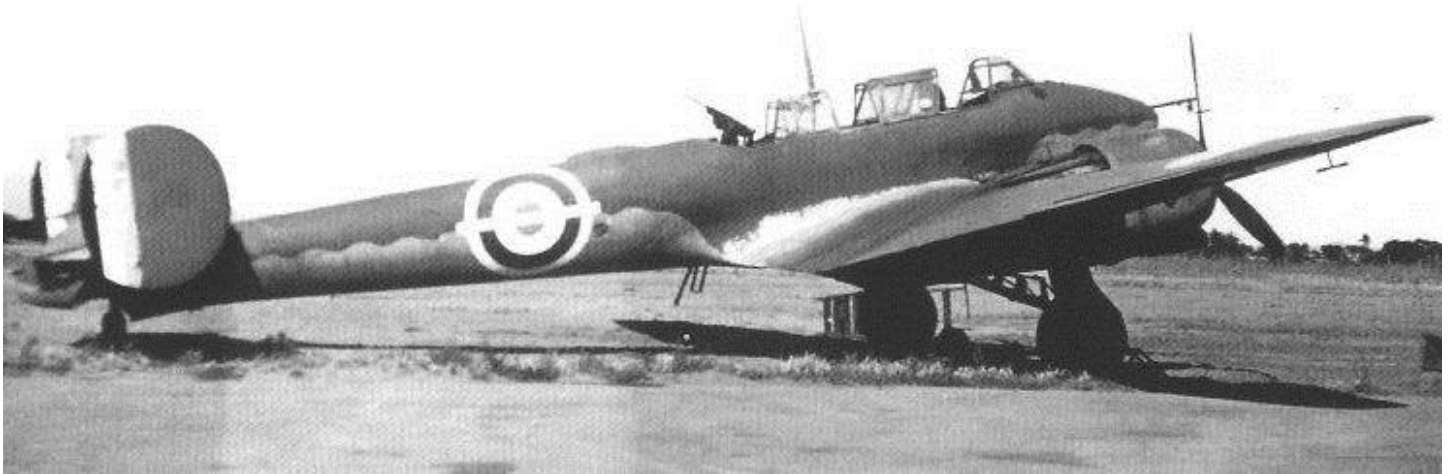


Potez 631



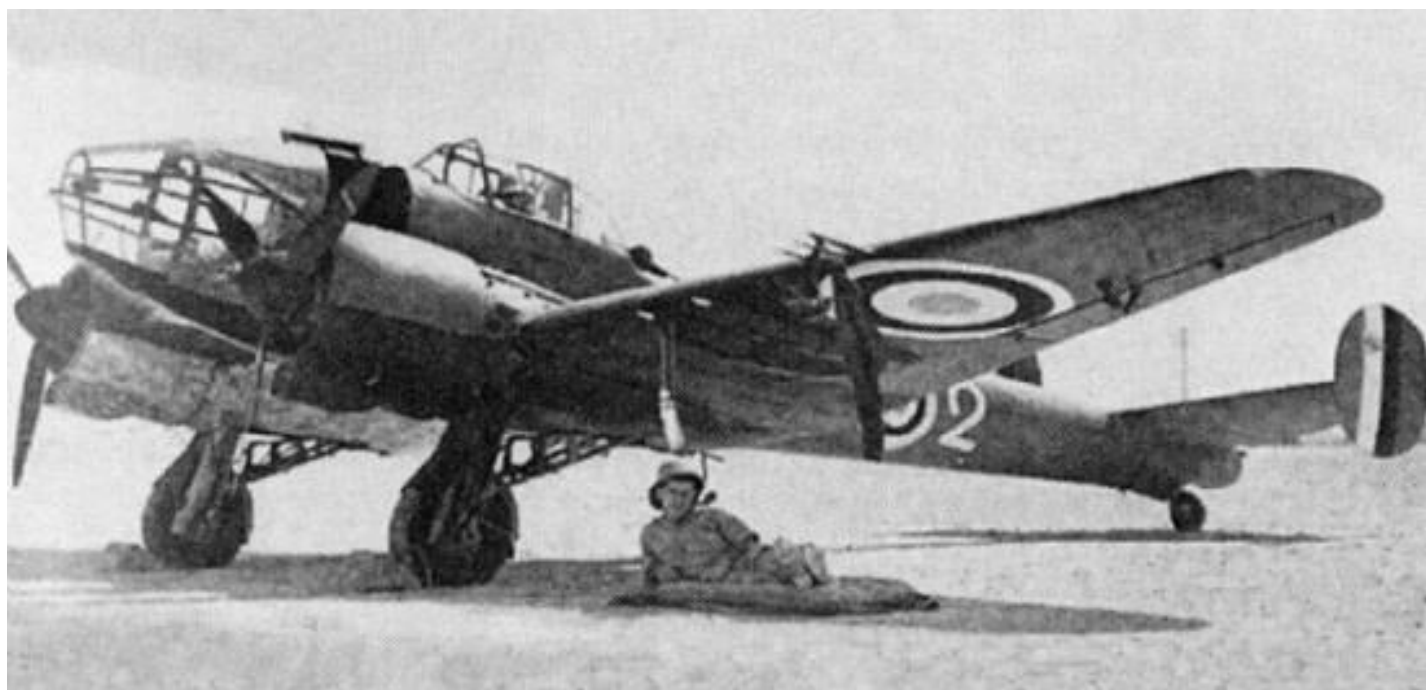
Le Potez 631 est un chasseur français de la Seconde Guerre mondiale. Le Potez 631 et les modèles dérivés étaient une famille d'appareils bimoteurs développés pour l'Armée de l'air à la fin des années 1930. Sa conception est contemporaine à celle du Bristol Blenheim britannique et Messerschmitt Bf 110 allemand. L'état-major de l'armée de l'Air émit un programme en octobre 1934, concernant un triplace de commandement à la chasse destiné à guider des intercepteurs, à vue et par radio, sur le lieu des combats, ainsi que des missions secondaires telles que l'escorte et la chasse de jour et de nuit. Le prototype du Potez 63 effectua son vol initial en avril 1936, les premiers exemplaires de série en février 1938. La lignée des Potez 63 fut une des plus prolifiques de l'industrie aéronautique française, déclinée en version chasseurs lourds, bombardiers et avions de reconnaissance (1100 exemplaires en juin 1940). Cet appareil donna naissance au chasseur de jour Potez 630 et au chasseur de nuit Potez 631, tous deux se présentant comme un bimoteur à ailes basses, à train d'atterrissage semi-escamotable et à empennage bi-dérive. Dans les derniers jours du mois d'août 1939, à la veille de la déclaration de guerre à l'Allemagne, l'armée de l'Air alignait 379 Potez 63, dont les deux tiers environ étaient affectés à des unités opérationnelles, les autres se trouvant en réserve dans les parcs. Les Potez 63 de certaines escadrilles furent confondus