

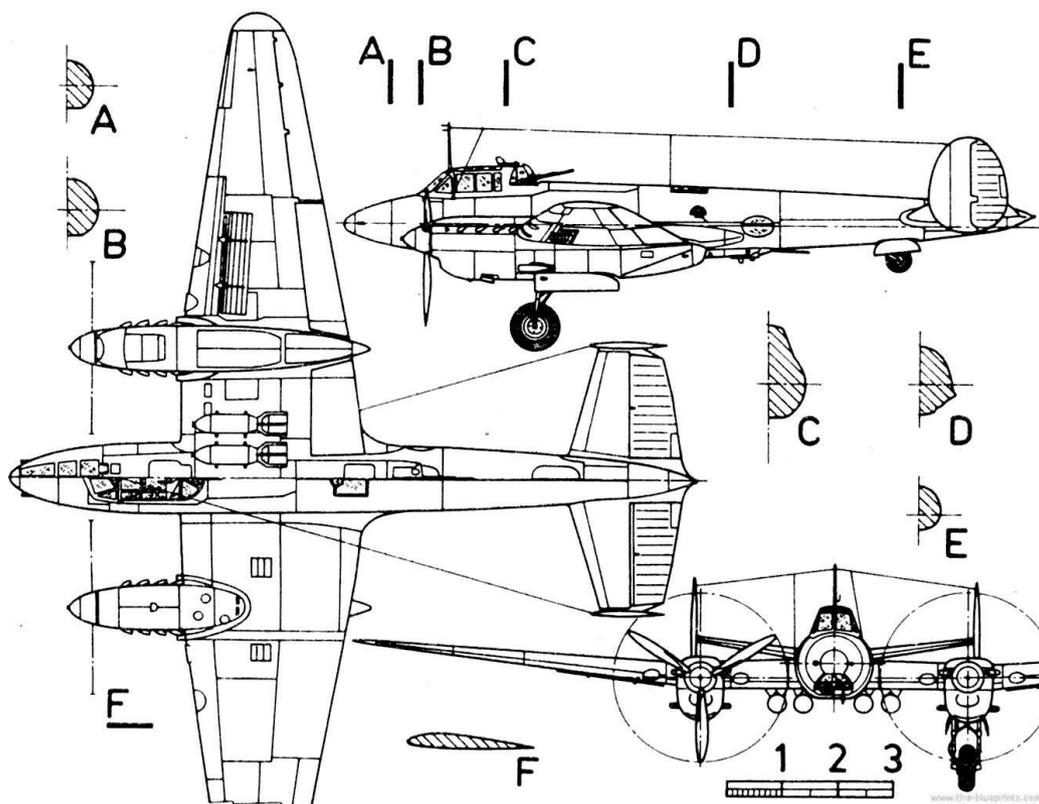
Petliakov Pe2

Le Petliakov Pe2 est conçu sous la direction de Vladimir Petliakov en 1939 comme un bombardier de haute altitude servira pour l'attaque au sol. Entièrement en métal il avait une cabine pressurisée, des moteurs avec compresseurs et de nombreuses fonctions électriques, comme les volets. Il se montra immédiatement au point et pouvant être construit en série, mais la Blitzkrieg montra que des avions d'appui et d'attaque au sol étaient plus urgents. On demanda donc sa modification en bombardier en piqué.

