for 2 × 1,000-lb (454-kg) bombs on underwing pylons

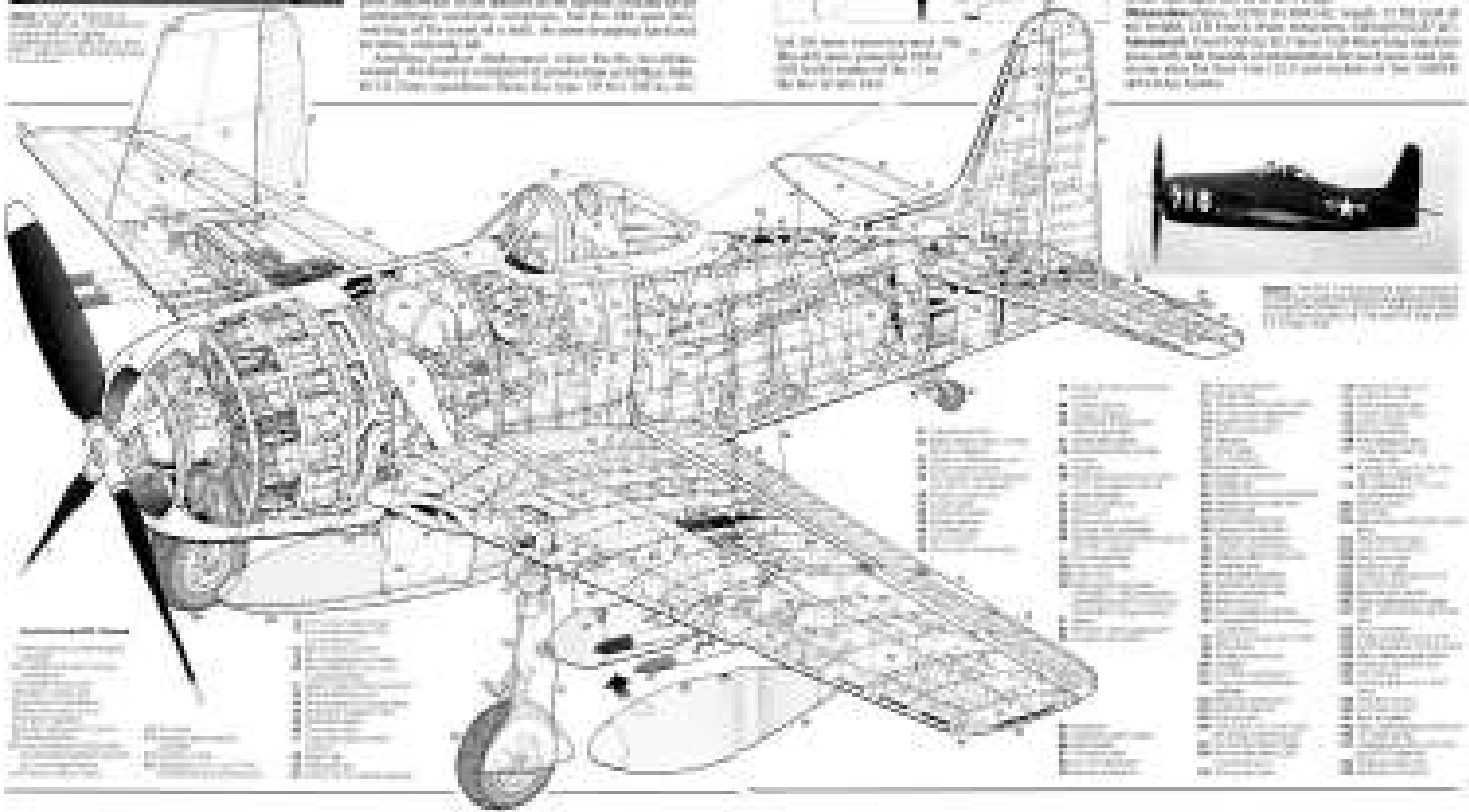


Above: A P-80A-1 Shooting Star of the 412th Fighter Group



Grumman F8F Bearcat (August 1944)



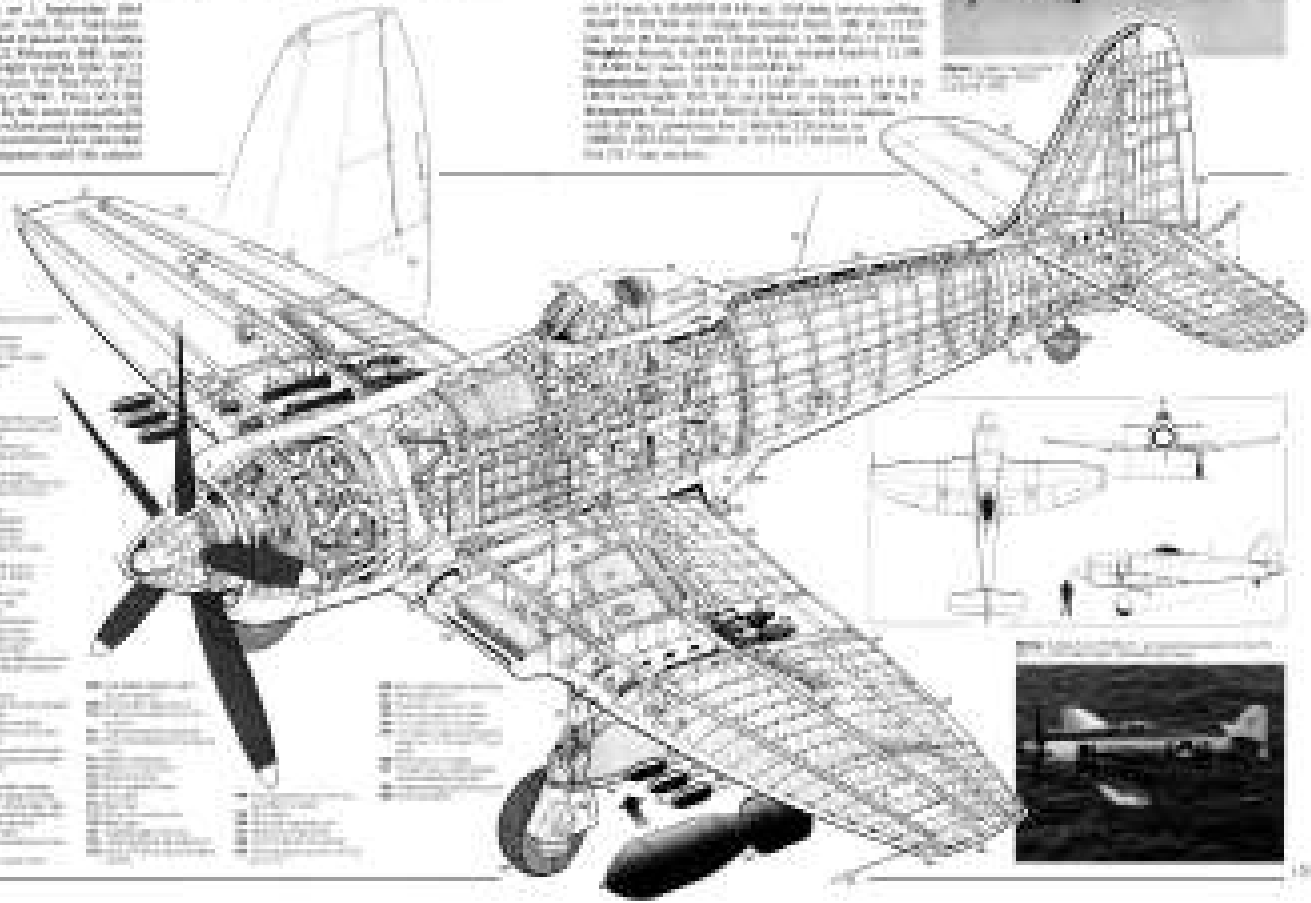


Hawker Sea Fury (September 1946)

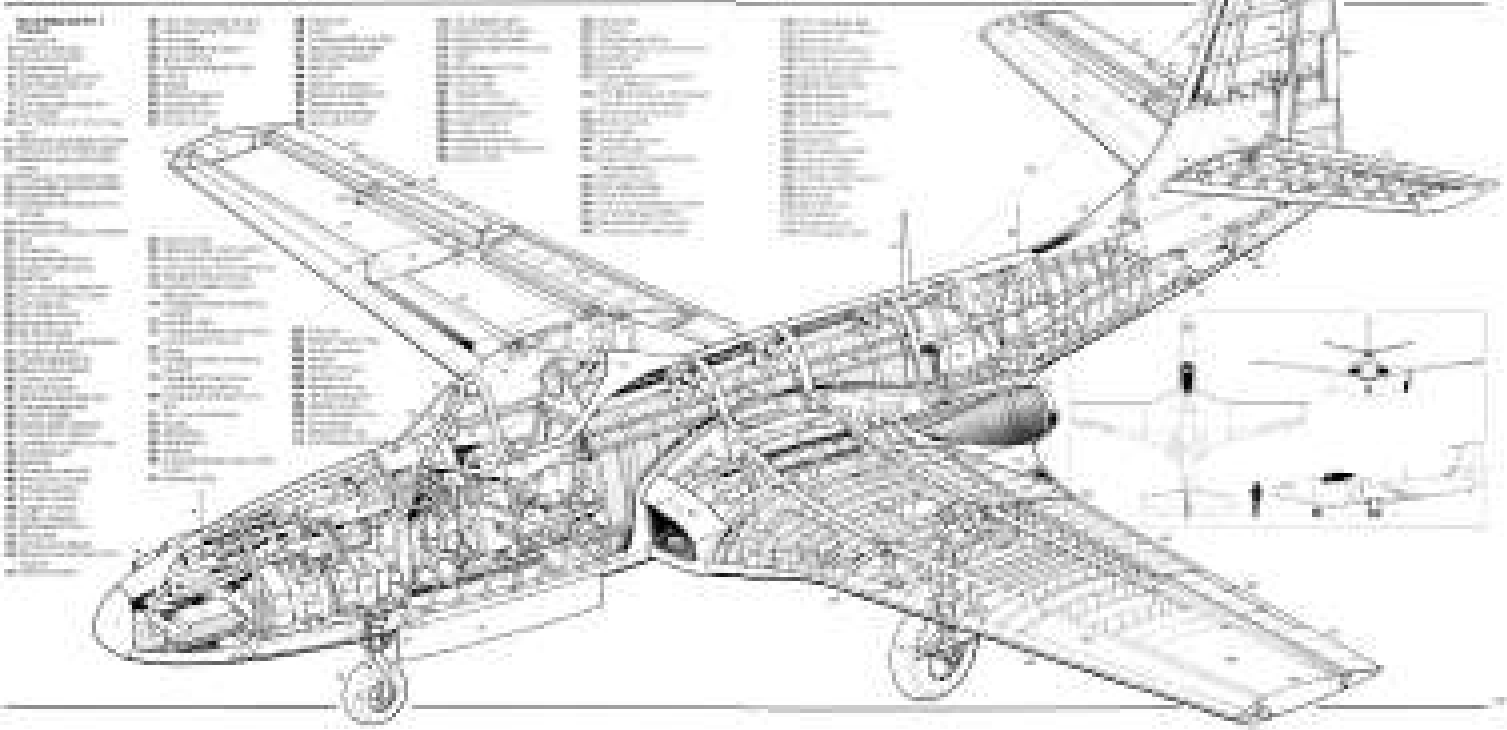
A contemporary of the Bristol (see pages 114-17), while sharing the same basic layout, the Hawker Sea Fury was a very different aeroplane. Intended to operate from aircraft carriers, the Sea Fury was developed from the Hawker Fury and Tempest fighters and was powered by the Bristol Centaurus sleeve-valve radial engine. Although it was ordered into production in 1942, the Sea Fury did not enter service with the Fleet Air Arm until 1947. It was the last piston-engined fighter to serve with the Royal Navy, and saw action during the Korean War.

Although ordered in 1942, the first prototype Sea Fury, VX718, did not fly until 1945. Powered by a Bristol Centaurus XV engine, it was a development of the Hawker Fury and Tempest fighters. Like the Fury, the Sea Fury had a thin wing with a high wing loading, and was fitted with a tailwheel undercarriage. The Sea Fury was also fitted with a four-bladed propeller, and had a strengthened airframe and arrestor gear for operations from aircraft carriers.