avec des Messerschmitt Bf 110 par la chasse et l'artillerie antiaérienne française et britannique. Peu de Potez 631 continuèrent à voler après l'Armistice du 25 juin 1940, à la suite de l'invasion de la zone non occupée, en novembre 1942, les Allemands et les Italiens en saisirent quelques dizaines qu'ils utilisèrent pour l'entraînement. Une caractéristique typique des modèles 630 et 631 était leur armement frontal, qui consistait à la base en deux canons de 20 mm Hispano-Suiza HS.404 montés sous le fuselage, bien que parfois un des canons était remplacé par une mitrailleuse MAC 1934. Plus tard, les Potez 631 reçurent quatre mitrailleuses extérieures légères sous les ailes, il était même théoriquement possible d'en mettre six. Tandis que le projet de chasseur de nuit Potez 635 CN2 était annulé et que le Potez 63.12 C3 équipé de moteurs en étoile Pratt & Whitney Twin Wasp Junior restait à l'état de prototype, le premier lot de chasseurs lourds Potez 671 (dérivés du prototype Potez 670-01) était sur les chaînes de montage quand les allemands capturèrent l'usine SNCAN de Méaulte près d'Albert. Quelques-uns allaient être employés par les Forces aériennes françaises libres en Afrique.



Potez 631 :

- 2 moteurs Gnome-Rhône 14 Mars en étoiles
- 2 X 710 Ch
- 410 Km/h
- 2 canons de 20 mm et 1 Mitrailleur 7.5 mm
- 4430 Kg en charge
- 8000 m de plafond pratique
- 1500 Km en distance franchissable
- 2 ou 3 équipiers





Source : <http://les-avions-de-legende.e-monsite.com/pages/les-chasseurs/les-chasseurs-francais/potez-631.html>

