

F4F Wildcat



F4F-3 in non-specular blue-grey over light-grey scheme from early 1942.

Type Fighter

Manufacturer [Grumman](#)

Maiden flight [2 September 1937](#)

Introduced [December 1940](#)

Retired [1945](#)

Primary users [United States Navy](#)
[United States Marine Corps](#)
[Fleet Air Arm](#)

Number built 7,722



F4F-3 Wildcat of [Lt. Butch O'Hare](#), April 1942



Grumman F4F-4 of VF-11, [Guadalcanal](#) 1942.



Grumman F4F-4 Wildcat of VF-41, early 1942.



Grumman F4F-4 Wildcat on board of escort carrier [USS Suwannee \(CVE-27\)](#) in late 1942.

The [Grumman F4F Wildcat](#) was an [American carrier](#)-based fighter that began service with both the [United States Navy](#) and the [Fleet Air Arm](#) in 1940. Although first used in combat by the British in Europe, the Wildcat would become the primary carrier fighter for the first year and a half of the [United States Navy](#)'s involvement in [World War II](#) in the Pacific Theater. The **FM Wildcat**, an improved version built by [General Motors](#), remained in service throughout the remainder of the war on [escort carriers](#), where larger and heavier fighters could not be used.

Design and development

The F4F-1 began as a unbuilt biplane design entered in a US Navy competition, being beaten by the monoplane [Brewster F2A-1](#) design. This resulted in its complete remodeling into the monoplane XF4F-2.^[1] This was evaluated against the Buffalo, but although the XF4F-2 was marginally faster, the Buffalo was otherwise superior and was chosen for production.^[1] Grumman's prototype was then rebuilt as the XF4F-3 with new wings and tail and a supercharged version of the [Pratt & Whitney R-1830 "Twin Wasp"](#) radial engine.^{[1][2]} Testing of the XF4F-3 led to an order for F4F-3 production models, the first of which was completed in February 1940. France also ordered the type, powered by [Wright R-1820 "Cyclone 9"](#) radial engines, but France fell before they could be delivered and they ultimately went to the British Royal Navy, which called them "Martlet I"s. Both the British planes and the US Navy's F4F-3 with an armament of four .50 caliber Browning machine guns, joined active units in 1940^[2].

All versions of the Wildcat used fuselage mounted, hand-cranked landing gear with a relatively narrow track, making landing accidents, where the landing gear were not fully locked into place, distressingly common.^[citation needed] This unusual main landing gear design was originally designed by [Grover Loening](#), for his firm's aircraft in the 1920s, and as Leroy Grumman had worked for Loening before starting up his own company, it was readily licensed to Grumman and was used earlier on all of Grumman's fighter biplanes (from the [FF-1](#) through the [F3F](#)) of the 1930s and on the [J2F Duck](#) amphibious biplane.^[3]

The name "Wildcat" was officially adopted on 1 October 1941.

Operational service

The F4F was taken on by the British [Fleet Air Arm](#) as part of an interim replacement for the [Fairey Fulmar](#); navalised [Supermarine Spitfires](#) not being available because of the greater need of the [Royal Air Force](#).^[4] In the European theater, the Wildcat scored its first combat victory on [Christmas Day](#) 1940, when a land-based Martlet (as the type then known in British service) destroyed a [Junkers Ju 88](#) bomber over the [Scapa Flow](#) naval base.^[5] This was the first combat victory by a US-built fighter in British service in World War II^[5]. The type also pioneered combat operations from the smaller [escort carriers](#).^[6] Six went to sea aboard the converted ex-German merchant vessel [HMS Audacity](#) in mid-1941 and shot down several Luftwaffe [Fw 200 Condor](#) bombers during highly effective convoy escort operations.^[7] These were the first of many Wildcats to see shipboard combat. The Fleet Air Arm was

later to abandon the practice of using its own unique names for US-provided aircraft in British naval service, and began to use the US Navy's aircraft names instead ^[8].

The Wildcat was outperformed by the [Mitsubishi Zero](#), its major opponent in the early part of the [Pacific Theater](#), but held its own by absorbing far more damage. ^[9] With relatively heavy armor and [self-sealing fuel tanks](#), the Grumman airframe could survive far more than its lightweight, unarmored Japanese rival. Many US Navy fighter pilots also were saved by the F4F's ZB homing device, which allowed them to find their carriers in poor visibility, provided they could get within the 30-mile range of the homing beacon. ^[10]

Four US Marine Corps Wildcats played a prominent role in the defence of [Wake Island](#) in December 1941. USN and USMC aircraft were the fleet's primary air defence during the Battles of [Coral Sea](#) and [Midway](#) and, land-based Wildcats played a major role during the [Guadalcanal Campaign](#) of 1942-43. ^[11] It was not until 1943 that more advanced naval fighters, the [F6F Hellcat](#) and [F4U Corsair](#), capable of taking on the Zero on more even terms reached the South Pacific theatre.