The first prototype flew on 21 September 1945, and a production order was placed in October 1942. The first production aircraft, NX793, flew on 1 December 1945, and the first Sea Fury squadron, No. 807 Squadron, received its aircraft in May 1947. The Sea Fury was the last piston-engined fighter to serve with the Royal Navy, and was used in the Korean War. It was also used by the Royal Canadian Navy, the Royal Australian Navy, the Royal Netherlands Navy, the Royal Pakistan Navy, the Royal Indian Navy, the Royal Iranian Navy, the Royal Iraqi Navy, the Royal Egyptian Navy, the Royal Indonesian Navy, the Royal Burmese Navy, the Royal Thai Navy, the Royal Laotian Navy, the Royal Cambodian Navy, the Royal Vietnamese Navy, the Royal Malaysian Navy, the Royal Singapore Navy, the Royal Brunei Navy, the Royal Sarawak Navy, the Royal North Borneo Navy, the Royal Hong Kong Navy, the Royal Macau Navy, the Royal Timor Navy, the Royal Portuguese Navy, the Royal Spanish Navy, the Royal Italian Navy, the Royal Greek Navy, the Royal Turkish Navy, the Royal Yugoslav Navy, the Royal Albanian Navy, the Royal Bulgarian Navy, the Royal Romanian Navy, the Royal Hungarian Navy, the Royal Czechoslovak Navy, the Royal Polish Navy, the Royal Soviet Navy, the Royal Finnish Navy, the Royal Swedish Navy, the Royal Norwegian Navy, the Royal Danish Navy, the Royal Icelandic Navy, the Royal Irish Navy, the Royal Scottish Navy, the Royal Welsh Navy, the Royal Manx Navy, the Royal Channel Islands Navy, the Royal Isle of Man Navy, the Royal Isle of Wight Navy, the Royal Isle of Anglesey Navy, the Royal Isle of Lundy Navy, the Royal Isle of Sheppey Navy, the Royal Isle of Thanet Navy, the Royal Isle of Grain Navy, the Royal Isle of Hoo Navy, the Royal Isle of Canvey Navy, the Royal Isle of Foulness Navy, the Royal Isle of Mersea Navy, the Royal Isle of Tollesbury Navy, the Royal Isle of Osea Navy, the Royal Isle of Bradwell Navy, the Royal Isle of Dengie Navy, the Royal Isle of Stansgate Navy, the Royal Isle of Rochford Navy, the Royal Isle of Southend Navy, the Royal Isle of Leigh Navy, the Royal Isle of Canvey Navy, the Royal Isle of Foulness Navy, the Royal Isle of Mersea Navy, the Royal Isle of Tollesbury Navy, the Royal Isle of Osea Navy, the Royal Isle of Bradwell Navy, the Royal Isle of Dengie Navy, the Royal Isle of Stansgate Navy, the Royal Isle of Rochford Navy, the Royal Isle of Southend Navy, the Royal Isle of Leigh Navy.



McDonnell FH-1 Phantom (January 1945)

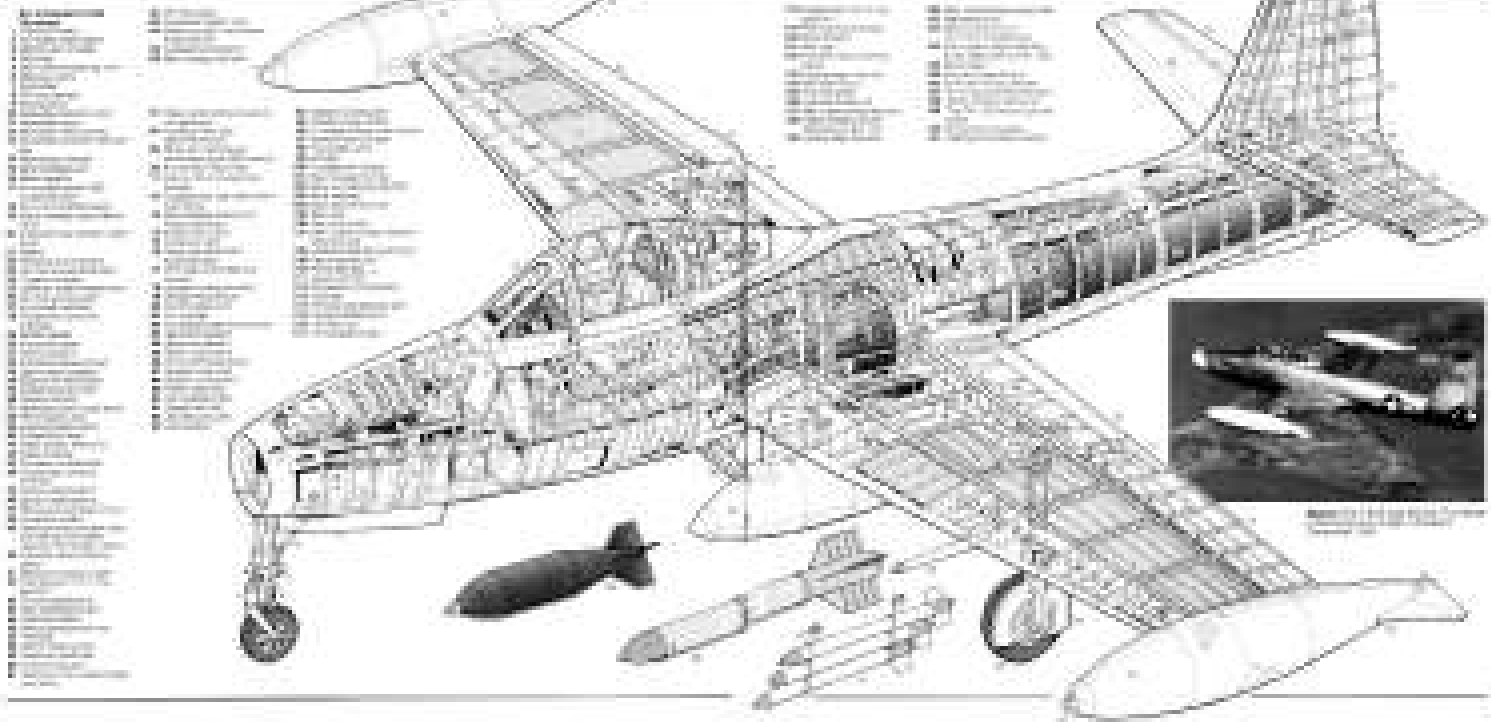


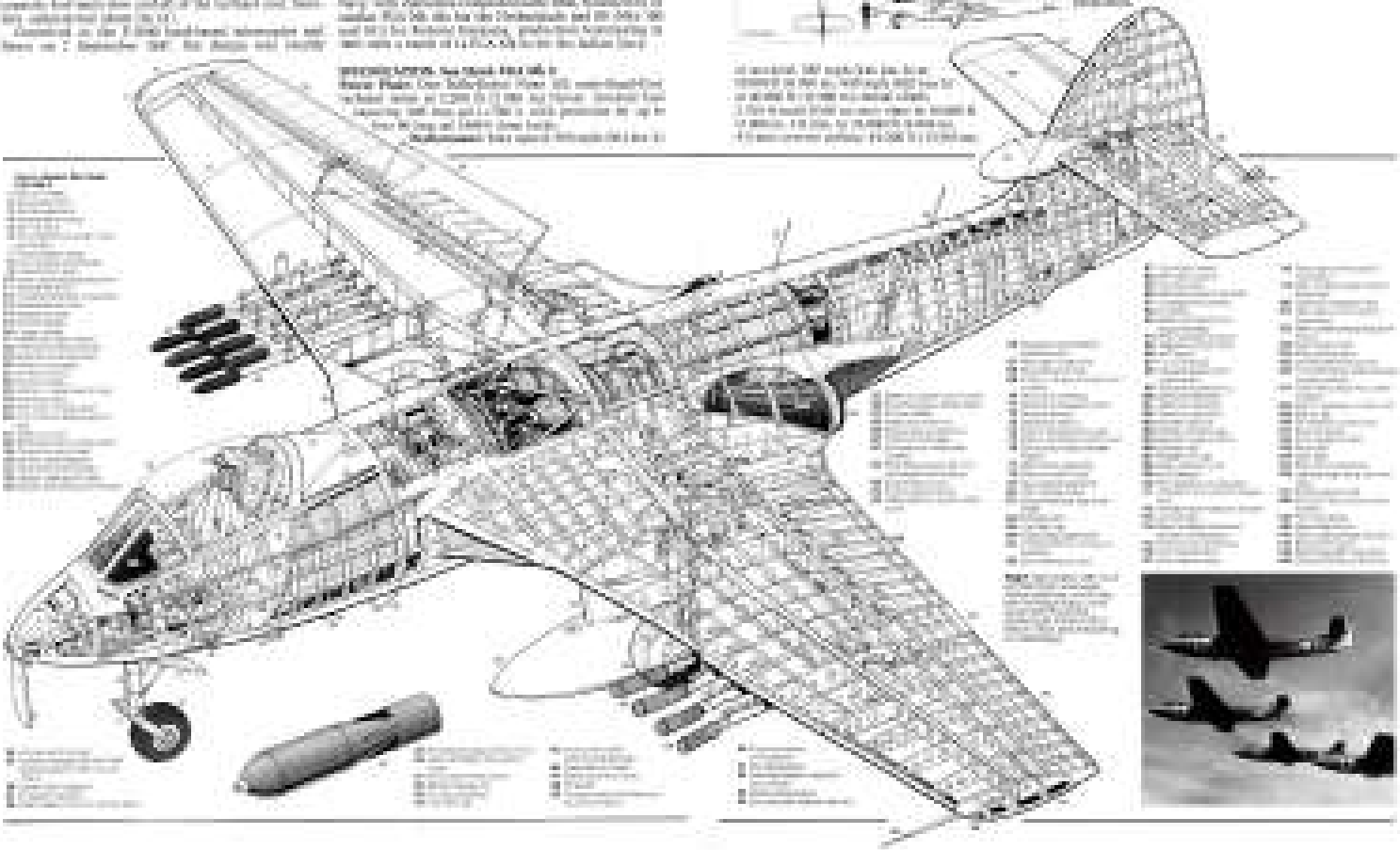
Republic F-84 Thunderjet (February 1946)

The Army Air Forces' procurement policies concentrated unprecedentedly for the outfit of service development of the unsuccessful Republic XP-84 Thunderjet jets experimental first production batch of 1,000 aircraft. Manufacturer's plans envisaged the construction of three prototypes, 15 preproduction YP-84 Thunderjet and 1,000 production P-84 Thunderjet fighters. Initial production was to be followed by the P-84B Thunderjet, which was to have differed from the P-84A in having a more powerful engine, and the P-84C Thunderjet, which was to have been a reconnaissance version of the P-84B. The P-84 was to be armed with six 12.7-mm (0.50-in) machine guns and was to have had provision for carrying two 1,000-lb (454-kg) bombs or ten 5-in (127-mm) rockets.

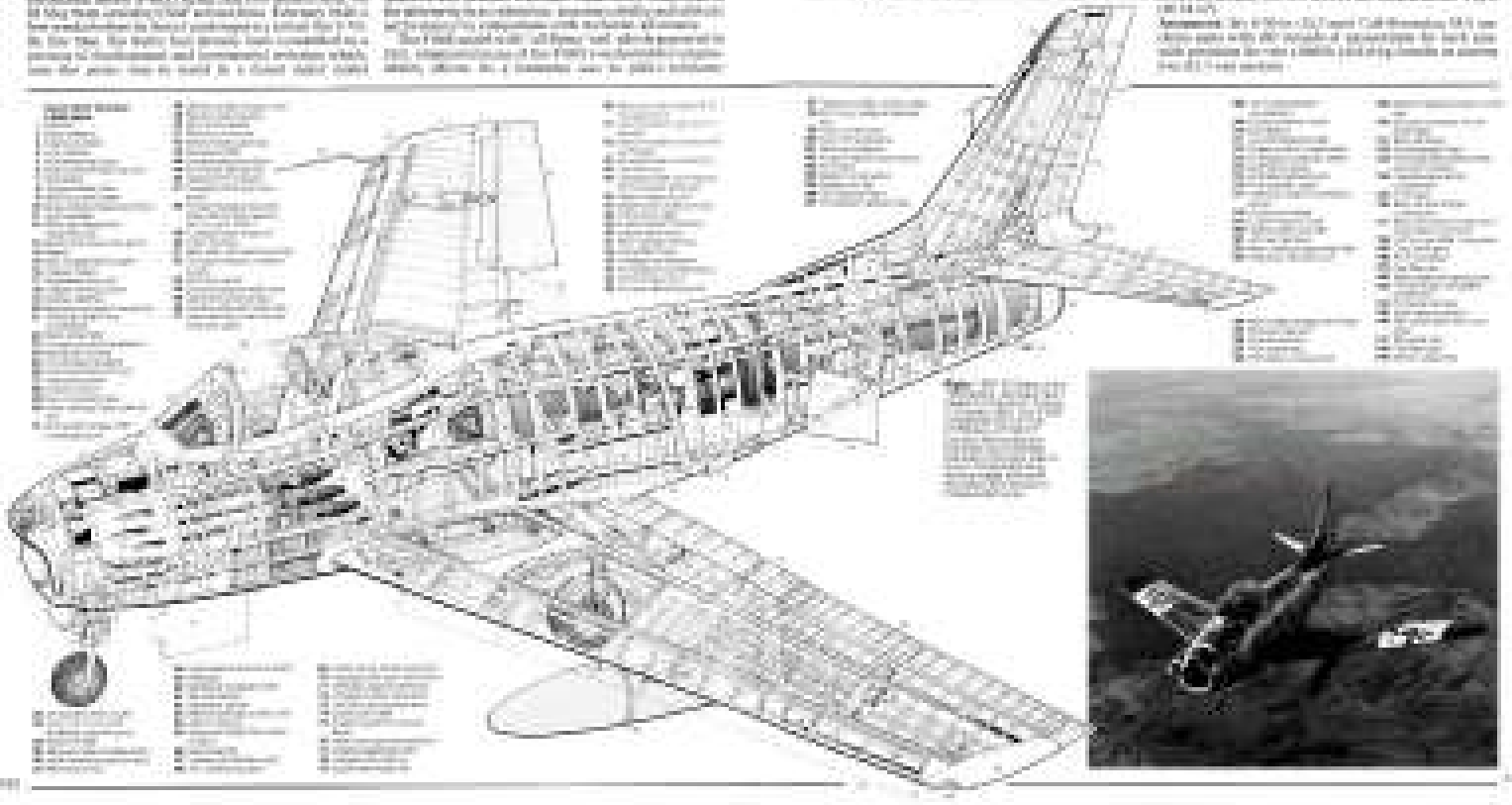
The first prototype XP-84 Thunderjet (44-61997) was flown for the first time on 28 February 1946 by Republic test pilot Alexander Kartveli. Powered by a 3,750-lb st (16.68-kN) Allison J35-A-3D turbojet, the aircraft had a maximum speed of 587 mph (945 km/h) at 30,000 ft (9145 m), a service ceiling of 38,000 ft (11580 m), and a range of 1,000 miles (1610 km) with maximum fuel. The second prototype XP-84 (44-61998) was flown on 3 May 1946, and the third prototype (44-61999) was flown on 5 July 1946. The first YP-84A Thunderjet (44-61999) was flown on 5 July 1946, and the first YP-84A Thunderjet (44-61999) was flown on 5 July 1946. The first YP-84A Thunderjet (44-61999) was flown on 5 July 1946.