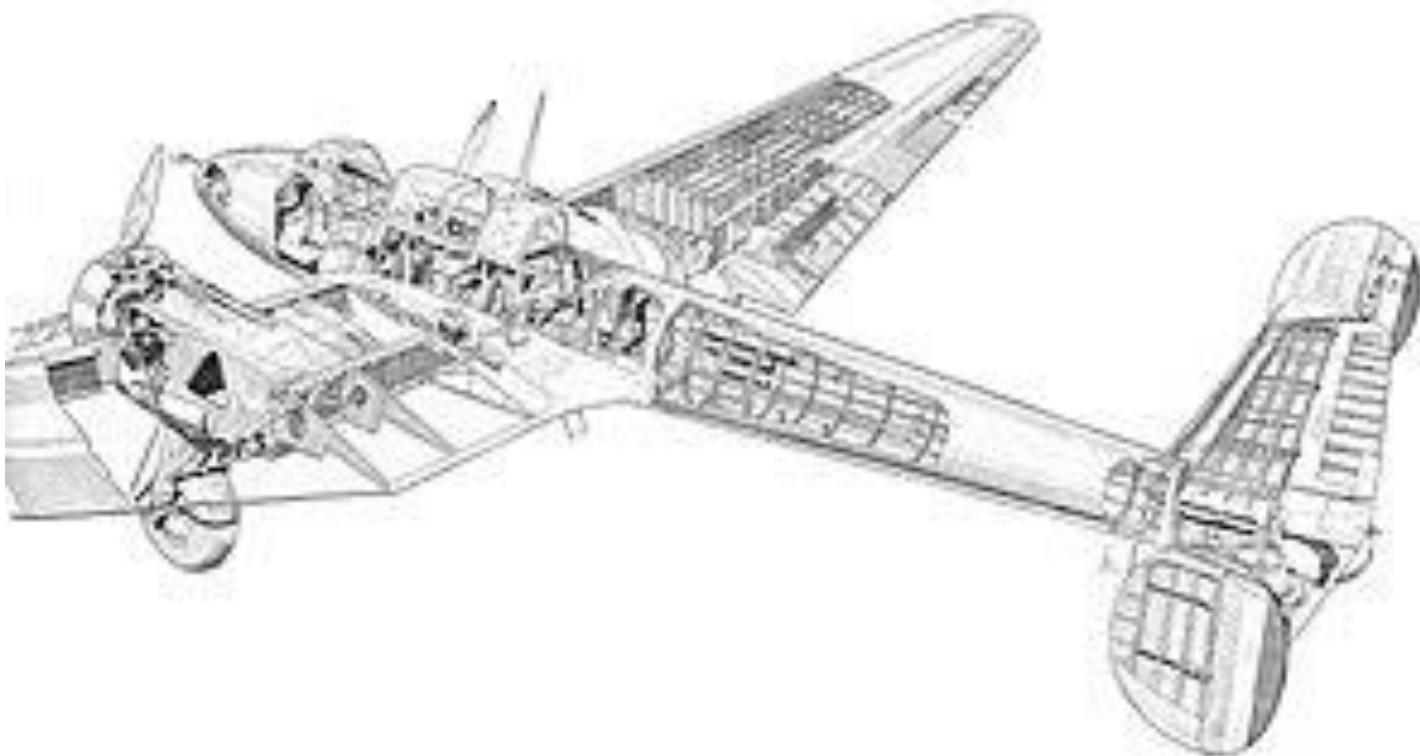
The **Potez 630** and its derivatives were a family of twin-engined, [multirole aircraft](#) developed for the [French Air Force](#) in the late 1930s. The design was a contemporary of the British [Bristol Blenheim](#) (which was larger and designed purely as a bomber) and the German [Messerschmitt Bf 110](#) (which was designed purely as a fighter). The Potez 630 was in use by several operators during the [Second World War](#). Following the [Battle of France](#), both the [Vichy French Air Force](#) and [Free French Air Forces](#) used the type; a number of captured aircraft were operated by several air wings of the [Axis powers](#). After the end of the conflict in 1945, a handful of aircraft were used for training purposes for some time.

Development

Origins

On 31 October 1934, the French [Ministry of Air](#) issued a specification for a [heavy fighter](#).^[2] The specification demanded the aircraft be capable of performing three principal roles: fighter direction, in which it was required to lead formations of single-engine fighters with sufficient maneuverability; day attack, in which the type was also to escort friendly [close air support](#) and bomber aircraft; and [nightfighter](#) operations.^[2] Specified performance details included a maximum speed of 450 km/h at 4,000 meters, a 300 km/h cruising speed, and an endurance of at least four hours. Armament requirements included two fixed forward-firing 20 mm [cannons](#) and a single [machine gun](#) to the rear for self-defence.^[2] The sought aircraft was also required to accommodate two/three seats along with a twin-engine configuration; however, some of the performance limitations imposed upon the aircraft, such as the maximum weight, served to restrict the range of suitable engines to power the type.^[2] The original *Potez 630* was developed to meet this specification; two variants of the aircraft were originally submitted for consideration, one (the 630) powered by [Hispano-Suiza 14AB radial engines](#) and the other (the 631) with the [Gnome-Rhône 14N](#).^[2] Other companies also produced submissions in response, including [Breguet Aviation](#), [Hanriot](#), [Chantiers aéronavals Étienne Romano](#), and [Loire-Nieuport](#). Each of the competing manufacturers were requested to produce a single prototype for evaluation at their own expense; work on the first prototype, designated as the *Potez 630-01*, commenced in April 1935.^[2] In addition to the Potez 630, the same specification had ultimately resulted in the successful [Breguet 690](#) series of attack aircraft. On 25 April 1936, the Potez 630-01, equipped with a pair of 580 hp Hispano-Suiza 14, conducted its [maiden flight](#) from [Méaulte](#), [Picardy](#).^[2] Initially, the prototype was equipped with an experimental feature in the form of a braced [horizontal stabilizer](#) that incorporated no dihedral. On 6 May 1936, the prototype suffered some damage due to a hard landing following the mid-air loss of a [propeller](#) blade.^[2] On 3 August 1936, after receiving repairs, the Potez 630-01 was transferred to [Villacoublay Air Base](#), [Île-de-France](#); it was soon refitted with an alternative tail arrangement similar to later production aircraft and long-stroke [landing gear](#). On 20 November 1936, flight testing of the prototype resumed; it was shortly thereafter delivered to the *Centre d'Essais de Matériels Aériens* (CEMA) for official tests.^[2] The original engines of the Potez 630-01 were progressively replaced with improved models of Hispano-Suiza engine, gradually increasing power to reach 700 hp on takeoff.^[2] At its maximum takeoff weight of 3,850 kg, the prototype was capable of a maximum speed of 460 km/h and a maximum range of 1,300 km when flown at an economical cruising speed of 300 km/h. In March 1937, the second prototype, designated Potez 630-02, performed its maiden flight from Méaulte.^[3] The Potez 631-01 was damaged after a landing with its landing gear not being locked into the down position; after repairs, it was handed over to CEMA for official trials in November 1937.^[4]

