DOWNLOAD PDF SUPERMARINE SPITFIRE MK. I-XVI

Chapter 1 : Supermarine Spitfire MK.I-XVI - Video Dailymotion

The Supermarine Spitfire is a British single-seat fighter aircraft used by the Royal Air Force and other Allied countries before, during and after World War II. Many.

MB, flown by Flt. All were fitted with the larger, pointed tip rudder. The last 45 or so Mk XIIs, were based on Mk VIIIs with two wing fuel tanks, each containing a maximum fuel load of 14 gal, and featured the larger horn balances, retractable tailwheel and undercarriage legs with torque-links, "dished" leg fairings and the stronger Dunlop AH four spoke wheels. The wheels were occasionally fitted with disc-style covers. A later model IFF was fitted, replacing the aerials from the tailplane tip to fuselage with a rod aerial under the starboard wing. Another important feature of the Griffon-engine Spitfires was the entirely flush-riveted finish which was progressively introduced on all Spitfires. Handling, however, was considered to be better than previous Spitfire marks, and the clipped wings conferred excellent manoeuvrability through enhanced aileron response. On reflection the general scheme became clear. Outside on the tarmac at Worthy Down stood the inoffensive-looking but highly potent DP All went according to plan until, when we were about halfway between Odiham and Farnborough and going flat out, I was beginning to overhaul the Fw and the Typhoon. I was also easily leaving the Typhoon behind and the eventual finishing order was, first the Spitfire, second the Typhoon, third the Fw This was precisely the opposite result to that expected, or indeed intended. It certainly put the cat among the pigeons and among the VIPs. This aircraft is carrying a 30 gal "slipper" drop tank under the centre-section. The first Griffon-powered Spitfires suffered from poor high altitude performance due to having only a single stage supercharged engine. By , Rolls-Royce engineers had developed a new Griffon engine, the 61 series, with a two-stage supercharger. In the end it was a slightly modified engine, the 65 series, which was used in the Mk XIV. The resulting aircraft provided a substantial performance increase over the Mk IX. Although initially based on the Mk VIII airframe, common improvements made in aircraft produced later included the cut-back fuselage and tear-drop canopies , and the E-Type wing with improved armament. The "fishtail" design of ejector exhaust stub gave way to ones of circular section. The increased cooling requirements of the Griffon engine meant that all radiators were much bigger and the underwing housings were deeper than previous versions. The cowling fasteners were new, flush fitting "Amal" type and there were more of them. The oil tank which had been moved from the lower cowling location of the Merlin engine variants to forward of the fuselage fuel tanks was increased in capacity from 6 to 10 gal. To help balance the new engine, the radio equipment was moved further back in the rear fuselage and the access hatch was moved from the left fuselage side to the right. Better VHF radio equipment allowed for the aerial mast to be removed and replaced by a "whip" aerial further aft on the fuselage spine. Because the longer nose and the increased slipstream of the big five-bladed propeller a new tail unit with a taller, broader fin and a rudder of increased area was adopted. The first one of these was flown by Jeffrey Quill on 20 January , Changes to the aircraft were restricted to those essential to enable it to accept the new engine I found that it had a spectacular performance doing mph at 25, ft, with a sea-level rate of climb of over 5, ft per minute. I soon realised that a new throttle box would be needed giving a much greater angular travel for the hand lever This, though not ideal, produced a very marked improvement in directional characteristics and we were able to introduce minor changes thereafter and by various degrees of trimmer tab and balance tab to reach an acceptable degree of directional stability and control. The enlarged fin of JF had a straight leading edge but for production a more elegant curved line was introduced. The pitch control mechanism controlled the pitch on the front propeller, If this failed the pitch of the rear propeller was no longer under control and might do anything which was potentially dangerous. When the new fighter entered service with Squadron in December it was a leap forward in the evolution of the Spitfire. Jeffrey Quill flew the first production aircraft, RB in October So the Mk XIV was in business, and a very fine fighter it was. It fully justified the faith of those who, from the early days in , had been convinced that the Griffon engine would eventually see the Spitfire into a new lease of life It was a splendid aeroplane in every respect. We still had some work to do to improve its longitudinal and directional characteristics, but it was powerful and performed magnificently. The only respect in which the XIV fell short