The Thunderjet was considerably disappointing in service, despite itself lacking the ability for differentiation in fighter-versus-fighter combat. Within a year of its first flight, the Thunderjet had been relegated to the ground-attack role, and was withdrawn from front-line service in 1954.



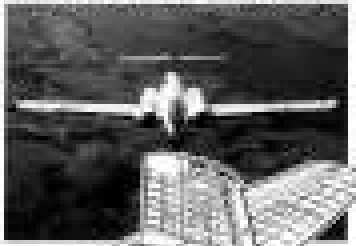


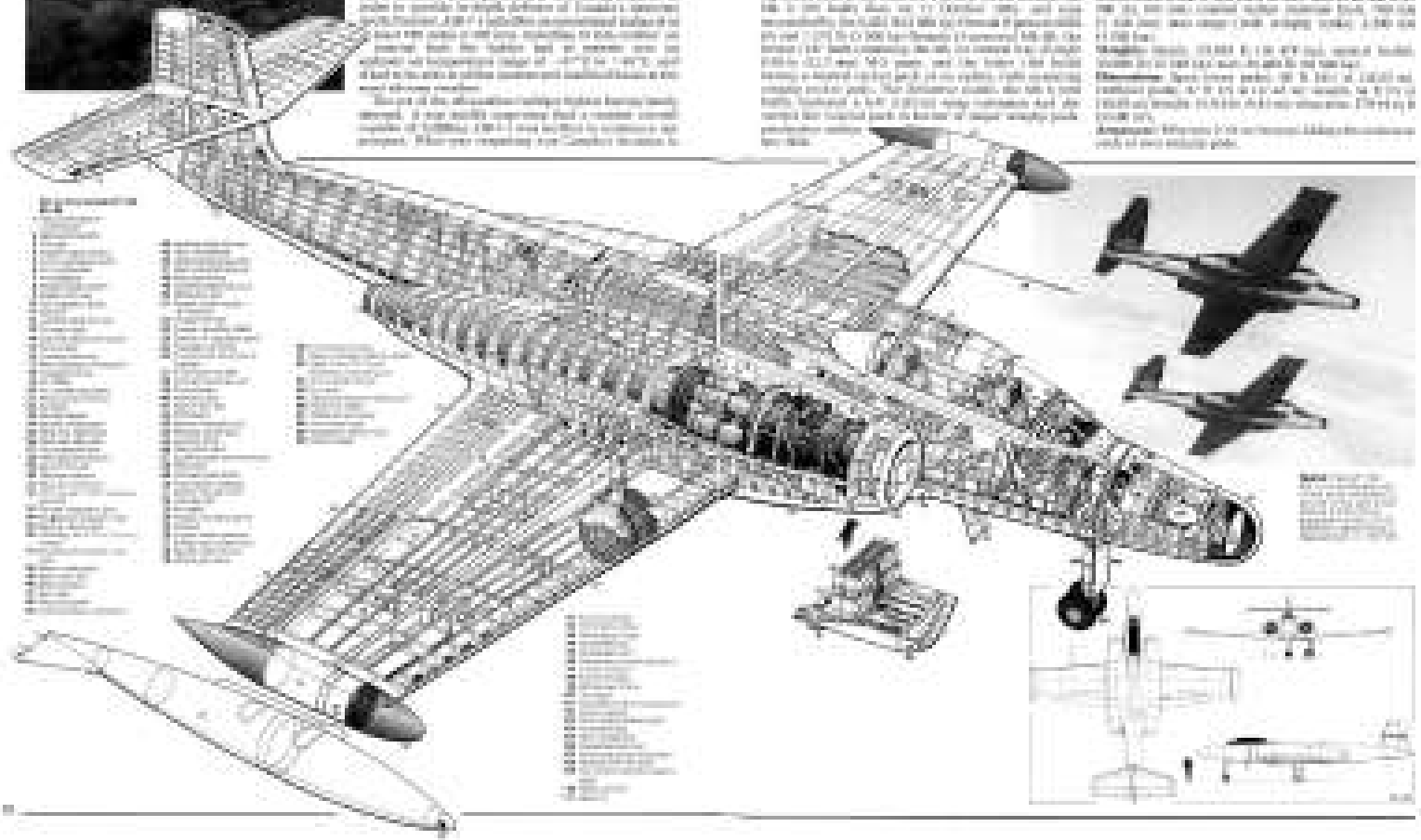
North American F-86 Sabre (October 1947)



Mikoyan-Gurevich MiG-15 (December 1947)

Avro Canada CF-100 Canuck (January 1950)



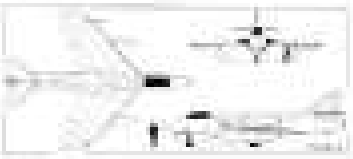


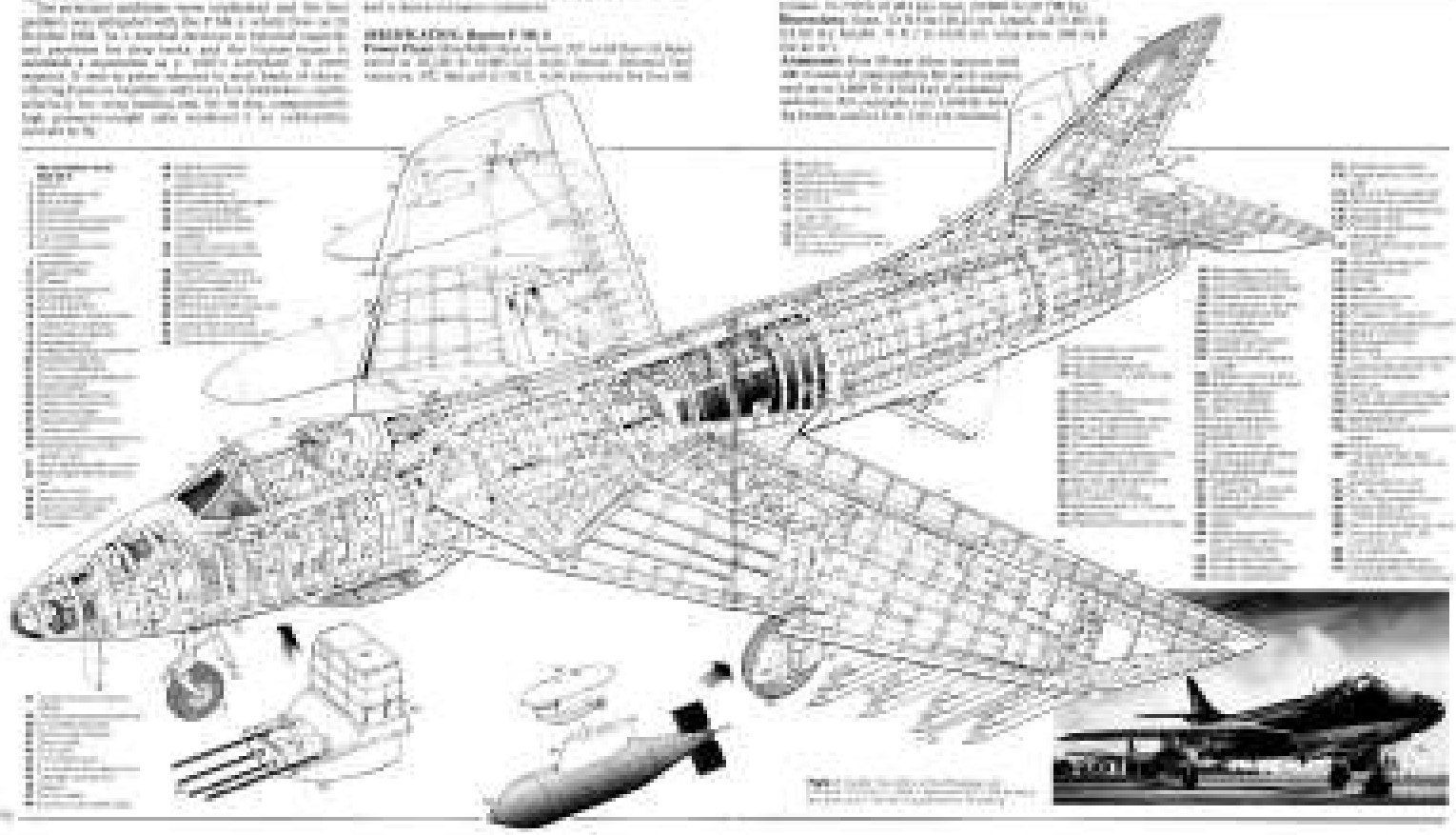
Republic F-84F Thunderstreak (later 1950)

With new flexibility of wing camouflaged, primary is a variant of the original straight-wing version, which made its first flight on 3 June 1950. The new wing was designed to provide a much greater degree of sweepback, and the first prototype, XF-84F, was flown on 14 February 1951.