Production



Cutaway of the Potez 630.

On 23 December 1936, the [Société nationale des constructions aéronautiques du Nord](#) (SNCAN) was officially formed, grouping together five French aircraft factories; further amalgamations into SNCAN soon took place, including Potez in early 1937.^[2] Shortly following its establishment, SNCAN received a provisional order letter for ten experimental aircraft; four of these were derived from the Potez 630, three from the Potez 631 (one being the existing 631-01 prototype), two Potez 633 light bombers and one Potez 637 aerial reconnaissance aircraft. This was promptly confirmed by a contract, under which one Potez 633 was replaced by a single Potez 637 low level ground attack aircraft.^[4] In June 1937, an order for an initial production batch of 10 two-seat and 30 three-seat Potez 631 day fighters was received, the first five of which were to be delivered by February 1938.^[4] As large-scale manufacturing of the Gnome-Rhône 14M engines had yet to be achieved and thus was not able to reach the desired production rate of the Potez 630, an additional order was placed for 80 aircraft powered by the alternative Hispano-Suiza engine.^[4] The first 48 aircraft to be produced were equipped with Hispano-Suiza 14AB02/03 engines, these were succeeded on later models by the improved Hispano-Suiza 14AB10/11. In December 1937, regular contracts took the place of the provisional letters; a further order for 50 Potez 633 light bombers was also received, bringing the total orders for the type to 180, including the ten prototypes that had been ordered.^[4] During the late 1930s, the Potez 630 received considerable foreign interest; in addition to France, many countries were in the process of re-equipping their air forces.^[4] One such foreign venture was the acquisition of a [licence to manufacture](#) by the [Czechoslovakian](#) aircraft firm [Avia](#) to produce a variant of the aircraft, designated as the *Potez 636*; none were completed prior to Czechoslovakia's [annexation by Nazi Germany](#) in 1938.^[4] In 1938, a further 50 additional Potez 631s were ordered, of which 20 were to be diverted to [Finland](#), although they never reached that country. A number of firm foreign orders was placed with SNCAN for the type; the [Republic of China](#) ordered four Potez 631 and five Potez 633, the [Kingdom of Yugoslavia](#) ordered two Potez 630 and one Potez 631, the [Kingdom of Romania](#) ordered 20 Potez 633, the [Kingdom of Greece](#) ordered 24 Potez 633, and [Switzerland](#) ordered one Potez 630 and one Potez 633.^[4] In May 1937, series production of the Potez 630 commenced.^[4] Manufacturing work on the aircraft's various sections and components was shared out across various SNCAN facilities; the fuselage and tailplanes were produced in [Caudebec-en-Caux](#), [Normandy](#), the wings were made at [Le Havre](#), Normandy, and final assembly was initially performed at Méaulte; the assembly work was later transferred to [Les Mureaux](#).^[5] In February 1938, the first production Potez 630 conducted its maiden flight; on 23 February, the [French Air Force](#) accepted their first production 630 aircraft.^[6]

Early on, production of the Potez 630 was hit by considerable delays, caused by a shortage of engines, propellers, and cannons; the first batch of Potez 630s were armed with four machine guns instead of the two 20 mm Hispano-Suiza cannons. On 2 August 1938, the first Potez 631 was officially accepted.^[6] On 15 March 1938, a major re-equipment and expansion program of the French Air Force, known as *Plan V*, was approved.^[6] While there had been intentions to order a more capable twin-engine aircraft, these were not ready for production, thus the Potez 631 and 633 were retained for this production program, which first involved 207 twin-engined day-and-night fighters along with 449 daytime light bombers. On 25 March 1938, the order for the Potez 633 was increased to 125 bombers, which were also requested to be three-seaters.^[6] The Potez 633 orders were subsequently cancelled, ordering additional Potez 631 aircraft in their place; further orders of the Potez 631 were placed to allow for the speedy withdrawal of the troublesome Potez 630.^[6] Between January and June 1940, an average production rate of 100 aircraft per month was maintained.^[7]