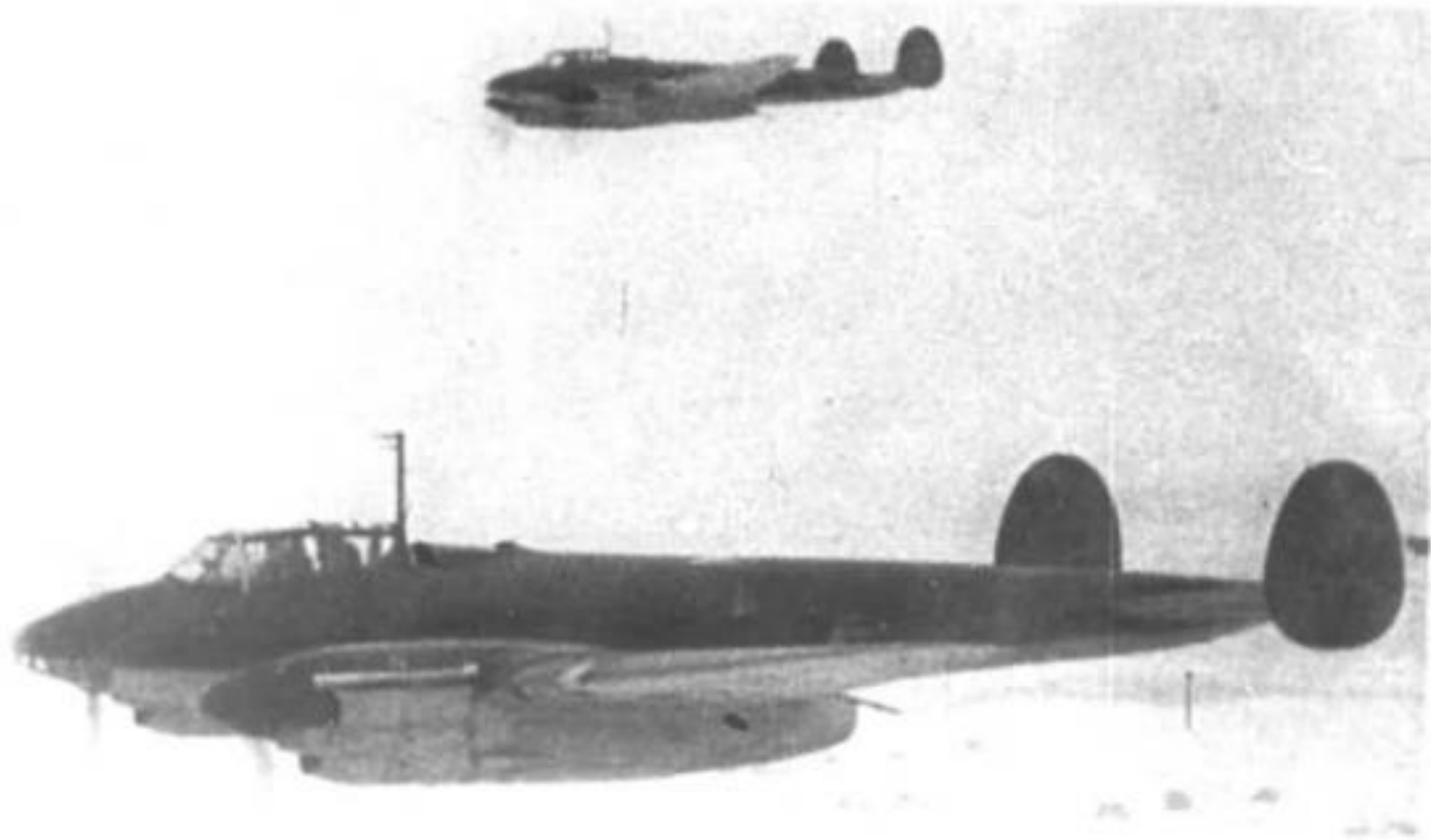
La pressurisation et les compresseurs furent retirés tandis que l'on ajoutait des freins aérodynamiques. Cette version vola le 15 décembre 1940 et la production débutant immédiatement, fut mise en escadrille au printemps suivant. En 1941 les forces soviétiques furent trop bousculées pour permettre un engagement efficace du Pe2 mais, dès la stabilisation des fronts, il montra son grand potentiel. De la classe du Messerschmitt Bf110, il était un peu moins rapide et armé vers l'avant mais plus maniable et mieux défendu vers l'arrière.

Petliakov Pe2 :

- 2 moteurs Klimov VK-105-RF
- 2 X 1210 Ch
- 540 Km/h
- 2 Mitrailleuses 12.7 mm et 3 de 7.62 mm 1200 Kg de bombes
- 8500 Kg en charge
- 8800 m de plafond pratique
- 1500 Km en distance franchissable
- 3 Equipiers







<http://les-avions-de-legende.e-monsite.com/pages/les-avions-d-assaut-sovietique/petliakov-pe2.html>

version anglaise

The **Petlyakov Pe-2** ([Russian](#): Петляков Пе-2) was a [Soviet](#) twin-engine [dive bomber](#) used during [World War II](#). One of the outstanding tactical attack aircraft of the war, it also proved successful as a [heavy fighter](#), as a [night fighter](#) ([Pe-3](#) variant) and as a [reconnaissance aircraft](#). The Pe-2 was, numerically, the most important Soviet bomber of World War II, at their peak comprising 75% of the Soviet twin-engine bomber force. The Soviets manufactured Pe-2s in greater numbers (11,430 built) during the war than any other twin-engine combat aircraft except for the German [Junkers Ju 88](#) and the British [Vickers Wellington](#). Several communist air forces flew the type after the war, when it became known by the [NATO reporting name](#) ***Buck***.