The Japanese ace [Saburo Sakai](#) describes the Wildcat's ability for absorbing damage: ^[11]

“ I had full confidence in my ability to destroy the Grumman and decided to finish off the enemy fighter with only my 7.7mm machine guns. I turned the 20mm. cannon switch to the 'off' position, and closed in. For some strange reason, even after I had poured about five or six hundred rounds of ammunition directly into the Grumman, the airplane did not fall, but kept on flying. I thought this very odd - it had never happened before - and closed the distance between the two airplanes until I could almost reach out and touch the Grumman. To my surprise, the Grumman's rudder and tail were torn to shreds, looking like an old torn piece of rag. With his plane in such condition, no wonder the pilot was unable to continue fighting! A Zero which had taken that many bullets would have been a ball of fire by now. ”

During the course of the war, Navy and Marine F4Fs and FMs flew 15,553 combat sorties (14,027 of these from aircraft carriers ^[12]), destroying 1,327 enemy aircraft at a cost of 191 Wildcats (an overall kill-to-loss ratio of 6.9:1). ^[13] True to their escort fighter role, Wildcats dropped only 154 tons of bombs during the war. ^[13]

Variants



GM built FM-2 during filming of "Midway" (1976) on USS *Lexington* museum ship, Corpus Christi, Texas.



Grumman F4F-4 Wildcats on [USS Wasp](#), 1942.

The original Grumman **F4F-1** design was a biplane, which proved inferior to rival designs, necessitating a complete redesign as a monoplane named the **F4F-2**. This design was still not competitive with the Brewster [F2A Buffalo](#) which won initial US Navy orders, but when the **F4F-3** development was fitted with a more powerful engine, the [Pratt & Whitney Twin Wasp](#), it showed its true potential. ^[citation needed]

US Navy orders followed as did some (with [Wright Cyclone](#) engines) from France; these ended up with the [Royal Navy's Fleet Air Arm](#) after the fall of France and entered service on the [8 September 1940](#). These aircraft, designated by Grumman as **G-36A**, had a different cowling from other earlier F4Fs and fixed wings, and were intended to be fitted with French armament and electronics following delivery. In British service initially the aircraft were known as the **Martlet I**, but not all Martlets would be to the exact same specifications as US Navy aircraft. All Martlet Is featured the four .50-caliber (12.7 mm) [M2 Browning machine guns](#) of the F4F-3 with 450 rounds per gun. The British also received a version with the original Twin Wasp, but again with a modified cowling, under the manufacturer designation **G-36B**. These aircraft were given the designation **Martlet II** by the British. Lastly came a fixed wing variant of the G-36B, given the designation **Martlet III**. On paper the designation changed to **Martlet III(A)** when the second series of Martlet III was introduced.

Poor design of the installation on early F4Fs caused these otherwise reliable machine guns to frequently jam, a problem common to wing-mounted weapons of many US fighters early in the war. ^[14] It was an F4F-3 flown by Lt. [Edward O'Hare](#) that in a few minutes shot down five Mitsubishi twin-engine bombers attacking USS *Lexington* off Bougainville on [20 February 1942](#). But contrasting with O'Hare's performance, his wingman was unable to participate because his guns would not function. ^[15]

A shortage of two-stage superchargers led to the development of the **F4F-3A**, which was basically the F4F-3 but with a 1,200 hp Pratt & Whitney R-1830-90 [radial engine](#) with a more primitive single-stage two-speed [supercharger](#). The F4F-3A, which was capable of 312 mph at 16,000 ft, was used side by side with the F4F-3, but its poorer performance made it unpopular with US Navy fighter pilots. The F4F-3A would enter service as the **Martlet III(B)**.

A new version, the **F4F-4**, entered service in [1942](#) with six guns and folding wings, allowing more to be crammed on a carrier; this was the definitive version and the one that saw the most combat service in the early war years, including the [Battle of Midway](#). This version was less popular with American pilots, because the same amount of ammunition was spread over two additional guns,