Design



Front of a Potez 63.11

The Potez 630 was a twin engine, monoplane, fully metallic three-seater with efficient aerodynamic lines and twin tailfins. The basic design allowed for the type to replace various obsolete aircraft in the French Air Force in a wide range of roles.^[7] The long glasshouse housed a crew of three, comprising a pilot, an observer or commander who was carried based upon mission requirements, and a rear gunner who manned a single flexible light machine gun. The Potez 637 featured a glazed gondola located beneath the fuselage for an observer to be carried in the [prone position](#).^[4] Some variants, such as the Potez 631 and 633, had a vertical bomb bay located between the two crew members.^[4] The 630 was a relatively simple and sound design, requiring an average of 7,500 [man-hours](#) to assemble each aircraft. All members of the family (with the possible exception of the Potez 63.11) shared pleasant flying characteristics and were designed to allow for easy maintenance.^[7] As a day fighter aircraft, the performance of the Potez 631 C3 was relatively disappointing, due to a low maximum speed and inadequate rate of climb compared with contemporary fighter aircraft.^[7] As a night fighter, lack of detection equipment drastically limited their effectiveness.^[7]

Later models had a heavy armament (12 machine guns for the Potez 63.11). The Potez 63 family, as with the contemporary [Fairey Battle](#) and [Bristol Blenheim](#) bombers and like many French aircraft of the time, proved vulnerable to [Messerschmitt Bf 109s](#). Their similarity to the [Messerschmitt Bf 110](#), both being equipped with twin engines, twin fins and a long greenhouse canopy, is believed to have resulted in several aircraft being lost to "[friendly fire](#)".^[7]

Operational service

Introduction

From May 1938, production Potez 630 fighters started to be delivered; the first improved Potez 631 aircraft were received in August that year.^[6] Potez 630 and 631s, in two-seater configuration, were soon used to replace obsolete [ANF Les Mureaux 113](#) used as night fighters, while single-seat fighter groups received a number of three seat Potez 63s to act as command aircraft, from which formations of single-seat fighters would be directed and co-ordinated by radio.^{[8][9]} In July 1938, the first fifteen Potez 630 aircraft participated in the Villacoublay Air Show.^[6] In May 1938, the *Armée de l'Air* (French Air Force) placed an order for 125 Potez 633 light bombers; additional orders had also been placed by [Romania](#) and [Greece](#) for 20 and 24 Potez 633s respectively.^[10] France cancelled its order for Potez 633s in the summer of 1938, but further orders for the 633 were placed by Romania (for 20 more aircraft, which had been part built under the French order), and from China, for nine. Deliveries to Romania started late in 1938, with the Greeks receiving their first aircraft in the spring of 1939. In August 1939, with the risk of war increasing the French government requisitioned 32 Potez 633s from the Greek and Romanian orders that were still in France awaiting delivery.^[11] By September 1938, the Potez 630 had begun to supplant the obsolete [Bloch MB.200](#) bomber in the fighter direction role; however, the Potez 630's engines proved so troublesome in service that most units were rapidly re-equipped with the Potez 631 prior to the outbreak of the Second World War.^[6] By 1 April 1939, a total of 77 Potez 630 and 88 Potez 631 aircraft had been accepted by the French Air Force. The retirement of other obsolete French aircraft, such as the [Morane-Saulnier M.S.225](#) and [Dewoitine D.510](#), could be accommodated for by the increasing numbers of Potez 631s.^[12] Just prior to the outbreak of the Second World War, the French Air Force had 85 Potez 630s, 206 Potez 631s, 22 Potez 633s, 63 Potez 633s, and 5 Potez 63.11 aircraft.^[13] The Potez 633 aircraft that were exported to [Greece](#) and [Romania](#) saw greater service than their French counterparts despite their limited numbers. Greece had nine Potez 633s in service when [Italy invaded Greece](#) in October 1940. These were used for bombing attacks against Italian supply lines until shortage of spares forced their withdrawal. In June 1941, Romania joined Germany in the [invasion of the Soviet Union](#). Two squadrons were equipped with the Potez 633 which were used to support the Romanian army as it advanced towards [Odessa](#). In 1942, they were replaced by [Junkers Ju 88](#) bombers, allowing the survivors to be transferred to the advanced training role.^[14]