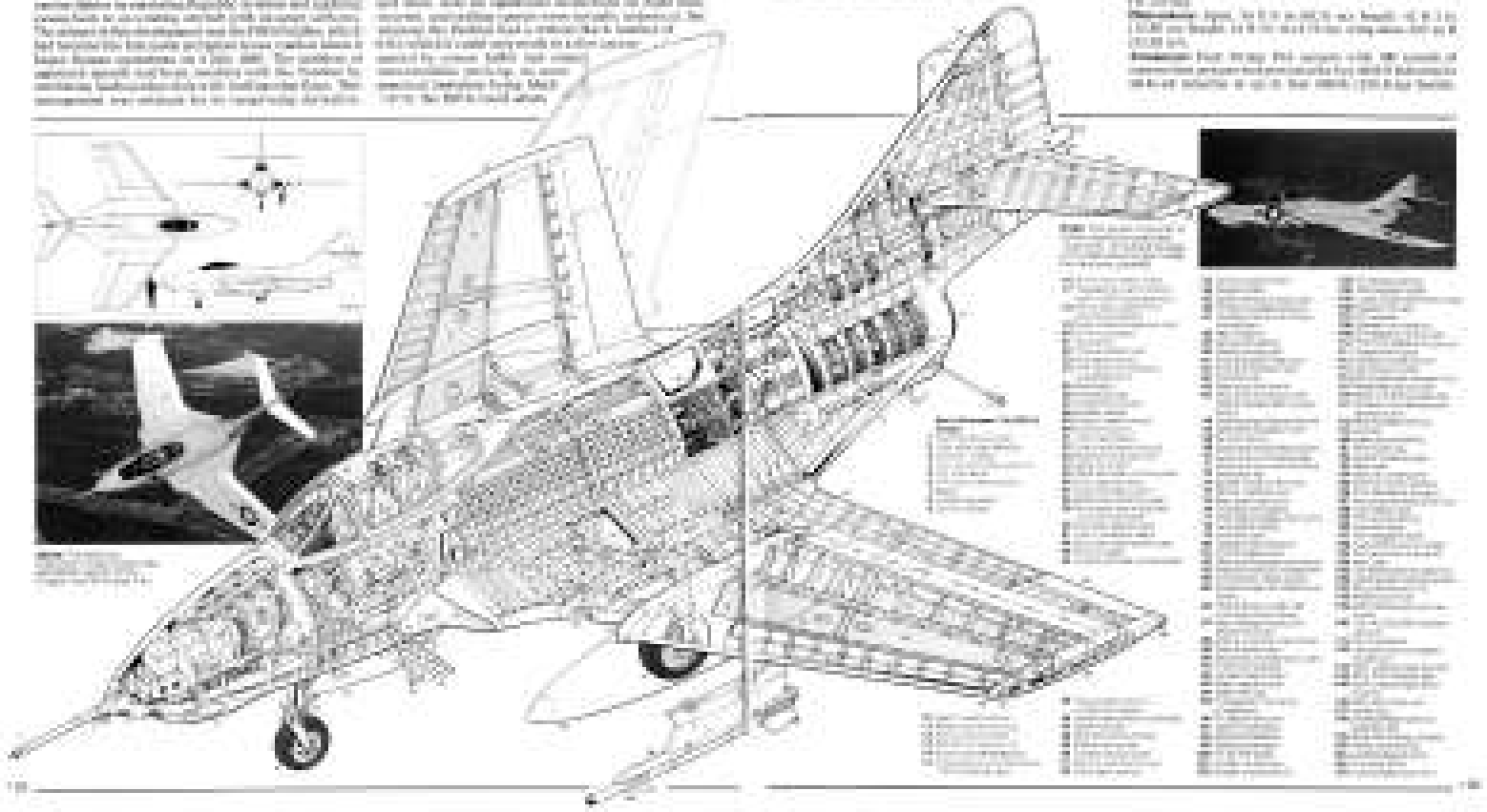
The new wing was mounted at a higher position on the fuselage than on the F-84E, and the fuselage was lengthened by 1.22 m (4 ft) to maintain the same tail moment. The wing was also thicker, and the leading edge was drooped to improve the aerodynamic characteristics at high angles of attack. The wing was also fitted with a new type of boundary layer control system, which blew air from the engine compressor over the upper surface of the wing to prevent the airflow from separating at high angles of attack. The new wing was also fitted with a new type of leading edge slat, which was automatically deployed when the aircraft was flying at high angles of attack.

The new wing was also fitted with a new type of leading edge slat, which was automatically deployed when the aircraft was flying at high angles of attack. The new wing was also fitted with a new type of leading edge slat, which was automatically deployed when the aircraft was flying at high angles of attack.

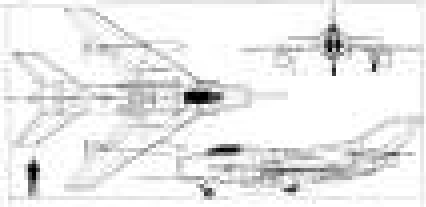


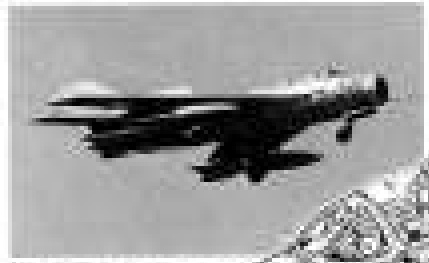


Grumman F9F (F-9) Cougar (September 1951)

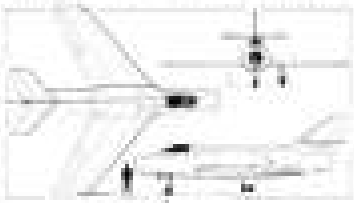


Mikoyan-Gurevich MiG-19 (May 1955)

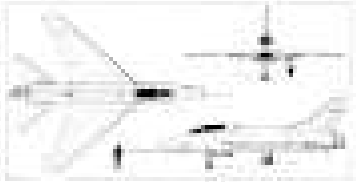


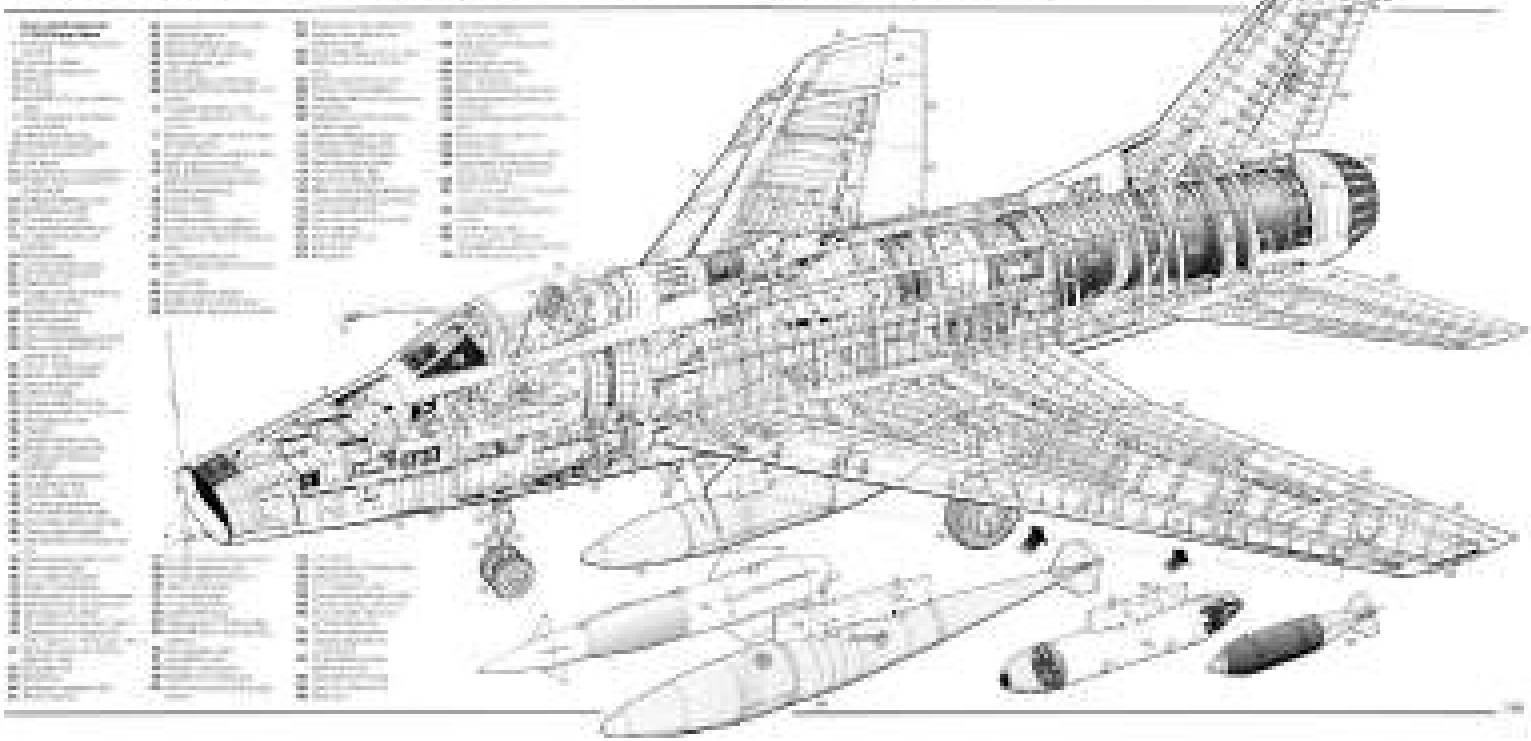


Dassault Mystère IV (September 1952)



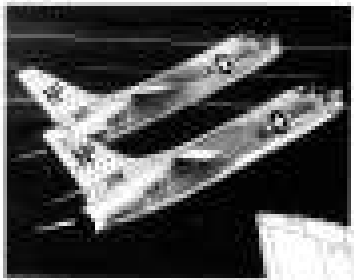
North American F-100 Super Sabre (1954–1958)



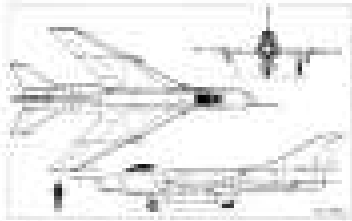


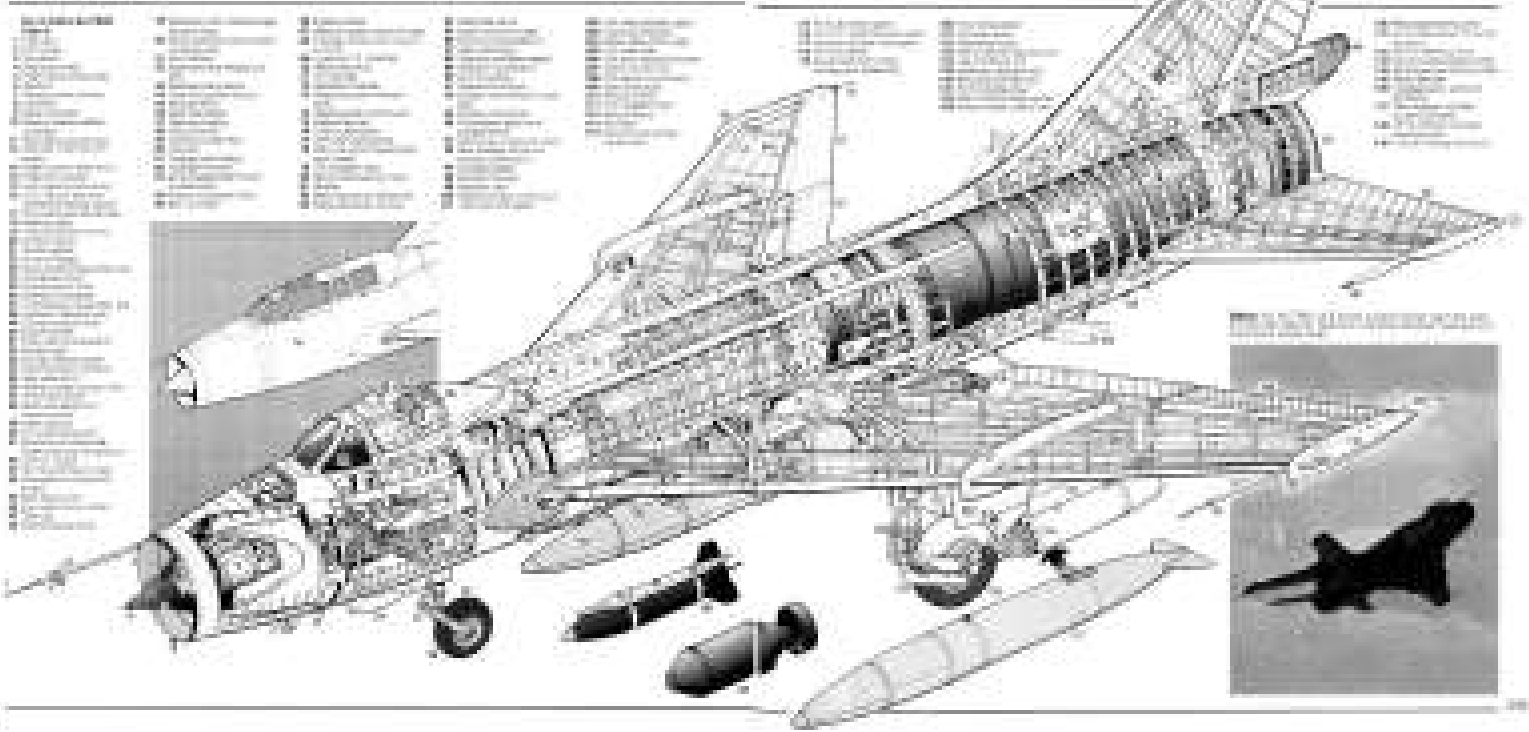
Lockheed F-104 Starfighter (February 1964)

Vought F-8 Crusader (March 1955)