Development

In 1937, [Vladimir Petlyakov](#) was the leader of the Heavy Aircraft Brigade at the [Tupolev OKB](#) responsible for the development of the ANT-42 four-engined long-range bomber (which would eventually enter service as the [TB-7/Pe-8](#)). However, that same year saw the start of [Stalin's Great Purge](#), and none were spared suspicion; [Andrei Tupolev](#), the head of the OKB, was coerced into signing a "confession" in October 1937 that he had formed an anti-Soviet group that included Petlyakov, and both men along with many others were arrested.

Too valuable to be simply executed, unlike many others arrested during the Great Purge, Petlyakov and other weapons designers were instead sent to [sharashkas](#), special prisons run by the [NKVD](#) where such valuable prisoners could continue their work under close scrutiny. In 1938, Petlyakov was tasked with leading the first Special Technical Department (STO — *SpetsTekhOd'yeI*) for aviation that also included other future well-known designers such as [Vladimir Myasishchev](#), a colleague of Petlyakov's at the Tupolev OKB.

VI-100

Because the Russian word for "100" (*сотка* — "sotka") sounds somewhat like the pronunciation of "STO", the STO was later renamed KB-100, and there Petlyakov proposed the development of a twin-engine interceptor against high-altitude long-range bombers, particularly those being developed in Germany such as the [Junkers Ju 86P](#) and [Henschel Hs 130](#). His proposal was accepted in March 1938, with the requirement that the first prototype be ready for its first flight before the end of 1939. The project was initially given the name ***Samolyot 100*** (lit. "Aircraft 100") and later called **VI-100** (*Vysotnyi Istrebitel* — "High-Altitude Fighter").

The VI-100 project was an ambitious one for its time, with advanced features such as a pressurised cabin, all-metal construction, [turbo-superchargers](#), and many electrically actuated systems. In addition, the performance requirements were also quite demanding: it was to be capable of reaching 630 km/h at an altitude of 10,000 m, a ceiling of 12,500 m, and a range of 1,400 km. The aircraft would also need a reinforced structure in order to withstand the Mach stresses of making diving attacks from high altitude against enemy bomber formations. In order to assist with the challenging development of the "100", other OKBs such as those of [Yakovlev](#), [Mikoyan & Gurevich](#), and [Sukhoi](#) were also enlisted. The first full-scale VI-100 mock-up was completed in May 1939, and the first flight of the prototype occurred on 22 December 1939.

The VI-100 was an all-metal [low-wing cantilever](#) monoplane powered by two [Klimov M-105R](#) engines, licence-built [Hispano-Suiza 12Y](#) engines that were the most advanced then available in the Soviet Union, driving VISH-42 three-blade [variable-pitch](#) propellers, enhanced by two TK-3 turbo-superchargers fitted in the engine nacelles. Its primary armament were two 20 mm [ShVAK](#) cannon and two 7.62 mm [ShKAS](#) machine guns, with another ShKAS machine gun in a fixed mounting in the tailcone for self-defence. The first prototype VI-100 was also designed to carry KS-76 (48 modified 76 mm artillery shells with timed fuses) or KS-100 (96 AO-25 bomblets) cassettes in the fuselage for dropping on enemy bomber formations. The second prototype was instead fitted with external bomb racks for 1,000 kg of bombs and internal bomb bays for 600 kg of bombs instead of the cassettes of the first prototype.

The first VI-100 prototype was demonstrated publicly during the 1940 [May Day](#) parade, flown by [Maj. Stefanovsky](#), as Petlyakov and his team watched on from the roofs of their *sharashka*. During testing in 1940, the second prototype VI-100 suffered a cockpit fire due to an improperly tightened nut in the fuel supply and crashed into a kindergarten, killing a group of young children and a teacher. Despite the loss of the second prototype and several defects being found in the first prototype, the VI-100 was judged satisfactory and suitable for further development. Its performance was superior to other Soviet high altitude fighters such as the Mikoyan-Gurevich I-200 (the future [MiG-3](#)), and compared favourably with contemporary aircraft such as the [Potez 630](#), [Messerschmitt Bf 110 C](#), and [Bristol Beaufighter Mk. I](#). However, events were to lead to substantial changes in the direction of the VI-100 project.

PB-100

The value of tactical dive bombing had been proven by the [Junkers Ju 87 Stuka](#) dive bombers of the [Luftwaffe](#) during the [Blitzkrieg](#) campaigns of 1939 and 1940, and the need for such an aircraft in the VVS-RKKA ([Workers & Peasants' Red Army Air Force](#)) suddenly became very apparent. Furthermore, following the [Molotov–Ribbentrop Non-Aggression Pact](#), Soviet experts were able to visit German aircraft factories, where they discovered that Germany had no large-scale development of high-altitude long-range bombers underway. Existing aircraft were also judged to be within the capabilities of single-engined fighters like the I-200.