Second World War



A Potez 630 captured during the [Syria–Lebanon Campaign](#), 1941

On 28 August 1939, the French Air Force initiated the mobilisation of its units, including those equipped with the Potez 630 series.^[13] Due to requests from [French Naval Aviation](#) some Potez 631 aircraft were soon diverted to replace their [Dewoitine D.371](#) fighters. In February 1940, a new war plan, *Plan V bis*, was adopted; under this plan, nearly all Potez 630 and a number of Potez 631 aircraft were retired from front line service, with some of the 630s converted to become dual-control training aircraft.^[13] That same month, it was decided to rearm the majority of Potez 631s, replacing their original armament of one cannon and one machine gun with two cannons and four underwing machine guns for the purpose of conducting ground attack missions; however, progress on this was relatively slow.^[15] The French Air Force found a use for the Potez 633 aircraft as conversion trainers for units that had received the [Breguet 691](#) attack aircraft. On 20 May 1940, three Potez 633s took part in a strafing mission against German troops near [Arras](#). This was the type's only operational mission over France as two days later the aircraft was withdrawn from front-line service.^[16] A small number of Potez 633 originally destined for [China](#) were commandeered by the French colonial administration in Indochina and saw limited action in the brief [French-Thai War](#) in early 1941. Parked in the open ground, a number of them were destroyed by Thai [Hawk 75N](#) strafing during an air raid at Siem Reap.^[17] Once active combat had begun, the Potez 631 had quickly proved to be an ineffectual interceptor; it was slower than some German bomber aircraft and 130 km/h slower than the [Messerschmitt Bf 109E](#) fighter. Perhaps the most successful unit operating the Potez 631 was the [Flottille F1C](#) of the French Naval Air Arm; between 10 and 21 May 1940, aircraft of the unit shot down 12 enemy aircraft in exchange for 8 of their own losses prior to its withdrawal from active combat.^[18] At one point, the Potez 637 was the only modern aircraft equipping the [Groupes de Reconnaissance](#) (GOA), which had long been equipped with obsolete aircraft.^[19] From November 1939 onwards, the first units to convert to the Potez P.63.11 were each assigned three aircraft. By mid-January 1940, there were 43 Potez 63.11s in service with 12 GOAs.^[20] By June 1940, more than 700 reconnaissance Potez 63.11 had been delivered.^[21] These aircraft encountered various fates in service: more than 220 were destroyed or abandoned. Despite the addition of extra machine gun armament, aircraft having received either six, eight, or ten machine guns, the Potez 63.11 suffered the heaviest losses of any French type. One factor contributing to the high losses was the near-complete lack of spares, rendering 70 per cent of all P.63.11 aircraft unserviceable even prior to the German invasion; many aircraft were destroyed on the ground by enemy bombing and strafing attacks, and entire units were wiped out without conducting a single mission.^[18] The Potez 63.11 continued in service with the air force of [Vichy France](#) and with the forces of the [Free French](#); this led to the two opposing sides both operating the type in the North African theatre.^[22] The [Free French Air Force](#) initially possessed as few as three Potez 630 aircraft, but further models were captured from the [Vichy French Air Force](#). The Germans initially allowed several Potez 630-equipped units to continue under Vichy French control; these were typically stationed in Southern France and North Africa. In the latter theatre they frequently engaged in combat with Allied forces.^[23] By 1 November 1941, the Vichy Air Force had 22 Potez 630s, 82 Potez 631s, six Potez 637s, and 236 Potez 63.11 aircraft. Large numbers of Axis-aligned Potez 630s stationed in North Africa were destroyed by American bombers during [Operation Torch](#); Allied 630s were also used during the operation to conduct ammunition supply missions and to respond to *Luftwaffe* aircraft.^[23] On 27 November 1942, German military units occupied Vichy Air Force bases and seized their aircraft: around 134 Potez 630s of several variants were taken.^[23] Of the seized aircraft, 53 were refurbished and dispatched to Romania for use as trainers and [target tugs](#); spare engines were also reused to power a number of *Luftwaffe* [Henschel Hs 129Bs](#).^[23] Production of the type was resumed under German control; significant numbers of aircraft appear to have been pressed into service by the Germans, mostly in liaison and training roles. The last three Potez 631s in service were recaptured examples; these made a final contribution following the cessation of hostilities in their use as trainer aircraft at the *Centre d'Essais en Vol* for the revived French Air Force.^[24]

Variants

Unlike many contemporary French aircraft, production of the Potez aircraft was reasonably prompt and the first deliveries were effected before the end of 1938. The 63 had been designed with mass production in mind and as a result, one Potez 630 was cheaper and faster to manufacture than one [Morane-Saulnier M.S.406](#). As production tempo increased, a number of derivatives and experimental models were also developed.

Fighter variants

A typical feature of the 630 and 631 was the frontal armament, which originally consisted in two 20 mm [Hispano-Suiza HS.404](#) cannons in gondolas under the fuselage, though sometimes one of the cannons was replaced by a [MAC 1934 light machine gun](#) (LMG). Later in their career, 631s received four additional LMGs in gondolas under the outer wings, though it was theoretically possible to fit six.