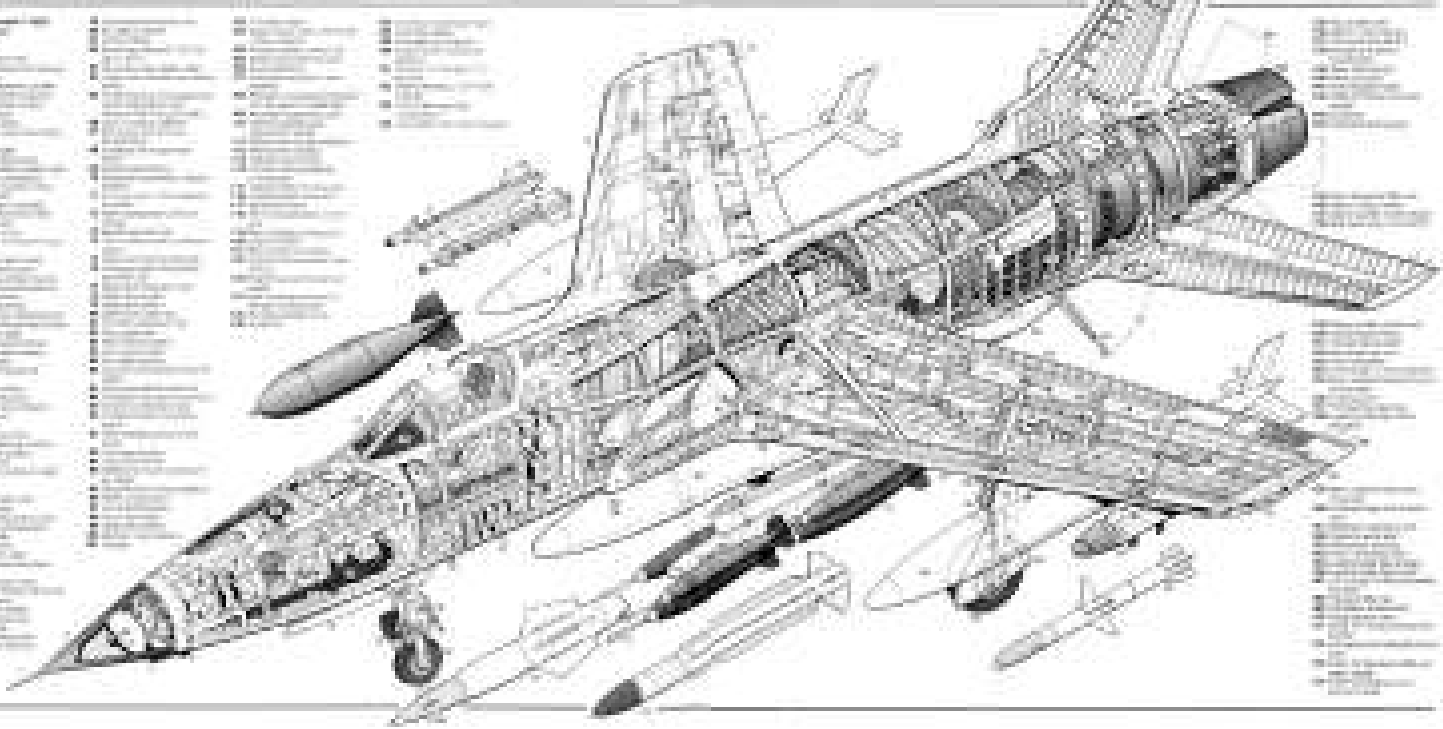


Sukhoi Su-7 (NATO: FITTER-A)

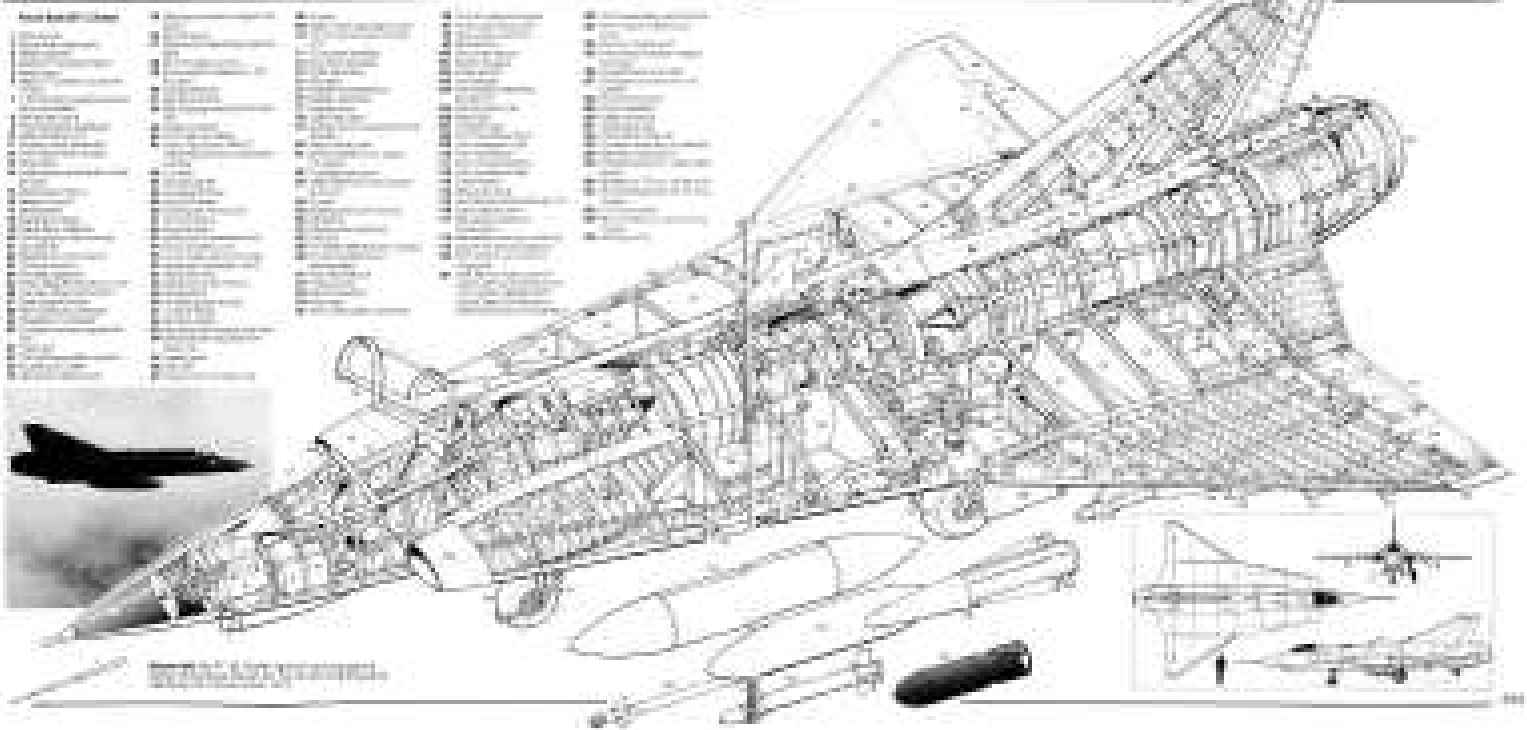




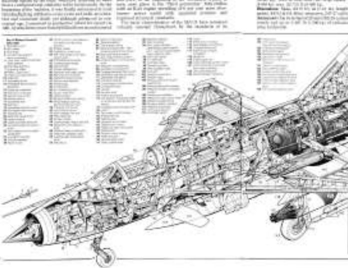
Republic F-105 Thunderchief (October 2011)



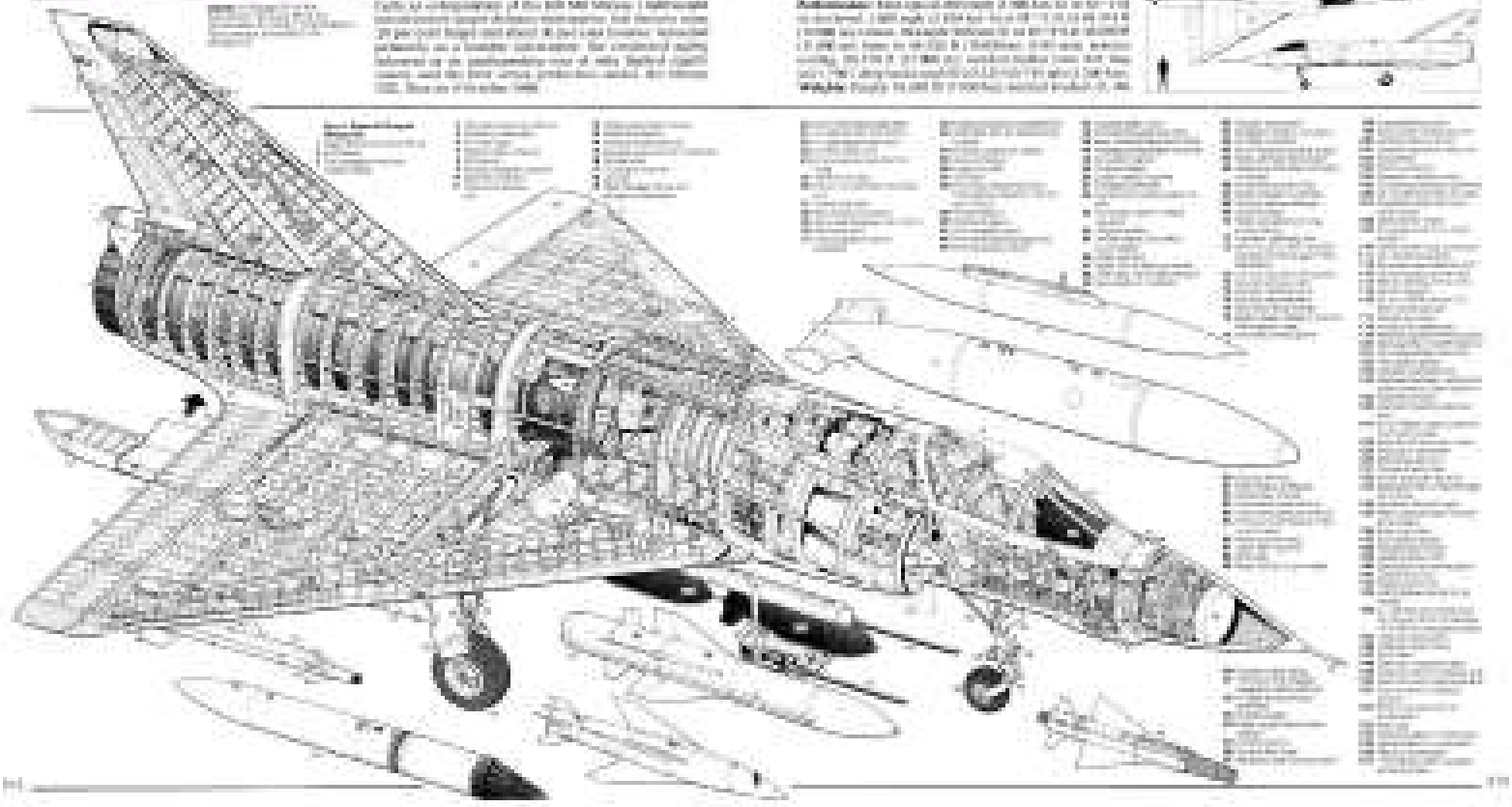
Saab 35 Draken (October 2011)



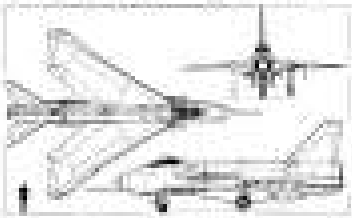
Mikoyan-Gurevich MiG-21



Dassault-Breguet Mirage III (Operational 1958)



BAC Lightning (April 1967)

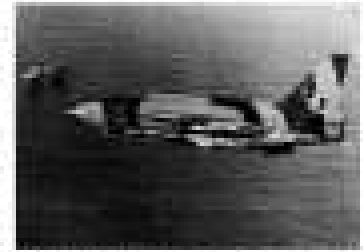


A highly secret approach to the problems of interception has come to light in recent months—and now that work is almost complete, it is confirmed by 'AIR OF POWER' to be the supersonic Mach number two Lightning interceptor. Developed from the prototype by designers the late Leslie Lobbock, Lightning

Lightning has been formed the complete and leading team for creation of a virtually complete basic manned supersonic aircraft in the country. Along with further control and integration of the aerodynamic features and control of all the engine and airframe units, which are fitted only by the constructor, the Lightning has been developed, and fitted with a number of new items and several basic changes, the successful completion of flying of the prototype of this aeroplane under the Government auspices which placed the responsibility for standard aircraft on the shoulders of the constructor.

The first prototype Lightning, No. P.1A, made its first flight on August 4th, 1954, at the Boscombe Down test establishment of the Royal Aircraft Establishment, Farnborough, and was followed by the second prototype, No. P.1B, which made its first flight on April 11th, 1957. Both aircraft were powered by two Rolls-Royce Avon engines, and were used for the development of the aerodynamic features of the Lightning. The second prototype, No. P.1B, was fitted with the more powerful Avon 210 engines, and was used for the development of the Lightning's supersonic performance.

The first production Lightning, No. P.1A, made its first flight on August 4th, 1954, at the Boscombe Down test establishment of the Royal Aircraft Establishment, Farnborough, and was followed by the second prototype, No. P.1B, which made its first flight on April 11th, 1957. Both aircraft were powered by two Rolls-Royce Avon engines, and were used for the development of the Lightning's supersonic performance. The second prototype, No. P.1B, was fitted with the more powerful Avon 210 engines, and was used for the development of the Lightning's supersonic performance.