As a result, in May 1940, it was decided that a dive-bomber using the good aerodynamics of the VI-100 would be designed and put into production. The new aircraft, now designated the **PB-100** (*Pikiruyushchiy Bombardirovshchik* — "Dive-Bomber"), was required to achieve a maximum speed of 535 km/h at an altitude of 4800–4900 m, a range of 1,600 km at an altitude of 5,000 m, and a ceiling of 8000 m. Petlyakov and his team were instructed to redesign the two-seat high altitude fighter into a three-seat dive-bomber within 45 days. In order to meet this deadline, Petlyakov's team were assisted by some 300 specialists from other OKBs.

The fuselage of the VI-100 had to be redesigned for the dive-bombing role. Initially, the PB-100 featured three pressurised cabins for the three-man crew, but the VVS judged that pressurisation was an inessential luxury for the dive-bombing role, and this was dropped. Furthermore, the high altitude performance provided by the turbo-superchargers was also unnecessary, and these too were dropped. Extensive glazing was added to the lower portion of the nose to give the pilot maximum visibility during a dive-bombing attack. A bomb bay for a single 100 kg bomb was added in each engine nacelle, while the engines remained the same. The wing was modified, with dive brakes added. The cockpit was redesigned, bringing the navigator and pilot together, and given extensive glazing, while a defensive machine gun was added in the ventral position, operated by a gunner.

The redesign was completed in time, and the PB-100 was ordered into production without the construction of a prototype (only static tests were conducted for new components such as the fuselage), with the first two series production PB-100s completed by Zavod 39 in the late autumn of 1940.¹ The trials of the lead machine (No. 390101) began on 15 December 1940. In accordance with the new rules also adopted in December 1940, the aircraft was also redesignated **Pe-2 2M-105**.

Design features

The Pe-2 inherited the basic low-wing twin-engine monoplane configuration of the VI-100. It had an all-metal stressed-skin structure, with cloth only used to cover the ailerons and control surfaces. The tail had twin fins and rudders with a pronounced 8-degree dihedral on the tailplane; this had been added to the PB-100 to correct the poor lateral stability found on the VI-100 during testing.

The wing design of the Pe-2 was also inherited from the VI-100, but this had been optimised for high altitude performance at the cost of lower lift at low altitude, resulting in suboptimal manoeuvrability and take-off and landing characteristics. For example, while the Pe-2's flying characteristics were generally good once it was airborne, it took a good amount of force to pull the elevators up to rotate the plane for takeoff. Russian night bombing missions often flew with female pilots, and some of the women were not strong enough to get the airplane airborne by themselves.

When such a situation occurred, the procedure was to have the navigator get behind the pilot's seat and wrap her arms around the control wheel and help the pilot pull the wheel back. Once the aircraft was airborne, the navigator returned to her duties and the pilot continued to fly the plane without assistance. In addition, the Pe-2 had a reputation for hard landings, as well as for its notorious "bounce" on landing due to the inadequate shock absorbers in the landing gear. This could be fatal if the pilot was not prepared for it. As designed, the wings were also fitted with "Venetian blind"-type slatted dive brakes for the dive-bombing role.

Pe-2s were equipped with an inert gas fire-suppression system for the self-sealing fuel tanks, which progressively filled the fuel tanks with nitrogen in order to reduce the risk of ignition when hit by enemy fire.

Armament

The crew of the Pe-2 dive bomber "For the Great Stalin" of the Bomber Aviation Regiment of the Black Sea Fleet after completing the mission

The Pe-2 had an internal capacity for six 100 kg bombs, for a total of 600 kg; this was no better than that of the older [Tupolev SB](#) bomber. The internal capacity consisted of a fuselage bomb bay capable of carrying four 100 kg bombs or an additional fuel tank, with two small internal bomb bays in the rear of the engine nacelles for a single 100 kg bomb each. This was supplemented by four external underwing racks. These were capable of carrying four 100 kg or 250 kg bombs, or two 500 kg bombs in overload configuration, giving a maximum bombload of 1,000 kg.¹ Only the bombs in the external racks could be used in a dive-bombing attack; the internally carried bombs had no dive release gear and could not be dropped in a steep dive.

The offensive armament originally consisted of two 7.62 mm ShKAS fixed forward-firing machine guns in the nose. The right ShKAS was replaced by the more powerful [12.7 mm UBK](#) heavy machine gun from Series 13 production aircraft onwards. From Series 32 onwards, provisions were made for underwing guide rails for up to ten [RS-132](#) or [RS-82](#) unguided rockets.