Bomber variants

Potez 633 B2

two-seater, light level bomber. The Potez 633 retained the fuselage, wings and engines of the 631 but the observer's position and cannon gondolas were deleted and a small bomb bay was added between the pilot and rear gunner. Front armament consisted of a single light machine gun in the nose. The bomb bay could house eight 50 kg-class or two 200 kg (440 lb) -class bombs. There was no bombardier position, as the rear gunner was supposed to direct the bombing run through a periscopic bombsight fitted ahead of him, a disposition that proved unworkable in the field.

Potez 633.01

The first two-seat bomber prototype flew in late 1937. The Armée de l'air ordered 133 Potez 633s in 1938, but two months later decided all aircraft in the light level bomber category should be 3-manned, like the [Douglas DB-7](#) and [Bloch MB.175](#). The French order for 633s was converted into an order for more 631s. The 633 was however offered for export and attracted orders from Romania, China and Greece.

Potez 632 Bp.2

One example of the [dive bomber](#) prototype was started, but completed as a 633 however with Hispano-Suiza engines. It was sold to Switzerland for evaluation.

Potez 63 9 AB2

The single two-seat attack bomber prototype was converted as a standard 633.

Reconnaissance variants



Potez 63.11 in North Africa. January, 1943



Potez 63.11 at Aleppo, Syria, in June 1941.

Dissatisfied with its strategic reconnaissance aircraft such as the troublesome [Bloch MB.131](#), the Armée de l'air required the development of a derivative of the Potez 631 for this role.