DEVELOPMENTS. Lightning F.1A/F.1

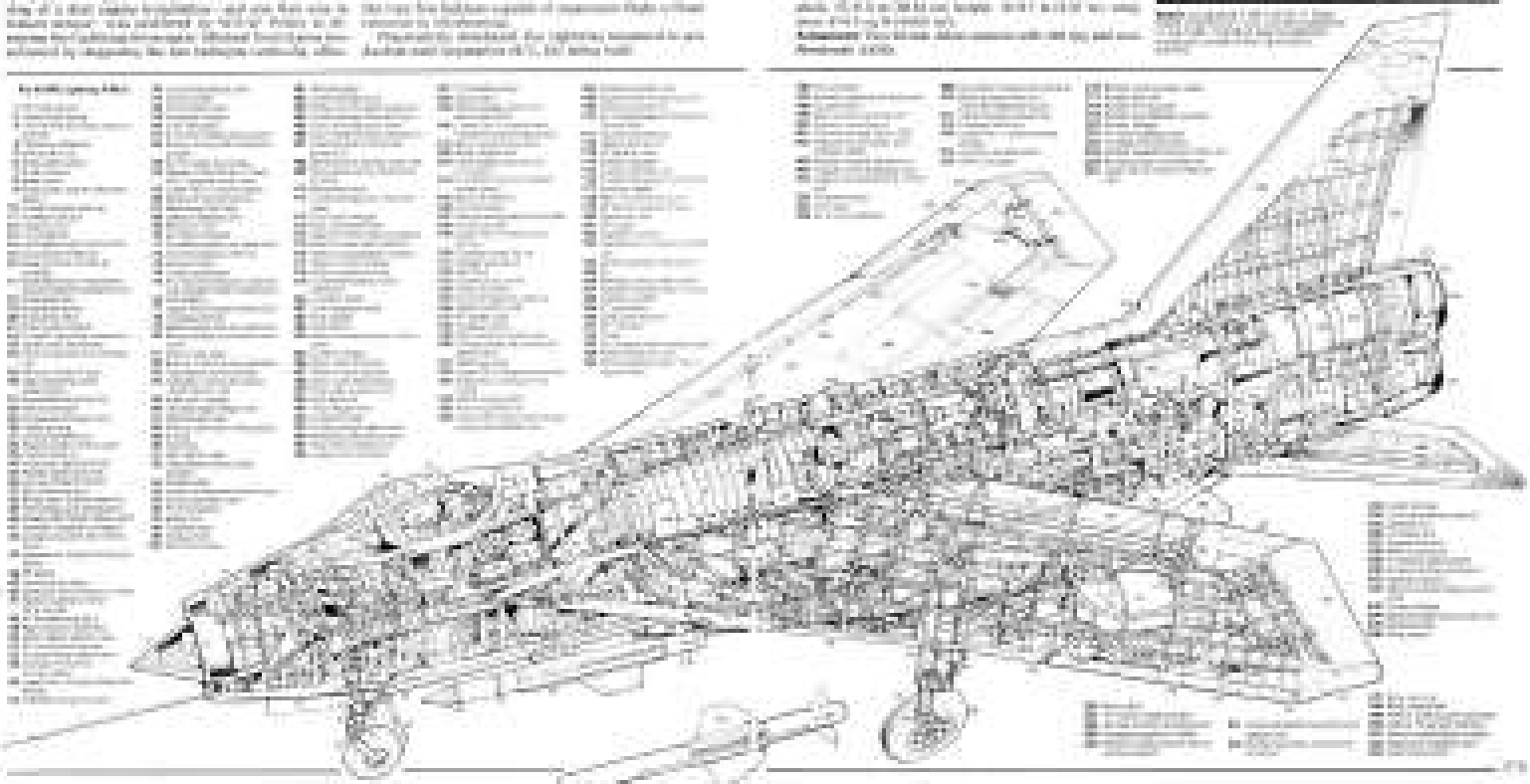
Power Plant: Two Rolls-Royce Avon 301 turbojets each rated at [illegible] lb st dry and [illegible] lb st with reheat.

Performance: Max speed [illegible] mph (Mach [illegible]) at [illegible] ft; max speed [illegible] mph (Mach [illegible]) at sea level; initial climb [illegible] ft/min; time to [illegible] ft [illegible] min; service ceiling [illegible] ft; range [illegible] miles with [illegible] gal internal fuel and [illegible] gal external fuel.

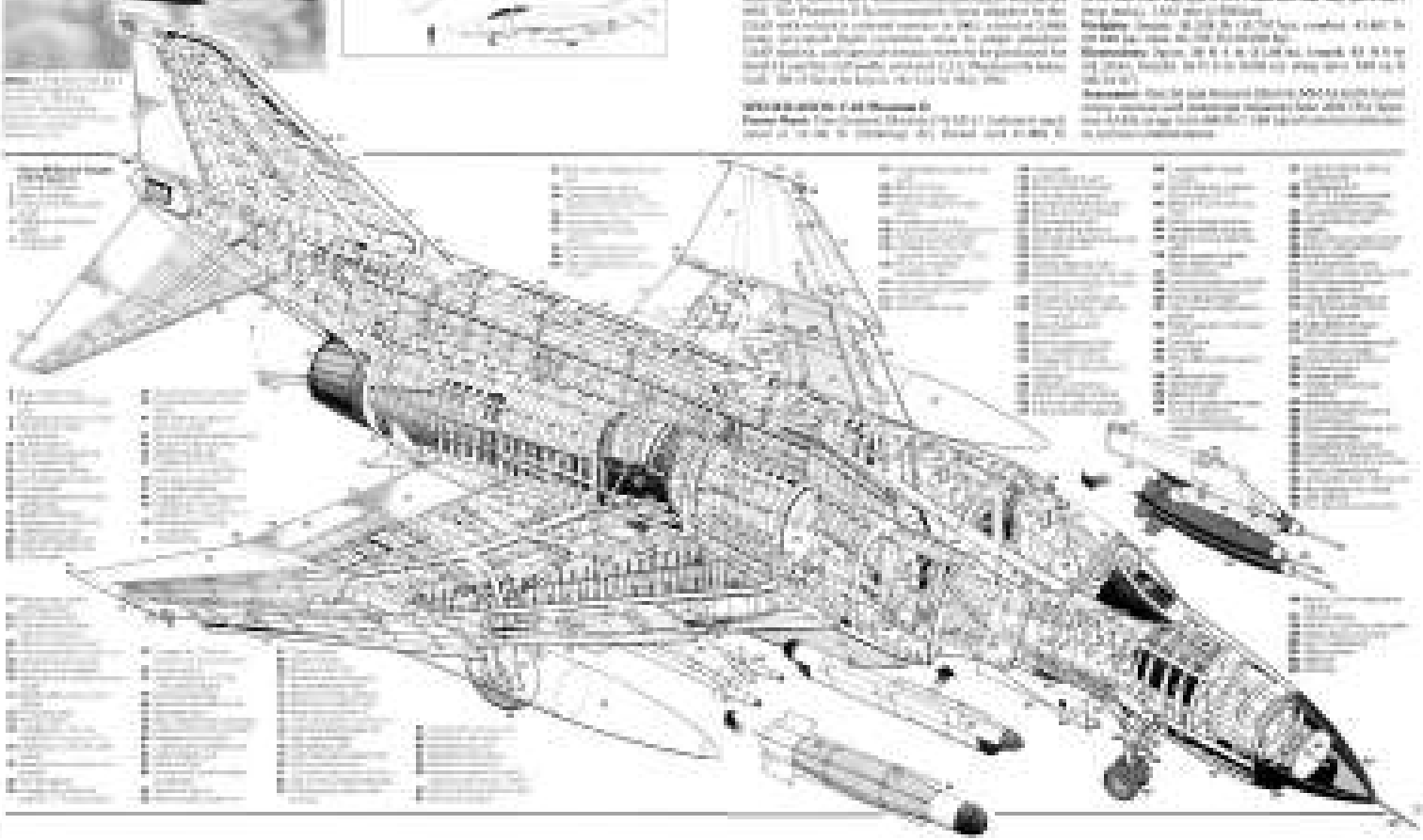
Weights: Empty [illegible] lb; max take-off [illegible] lb.

Dimensions: Span [illegible] ft [illegible] in; length [illegible] ft [illegible] in; height [illegible] ft [illegible] in; wing area [illegible] sq ft.

Armament: Two 30 mm Aden cannon with 180 rpg and two Red Top AAMs.



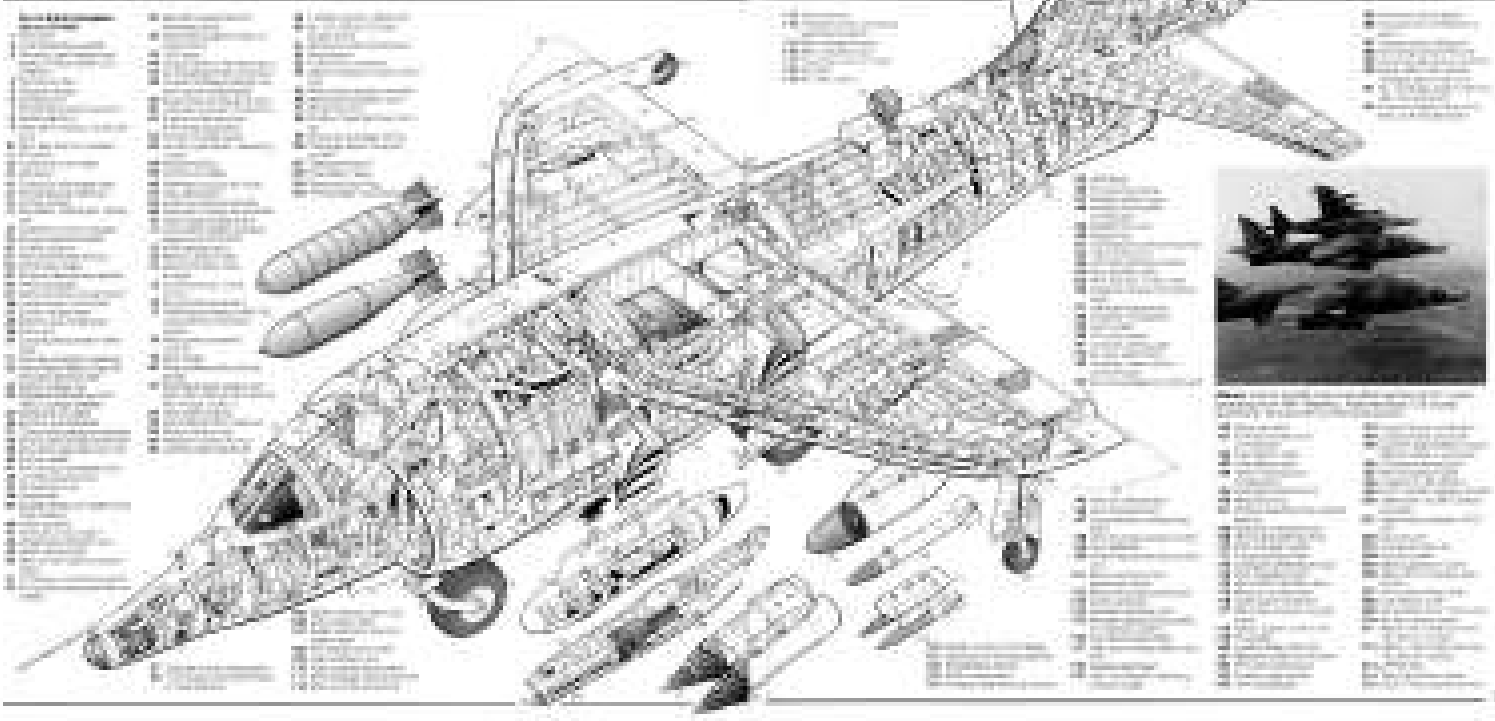
McDonnell Douglas F-4 Phantom II (May 1958)