decreasing firing time.^[16] With the F4F-3's four 50-caliber guns and 450 rounds per gun, pilots had 34 seconds of firing time; six guns decreased ammunition to 240 rounds per gun, which could be expended in less than 20 seconds. The increase to six guns was attributed to the Royal Navy, who wanted greater firepower to deal with German and Italian foes. Jimmy Thach is quoted as saying, "A pilot who cannot hit with four guns will miss with eight."^[17] Extra guns and folding wings meant extra weight, and reduced performance: the F4F-4 was capable of only about 318 mph at 19,400 ft. Rate of climb was noticeably worse in the F4F-4, while Grumman optimistically claimed the F4F-4 could climb at a modest 1,950 feet per minute, in combat conditions, pilots found their F4F-4s capable of ascending at only 500 to 1,000 feet per minute.^[18] Moreover, the F4F-4's folding wing was intended to allow five F4F-4s to be stowed in the space required by two F4F-3s. In practice, the folding wings allowed an increase of about 50% in the number of Wildcats carried aboard US fleet aircraft carriers. A variant of the F4F-4, designated **F4F-4B** for contractual purposes, was supplied to the British with a modified cowling and Wright Cyclone engine. These aircraft received the designation of **Martlet IV**.

The **F4F-7** was a photographic reconnaissance variant, with armor and armament removed. It had non-folding "wet" wings that carried an additional 555 gallons of fuel for a total of about 700 gallons, increasing its range to 3,700 miles. 21 were built.^[1]

Grumman's Wildcat production ceased in early [1943](#) to make way for the newer [F6F Hellcat](#), but General Motors continued producing Wildcats for both US Navy and Fleet Air Arm use. From 1943 onward, Wildcats were primarily assigned to [escort carriers](#) ("jeep carriers") as larger fighters such as the Hellcat and the Vought [F4U Corsair](#) were needed aboard fleet carriers, and the Wildcat's slower landing speed made it more suitable for shorter flight decks.^[citation needed] At first, GM produced the **FM-1** (identical to the F4F-4, but with four guns). Production later switched to the improved **FM-2** (based on Grumman's XF4F-8 prototype) optimized for small-carrier operations, with a more powerful engine, and a taller tail to cope with the torque.^[19] In all, 7,860 Wildcats were built.^[20] The British received 300 Eastern Aircraft FM-1s as the **Martlet V** in 1942/43 and 340 FM-2s as the **Wildcat VI**^[21]. In total nearly 1,200 Wildcats would serve with the FAA. By January 1944, the Martlet name was dropped and the type was identified as "Wildcat."^[22]

Operators

[United Kingdom](#)

- [Fleet Air Arm](#)

[United States](#)

- [United States Navy](#)
- [United States Marine Corps](#)

Survivors

F4F-3 "Wildcat" N3210D -Olympic Flight Museum, Olympia, Washington, presently in flying condition.

Specifications (F4F-4)



Grumman F4F-4 Wildcat with six kill markings (1942).



F4F-4 receives maintenance of its six [M2 Browning machine guns](#).
Data from ^{[citation needed](#)}

General characteristics

- **Crew:** 1
- **Length:** 28 ft 9 in (8.8 m)
- **Wingspan:** 38 ft 0 in (11.6 m)
- **Height:** 9 ft 2.5 in (2.8 m)
- **Wing area:** 260 ft² (24.2 m²)
- **Empty weight:** 5,760 lb (2,610 kg)
- **Max takeoff weight:** 7,950 lb (3,610 kg)
- **Powerplant:** 1× [Pratt & Whitney R-1830-86](#) double-row [radial engine](#), 1,200 hp (900 kW)

Performance

- **Maximum speed:** 320 mph (290 knots, 515 km/h)
- **Range:** 770 mi (670 nm, 1,240 km)
- **Service ceiling:** 39,500 ft (12,000 m)
- **Rate of climb:** 1,950 ft/min (9.9 m/s)

Armament

- **Guns:** 6× 0.50 in (12.7 mm) [M2 Browning machine guns](#), 240 rounds/gun
- **Bombs:** 2× 100 lb (45 kg) bombs

External links

- [Naval Historical Center Wildcat Entry](#)
- [VectorSite Wildcat Entry](#)
- [AcePilots Wildcat Entry](#)
- [How Leroy Grumman and Jake Swirbul built a high-flying company from the ground up](#)

- [Ghost of the lake](#)
- [History.navy.mil: "Naval aviation news - F4F"](#)

F4F Wildcat

Related development

- [Grumman F3F](#)
- [F6F Hellcat](#)

Comparable aircraft

- [Hawker Sea Hurricane](#)
- [Mitsubishi Zero](#)
- [Supermarine Seafire](#)

Designation sequence

- [1922-1962 Navy](#) :
 - [FF](#) - [F2F](#) - [F3F](#) - **F4F** - [XF5F](#) - [F6F](#) - [F7F](#)
 - [FF](#) - [FJ](#) - [FL](#) - **FM** - [FO](#) - [FR](#) - [FS](#)
 - **FM** - **F2M** - [F3M](#)

Related lists

- [List of military aircraft of the United States](#)
- [List of fighter aircraft](#)
- [List of aircraft of the Fleet Air Arm](#)