The defensive armament originally consisted of a single ShKAS machine gun in a dorsal TSS mounting, later MV-3 turret, manned by the navigator in the cockpit behind the pilot, and a ventral 7.62 mm ShKAS machine gun in a mounting in the fuselage behind the bomb bay aimed by a periscope. This defensive armament was found to be totally inadequate: from Series 13 onwards, the ventral ShKAS was replaced by one 12.7 mm UBT in an MV-2 mounting, while the dorsal ShKAS was also replaced by a UBT in various different mountings, some modified in the field and others from the factory:

- MV-7 turret: Turret mounting tested in September 1941. Unsatisfactory and not adopted.
- FT (*Frontovoye Trebovaniye* — "Frontline Demand") mounting: designed by Leonid Selyakov at Zavod 22 in response to the requests of Pe-2 crews to fit the standard Pe-2 with minimal changes to production and can be fitted in the field. Standardised from Series 83 onwards. This mounting required the canopy over the navigator to be removed, resulting in reduced comfort for the navigator manning the gun.
- VUB-1 turret: Turret mounting, standardised from Series 110 onwards. Pe-2s with this mounting are often known as "Pe-2FT" in Western literature, even though the VUB-1 turret has no connection to the actual FT mounting whatsoever.
- FZ (*Frontovoye Zadaniye* — "Frontline Mission") turret: Experimental turret mounting introduced in 1943. Uses magazines for the UBT instead of belts for easier and faster handling of the turret. Tests were successful, recommended for production, but not adopted in order to not disrupt Pe-2 production.

The replacement of the ShKAS defensive guns with the UBT was reported to increase the life expectancy of a Pe-2 from 20 sorties to 54.

Operational service



Soviet pilots and ground crew pose in front of a Pe-2 dive bomber at [Poltava](#), June 1944.

The Pe-2 was first publicly demonstrated in the May Day Parade of 1941. Testing of the Pe-2 was completed and it was accepted for service in June 1941, shortly before the [German invasion of the Soviet Union](#). During the early stages of the invasion, Pe-2 crews, who were poorly trained and unfamiliar with their new aircraft, were often sent on near-suicidal low-level bombing missions against advancing German forces, where they were highly vulnerable to light anti-aircraft guns and German fighters, or bombed from altitude with minimal accuracy and effectiveness against moving troops.

The aircraft did not show its true potential until the end of 1941, after the Soviet Air Force had a chance to regroup after the German onslaught, during the Winter. The Pe-2 quickly proved itself to be a highly capable aircraft, able to elude the Luftwaffe's interceptors and allowing their crews to develop great accuracy with their bombing. It could give German fighters fits when it could outrun them, at times reaching over 640 km/h (400 mph).

The records of the 16th and 39th BAPs of the Western Front Air Force note that the Pe-2's crews had the greatest success in repelling the attacks of enemy fighters in June and July 1941. On 1 July, for example, six Pe-2s fended off attacks by four Messerschmitt Bf 109s, shooting down two of them. A week later a group of Pe-2s was attacked by four Bf 109s and again brought down two of the attackers. On both occasions the Petlyakovs suffered no losses. On the southern front, a bombing mission against [Ploiești](#), in [Romania](#), by six Pe-2s, led by Capt. A. Tsurtsulin, was a great success: 250,450 kilograms (552,150 lb) of petroleum were burnt in the raid. The Romanian information agency claimed that at least 100 Soviet planes had bombed Ploiești.

The Pe-2 regiments' operations were not always successful and the service pilots complained about insufficient defensive armament and survivability: there was a great risk of fire and insufficient armour protection, especially for the navigators and gunners. German pilots soon discovered the limited sighting angles of the ventral gun mounting and its poor reliability. The ammunition belt of the UBT machine-gun often jammed after the first burst of fire when shooting in extreme positions. The navigator and the radio operator were poorly protected. On average, ten Pe-2 gunners were wounded for every pilot, and two or three were killed for the loss of one pilot.

Throughout 1942 the design was steadily refined and improved, in direct consultation with pilots who were actually flying them in combat. Improved armour protection and a fifth ShKAS machine-gun was installed and fuel tanks modified. Despite anecdotal reports by Soviet fliers, Pe-2s were daylight bombers, often crewed by comparative novices in the early years of the war, and took significant losses, even when well protected by fighters. In December 1942 General [Ivan Turkel \[ru\]](#) of the Soviet Air Force estimated the life expectancy of a Pe-2 was 30 combat flights. An example of loss rates after the Soviets gained the upper hand can be gained by the losses suffered by the 1st and 2nd BAK. The former started the month of July 1943 with 179 machines, and lost 52 that month, and 59 the next, ending August with 156 bombers after receiving replacements. The 2nd BAK started July with 122 Pe-2s, with monthly losses of 30 and 20, ending August 1943 with 114 Pe-2s after replacements arrived. Most of these losses were at the hands of the thinly stretched German fighter groups, which continued to inflict significant losses when present in strength, even in the closing months of the war. For example, in the Baltic where [JG54 Grünherz](#) were the main opposition, and greatly outnumbered, the Soviet 1st Gv BAK lost 86 Pe-2s shot down (another 12 to other causes), mostly to German fighters between 23 July 1944 and 8 February 1945. Western sources use mark Pe-2FT for production series after 83, where FT stands for Frontovoe Trebovanie (Frontline Request), although Soviet documents do not use this identification. Final versions Pe-2K (transitional version of Pe-2I) and Pe-2I were produced in small numbers, due to the unwillingness of Soviet industry to decelerate production numbers.