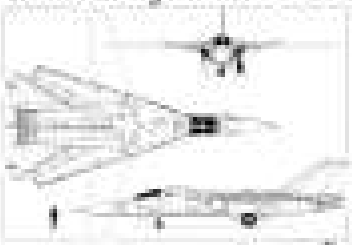


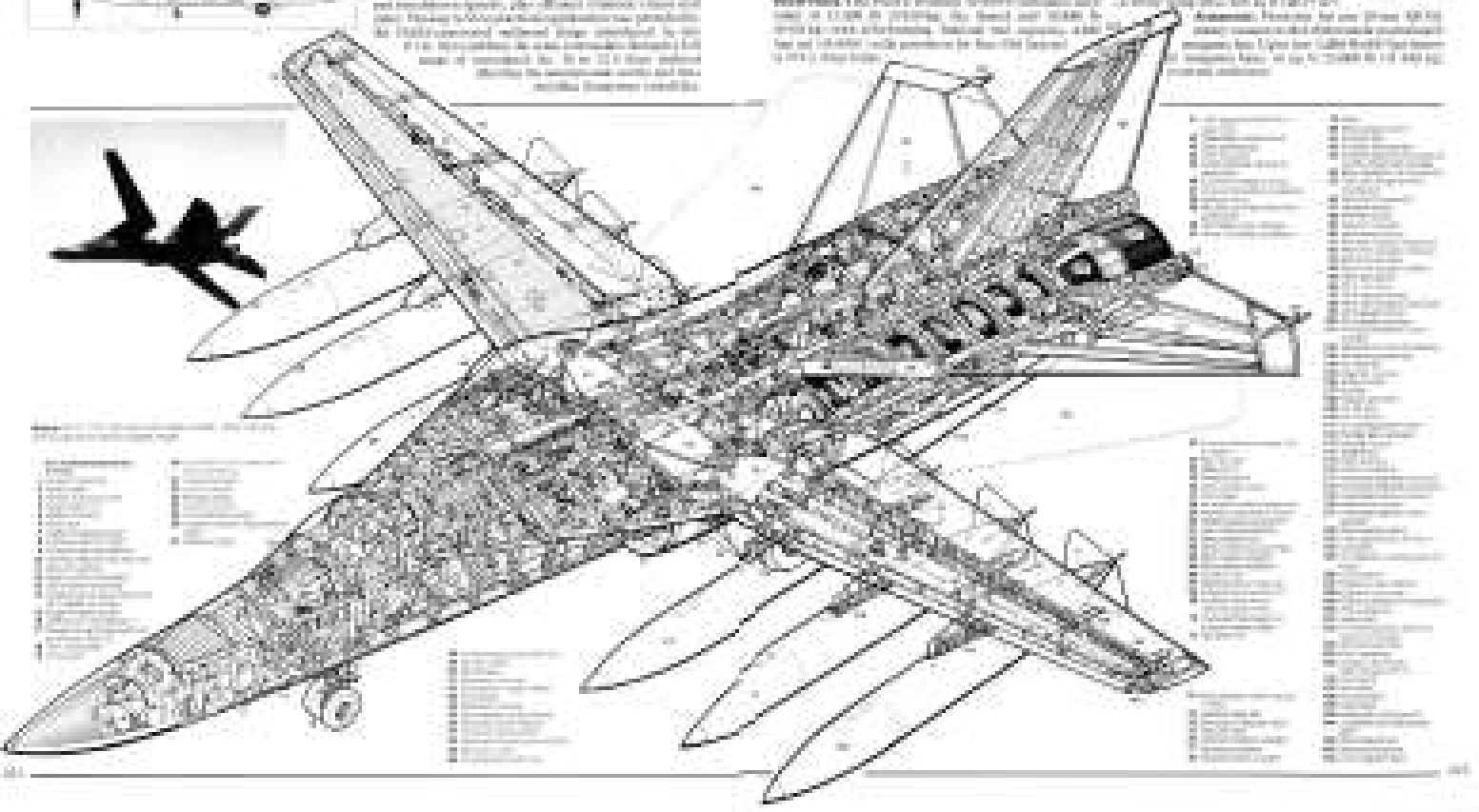
Northrop F-5

SPECIFICATION (F-5E Tiger II)

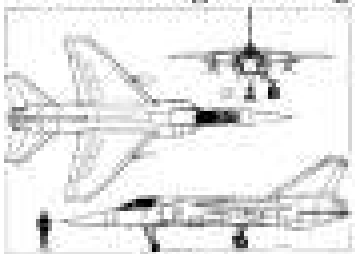
British Aerospace Harrier (October 1985)





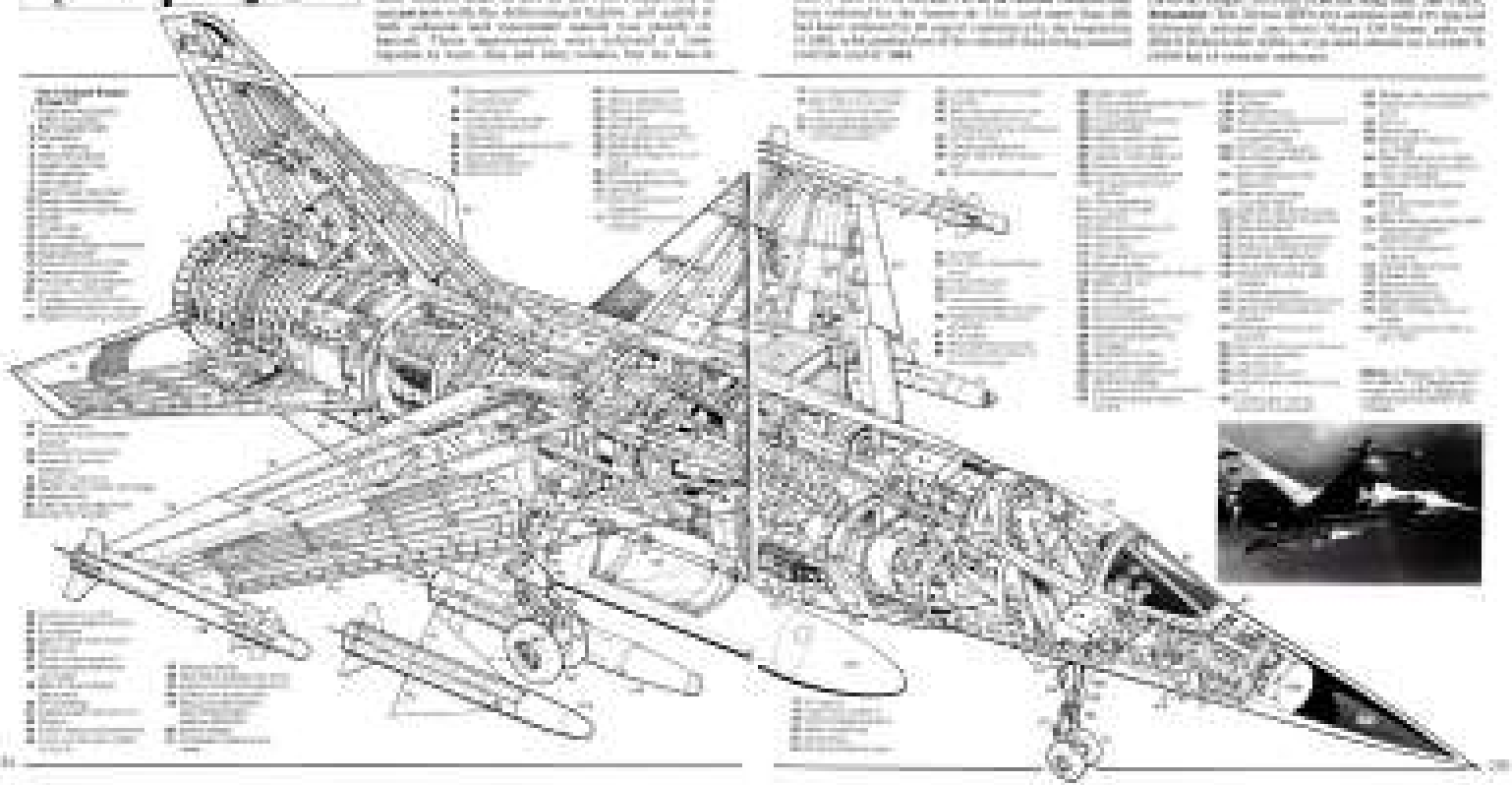


Dassault-Breguet Mirage F1 (December 1978)

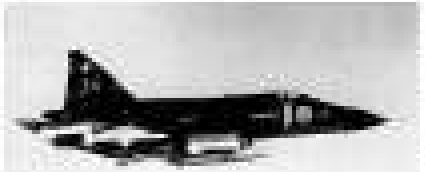


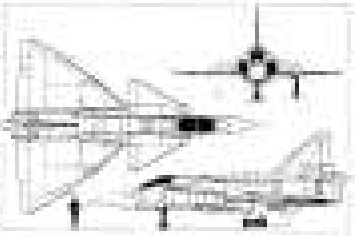
As a result of successful sharing established by the early Mirage with neighboring air powers, Dassault-Breguet's Marcel Dassault commissioned two studies with Avions a Voler Dassault commissioned two studies with Avions a Voler showing the form for which by the following on the Mirage F1 was given its first. During an early successful international demonstration of Mirage wing design by a Dassault test pilot, Dassault received the compliments of "Mirage" for the most successful flight. Mirage F1 was chosen by the Mirage F1 development team, which was a successful design.

Development of Mirage F1 and there as a prototype on 23 December 1966, the new fighter was initially similar to the Mirage III, but in the second wing the first was moved 1 m aft of the wing of the former's delta and had swept dihedral tail including horizontal tail. The first of Dassault and Sudbau-built Mirage F1 prototypes, with four of Dassault and Sudbau-built Mirage F1 prototypes, with four of which produced later, in April 23 and were competitive in comparisons with the aforementioned fighters, and quality of both airframes and instrument systems was steadily improved. These improvements were achieved in later versions to such that they were subject for the basic of

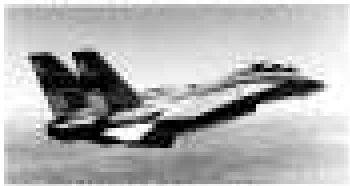


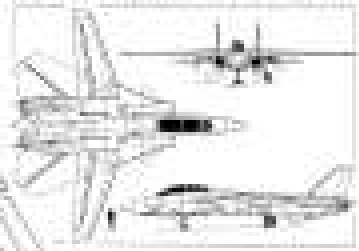
Saab 37 Viggen (February 1967)

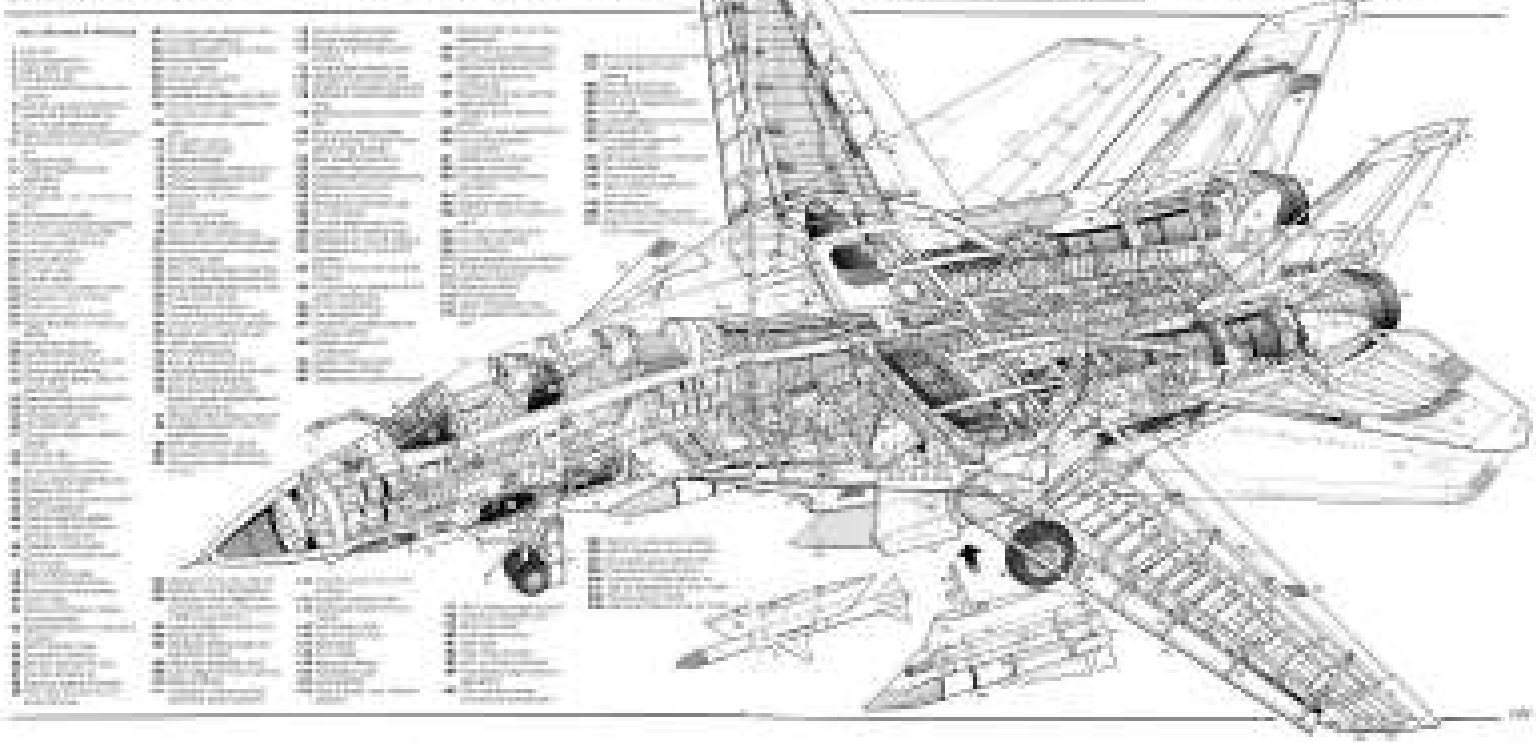




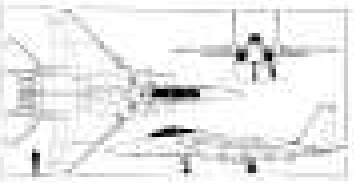
Grumman F-14 Tomcat (December 1970)