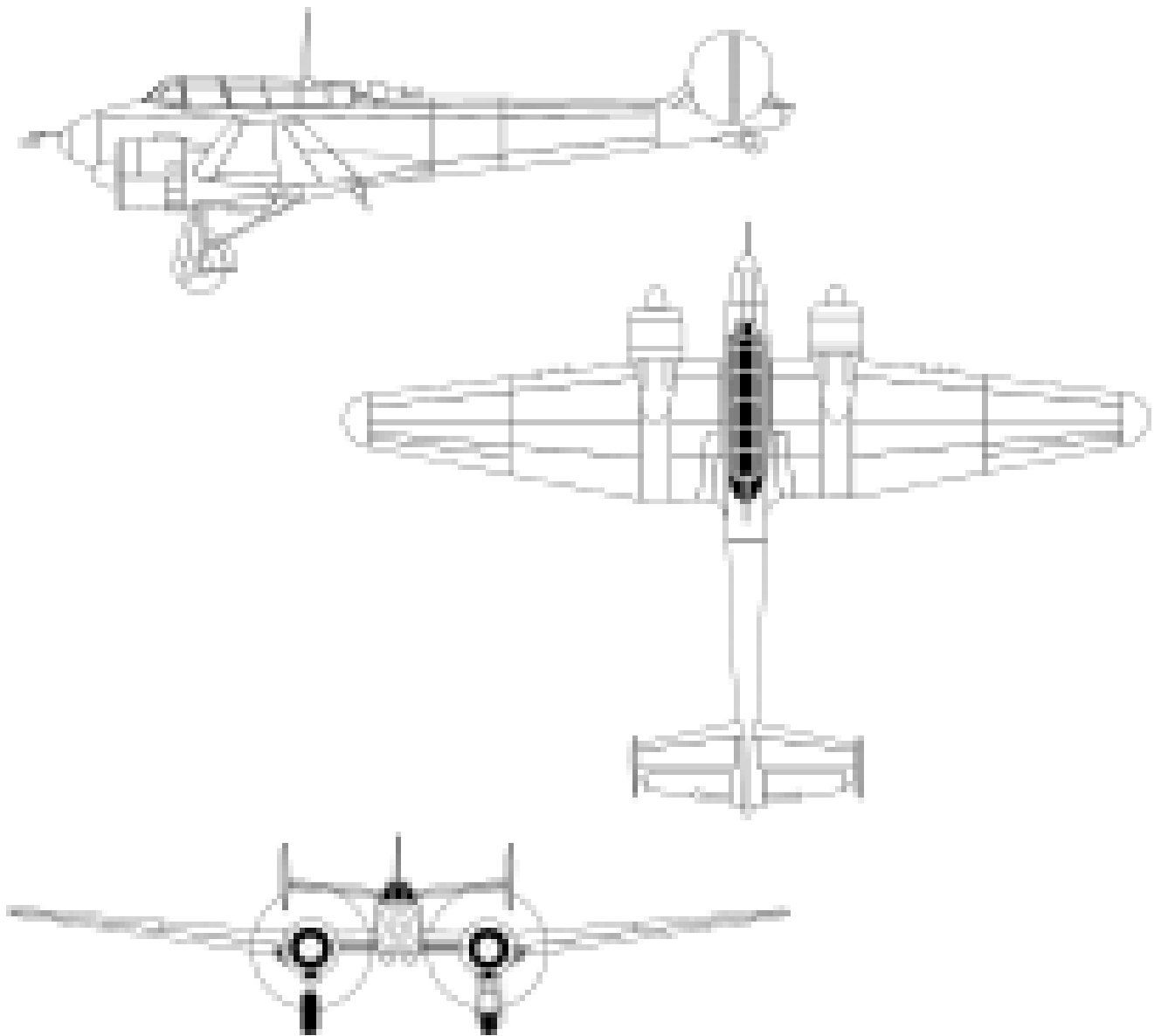
Potez 637

Strategic reconnaissance aircraft. The observer was housed in a gondola under the fuselage; this arrangement resulted in an aircraft that retained most of the qualities of the 631. 60 examples were ordered in August 1938 and delivered. At the same time, the Armée de l'Air was desperate to re-equip its [army cooperation](#) units which had particularly antiquated equipment, but since the development of the 637, had completely changed its mind about how the observer position should be arranged. Potez was therefore required to develop a variant that, while retaining the wings, engines and tail surfaces of the 631, hosted the observer in a more conventional nose glasshouse.

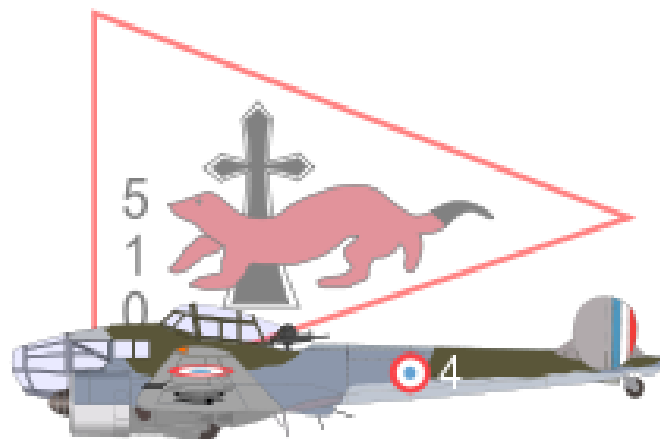
Potez 63.11

Because the pilot needed to be seated above the observer, the fuselage was taller, which resulted in reduced top speed and manoeuvrability. As a result, the 63.11 proved very vulnerable, despite being protected with some armour and basic self-sealing coating over the fuel tanks. As a secondary light bomber capability was part of the requirements (though it was rarely if ever used), the fuselage accommodated a tiny bomb bay, carrying up to eight 10 kg-class bombs. This bomb bay was replaced by an additional fuel tank on late examples. Additionally, two 50 kg-class bombs could be carried on hardpoints under the inner wings. Frontal armament was originally one, then three MAC 1934s under the nose, and many 63.11s were equipped with the same additional guns in wing gondolas as the 631s. The first **Potez 63.11 No.1** and second **No.2** prototypes first flew in December 1938, and no less than 1,365 examples were on order in September 1939, of which 730 were delivered, making the 63.11 the most numerous variant of the family by far.

Specifications (Potez 63.11A.3)



3-view drawing of the Potez 630



General characteristics

- **Crew:** 3
- **Length:** 10.93 m (35 ft 10 in)
- **Wingspan:** 16 m (52 ft 6 in)
- **Height:** 3.08 m (10 ft 1 in)
- **Wing area:** 32.7 m² (352 sq ft)
- **Empty weight:** 3,135 kg (6,911 lb)
- **Gross weight:** 4,530 kg (9,987 lb)
- **Powerplant:** 1 × [Gnome-Rhône 14M-04](#) 14-cylinder air-cooled radial piston engine, 522 kW (700 hp) LH rotation
- **Powerplant:** 1 × [Gnome-Rhône 14M-05](#) 14-cylinder air-cooled radial piston engine, 522 kW (700 hp) RH rotation
- **Propellers:** 3-bladed variable-pitch propellers

Performance

- **Maximum speed:** 425 km/h (264 mph, 229 kn) 5,500 m (18,045 ft)
- **Cruise speed:** 299 km/h (186 mph, 161 kn) at 4,500 m (14,764 ft)
- **Range:** 1,500 km (930 mi, 810 nmi)
- **Service ceiling:** 8,500 m (27,900 ft)
- **Rate of climb:** 8.4 m/s (1,650 ft/min)

Armament

- **Guns:** (original armament)
 - 1 × fixed, forward-firing [7.5 mm MAC 1934](#) machine gun
 - 1 × fixed, rearward-firing 7.5 mm MAC 1934 machine gun
 - 1 × flexibly mounted, rearward-firing 7.5 mm MAC 1934 machine gun
- (Final armament)
 - 3 × fixed forward firing machine guns under fuselage
 - 4 × fixed, forward firing machine guns under outer wings
 - 3 × semi fixed, rearward firing machine guns in ventral mount
 - 2 × flexibly mounted machine guns in aft cockpit
- **Bombs:** 4 × 50 kg (110 lb) bombs



Source : https://en.wikipedia.org/wiki/Potez_630