Starting on 14 April 1945, some Pe-2FT aircraft were operated by the [1st Czechoslovak Mixed Air Division](#) made up of exiled Czechoslovakian pilots in the Soviet Union. After the war, the reinstated [Czechoslovakian Air Force](#) operated 32 Pe-2FT and 3 UPe-2 between May 1946 and mid 1951. The first aircraft arrived at Prague-Kbely airfield in April 1946 and formed two squadrons of the 25 Air Regiment in [Havlíčkův Brod](#). Czechoslovakian aircraft were known under the designation B-32 (Pe-2FT) and CB-32 (UPe-2).

Finnish Air Force

In 1941, after the outbreak of the [Continuation War](#), Finland purchased six captured Pe-2 aircraft from Germany. These arrived at [State Aircraft Factory](#) facilities at Härmälä, near [Tampere](#), in January 1942, where the airframes were overhauled and given Finnish serial numbers. The seventh Pe-2 was bought from the Germans in January 1944, and it was flown to Finland at the end of the month.

It was initially planned to use these planes as dive bombers in the 1st flight of LeLv 48, which began to receive its aircraft in July 1942, but during the training it was found out that this caused too much strain for the engines. Thus, the role of Pe-2s was changed to fly long-range photographic and visual reconnaissance missions for the Army General Headquarters. These sorties began in late 1942, and were often flown with two 250 kg (551 lb) bombs for harassment bombing and in order to cover the true purpose of missions.

By the time the Soviet [Fourth strategic offensive](#) started in June 1944, the secondary bombing role had already ended and the surviving Pe-2s began to be used solely over the [Karelian Isthmus](#) on photographic reconnaissance flights in order to find out enemy troop concentrations, usually escorted by four [Finnish Air Force Bf 109 Gs](#). These vital missions allowed artillery and bombers of the Finnish Air Force and the *Luftwaffe's* [Detachment Kuhlmei](#) to strike against formations preparing for attack, which had an important impact on the outcome of the [Battle of Tali-Ihantala](#), where the Soviet advance was halted.

During the Continuation War, three Pe-2s were lost in accidents or technical failures, one was destroyed in bombing of Lappeenranta airfield, one was shot down by Soviet fighters and one went missing in action. In the Lapland War the only remaining machine flew a single reconnaissance sortie in October 1944. On average, the aircraft flew some 94 hours per plane during the war.

The Finnish Air Force also operated one Petlyakov Pe-3 (PE-301) that had been captured in 1943.

PE-301 and PE-215 were destroyed when Soviet aircraft bombed the Lappeenranta airfield on 2 July 1944. PE-212 went down in 1943, PE-213 was destroyed in an emergency landing in 1942. PE-214 was destroyed in a failed take-off attempt at Härmälä on 21 May 1942. As Härmälä airfield was quite short, the pilot had to try to lift off with too little speed, which caused the aircraft to stall and crash, killing the crew. PE-217 managed to shoot down a Soviet fighter in 1944. PE-216 was destroyed in a forced landing in 1944. PE-211 survived the war and was removed from FAF lists in 1946. It was still standing beside the Kauhava airfield in 1952, but further information on its fate is unknown.

Variants



Top view of an early production prototype Pe-2.