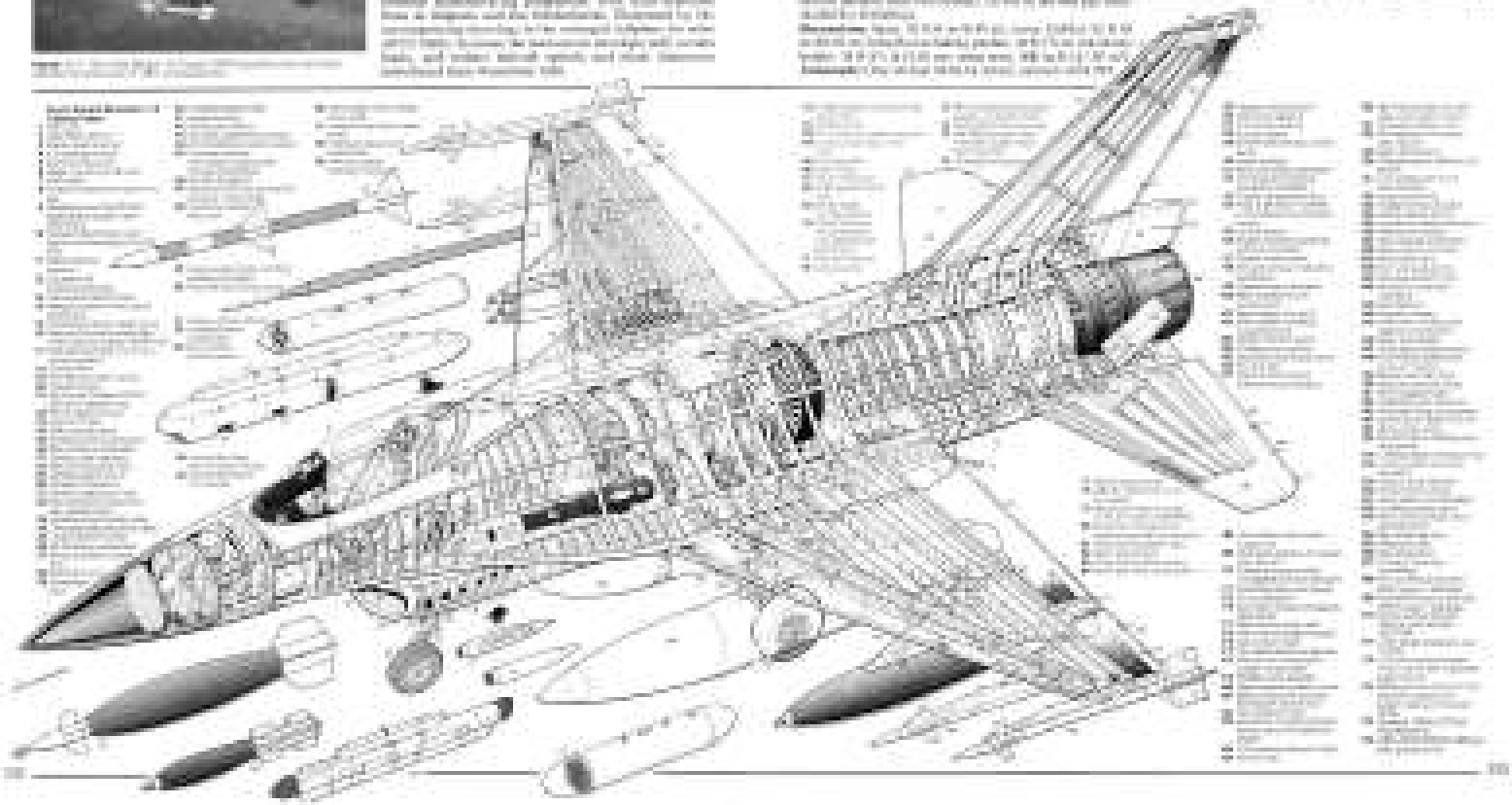




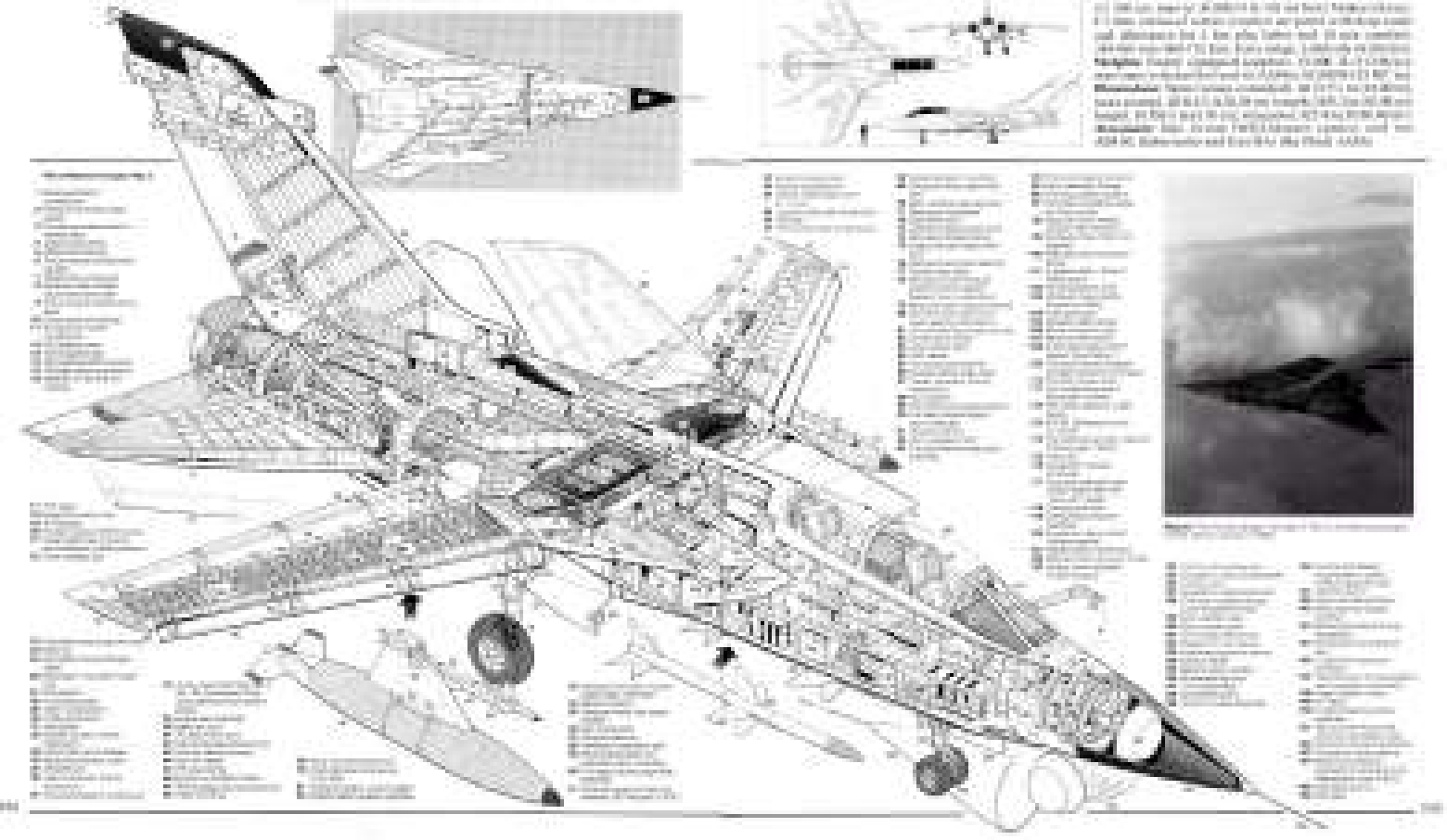
McDonnell Douglas F-15 Eagle (pdf, 1972)



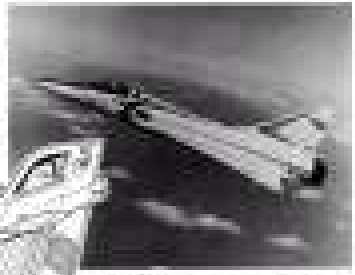
General Dynamics F-16 Fighting Falcon (January 1979)

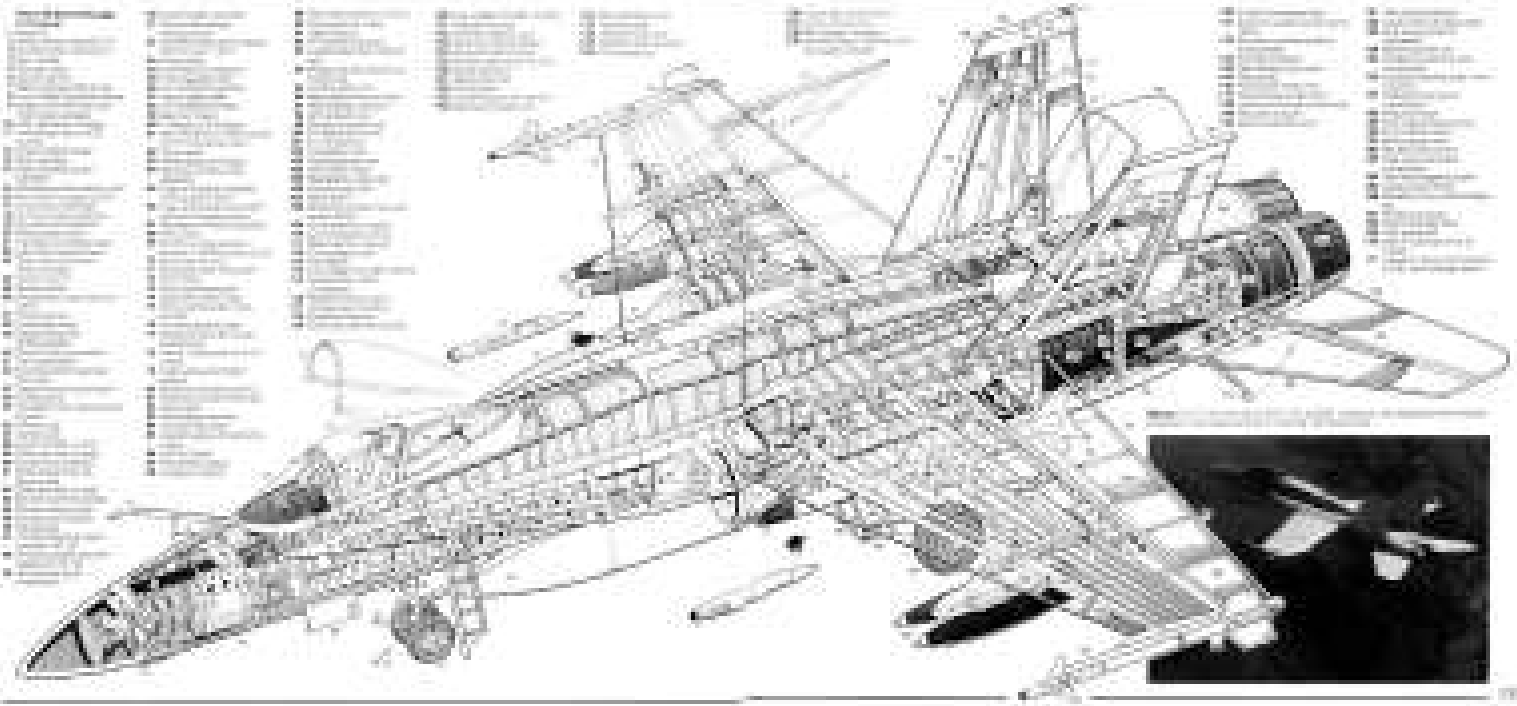


Panavia Tornado (Sepecat IDS)



Dassault-Breguet Mirage 2000 (Mach 2+)





Index of Aircraft Types

Picture Credits

240 pages including a 28-page full colour interactive section on the history of fighter aircraft and featuring 66 colour photographs and 4 colour diagrams

An entirely new way of looking at the history of these amazing warplanes and their significance in the advance of aerial warfare