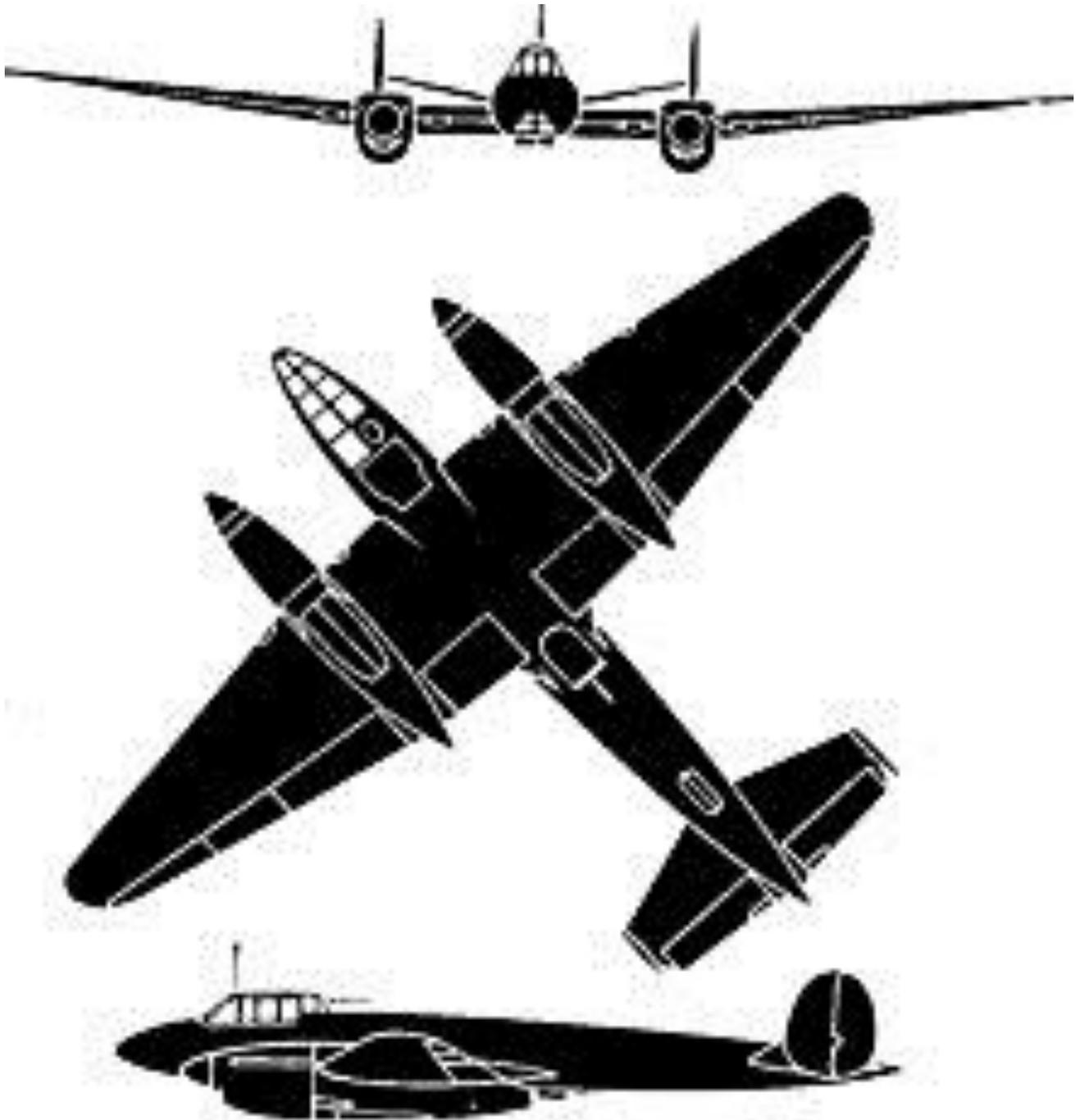
In total, around 11,400 Pe-2s were built; a large number of minor variants were also developed.

PB-100

Prototype of the Pe-2 modified from the [VI-100](#) in 1940.

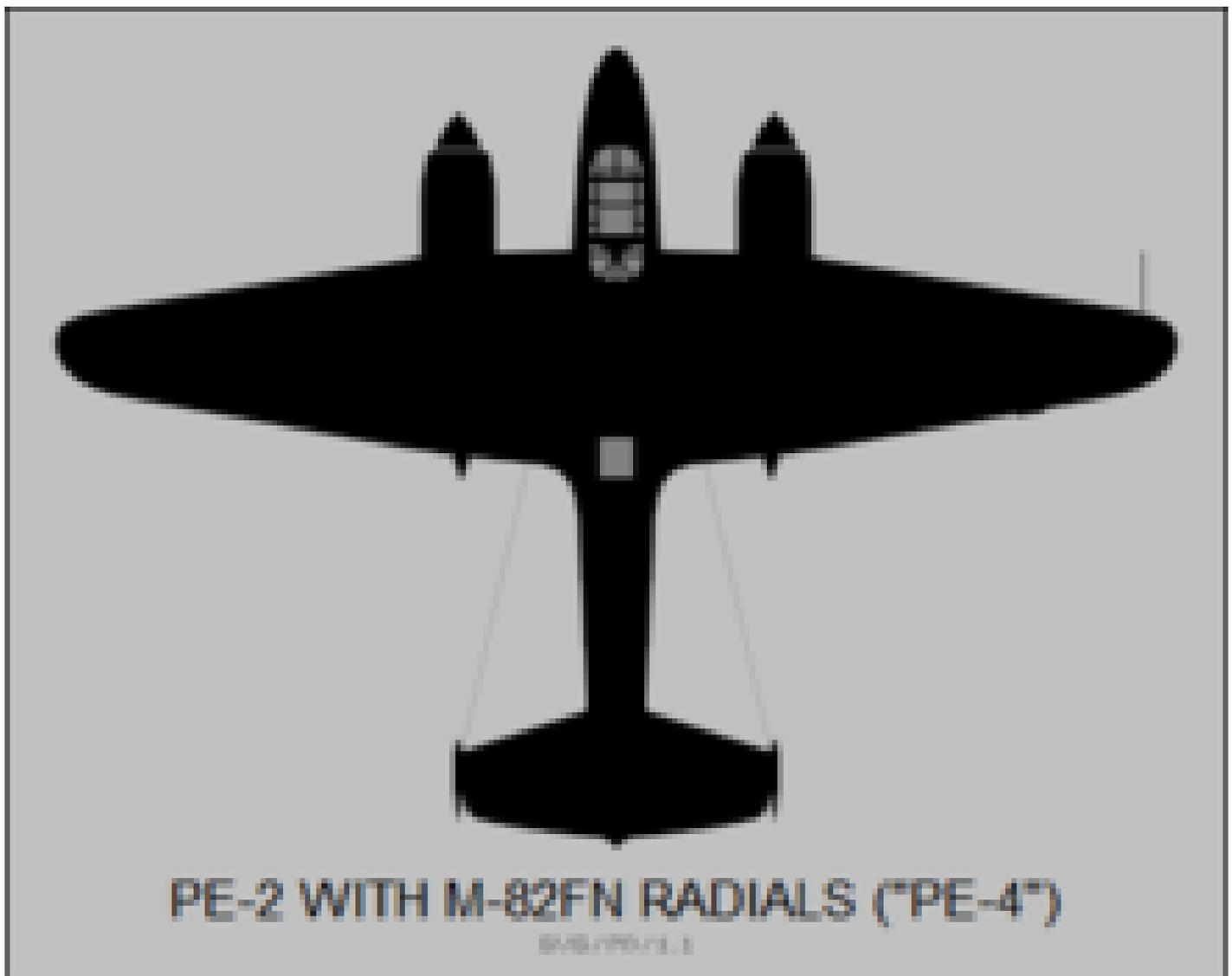
Pe-2

First production variant.



Bottom view of a Production Prototype Pe-2.

Pe-2B



Top View of a Pe-2 with the M-82FN engines.

Standard bomber version from 1944.

Pe-2D

Three-seat bomber version, powered by two VK-107A piston engines.

Pe-2FT

Main production variant. In Czechoslovakia known as the **B-32**. Improved defensive armament (7.62 mm machine gun in dorsal turret), removal of the dive brakes, and an uprated engine. Nose glazing was also reduced.

Pe-2FZ

Built in small numbers.

Pe-2I

Improved version designed by Vladimir Myasishchev. VK-107 engines; revised wing profile; remote-controlled tail gun. Top speed 656 km/h (408 mph). Could carry 1,000 kg (2,204 lb) bombs. Five examples built.

Pe-2K

Radial-engined version, small number built.

Pe-2K RD-1

One Pe-2K equipped with additional RD-1 rocket engine. The 300 kg (661 lb) Glushko RD-1 rocket engine was installed in the tail of the aircraft.

Pe-2M

Variant of Pe-2I with heavier armament.

Pe-2MV

This version was armed with 20 mm ShVAK cannons and two 12.7 mm (0.5 in) in an underfuselage gondola, it also had one 7.62 mm (0.3 in) machine gun in the dorsal turret.

Pe-2R

Three-seat photo reconnaissance version, with a larger fuel tanks and extended range. small number built.

Pe-2S

Two-seat training version.

Pe-2Sh

The PB-100 prototype was fitted with two 20 mm ShVAK cannons, and a single 12.7 mm (0.5 in) machine gun was fitted beneath the fuselage.

Pe-2VI

High altitude fighter version.

Pe-2UTI (UPe-2)

Dedicated [trainer](#) version, small number built. In Czechoslovakia known as the **CB-32**.

Pe-2 Paravan

Anti-barrage balloon version.

[Pe-3](#)

Long-range night fighter version.

Pe-2 M-82FN

Pe-2 with Shvetsov M-82FN engines. Also known unofficially as the Pe-4.

source : https://en.wikipedia.org/wiki/Petlyakov_Pe-2