was in its range. In operational service many pilots initially found that the new fighter could be difficult to handle, particularly if they were used to earlier Spitfire marks. I personally preferred the old Mk Vs from a flying standpoint Even with full aileron, elevator and rudder, this brute of a fighter took off slightly sideways. The under-wing IFF aerial can be seen, as can the small, D shaped beam approach aerial housing under the wing root. To achieve this a new hatch, similar to the radio hatch on the port side, was installed on the starboard side, and both hatches were fitted with camera ports in streamlined blisters. These field-converted aircraft were allocated to squadron RCAF. It was identical in most respects including engine the Griffon 65 and cockpit enhancements, but it carried extra fuel and had a revised, stronger wing structure. Its handling was also nearly identical and so it was not put through any performance tests. Like the Mk XIV there were fighter and fighter reconnaissance variants built. The Mk 18 missed the war. Later, other squadrons in the Far East and Middle East would receive them. After the first 25 type s were produced, later aircraft were also fitted with the pressurised cabin of the Mk X and the fuel capacity was increased to gallons, three-and-a-half times that of the original Spitfire This version was the type A total of were built with production ceasing in early , but they were used in front line RAF service until April In December, it was refitted with a Griffon 61 and re-designated as a Mk 21 initial prototype. Mk 21 type [edit] Media related to Supermarine Spitfire Mark 21 at Wikimedia Commons By early , it was evident that Spitfires powered by the new two-stage supercharged Griffon 61 engine would need a much stronger airframe and wings. The proposed new design was called the Mk 21, which at first displayed poor flight qualities that damaged the excellent Spitfire reputation. The wings were redesigned with a new structure and thicker-gauge light alloy skinning. The ailerons were 5 per cent larger and the Frise balanced type were dispensed with, the ailerons being attached by continuous piano-hinges. They were extended by eight inches, meaning that with a straighter trailing edge, the wings were not the same elliptical shape as previous Spitfires. To ensure sufficient ground clearance for the new propeller, the undercarriage legs were lengthened by 4. The undercarriage legs also had a 7. The larger diameter four-spoke main wheels were strengthened to cope with the greater weights; post-war these were replaced by wider, reinforced three spoke wheels to allow Spitfires to operate from hard concrete or asphalt runways. When retracted the wheels were fully enclosed by triangular doors which were hinged to the outer edge of the wheel wells. No further attempts should be made to perpetuate the Spitfire family. Where they went terribly wrong was to recommend that all further development of the Spitfire family should cease. They were quite unqualified to make such a judgement and later events would prove them totally wrong. An AFDU report on LA issued that month noted that the Spitfire 21 was now much easier to fly, General Handling The modifications carried out to this aircraft have resulted in an improvement of the general handling characteristics at all heights Conclusions The critical trimming characteristics reported on the production Spitfire 21 have been largely eliminated by the modifications carried out to this aircraft. Its handling qualities have benefitted sic to a corresponding extent and it is now considered suitable both for instrument flying and low flying. It is considered that the modifications to the Spitfire 21 make it a satisfactory combat aircraft for the average pilot. Spitfire 21s became operational on 91 Squadron in January The squadron had little opportunity to engage the Luftwaffe before the war ended but scored a rare success on 26 April , when two Spitfire Mk 21s shot up and claimed to have sunk a German midget submarine which they caught on the surface. With the end of the war, most orders for the Mk 21 were cancelled and only were completed. Some aircraft had less than five hours flying time. Most of the Mk 22s were built with enlarged tail surfaces, similar to those of the Supermarine Spiteful. A total of Mk 22s were built: However 12 squadrons of the Royal Auxiliary Air Force used the variant and continued to do so until March The Mk 22 was also used at Flying refresher schools. In May the remaining F. However the tests were disappointing and, after discussions at Supermarine, it was decided to build a new prototype using the Mk 21 prototype PP However the new wing gave less than perfect handling characteristics and so the Mk 23 was never built from the Mk 22 airframe as intended. There were also zero-point fittings for rocket projectiles under the wings. Although designed as a fighter-interceptor aircraft, the Spitfire proved its versatility in other roles. Late production aircraft were built with the lighter, short-barrelled, electrically fired Mark V Hispano cannon. A total of 81 Mk 24s were completed, 27 of which were conversions from Mk 22s. The last Mk 24 to be built was delivered in February

and were used until by 80 Squadron. These remarkable increases in performance arose chiefly from the introduction of the Rolls-Royce Griffon engine in place of the famous Merlin of earlier variants. Production[edit] After the destruction of the main Itchen and Woolston works by the Luftwaffe in September , all Supermarine manufactured Spitfires were built in a number of " Shadow Factories "; by the end of the war there were ten main factories and several smaller workshops which built many of the components. The main Castle Bromwich factory was also aided by a smaller number of the shadow factories. Information as to when the first production aircraft emerged is from the serial number lists provided in Morgan and Shacklady Protracted development of the Mk 21 meant that this variant did not reach operational service until January Production by Mark [52] [53] Mark.

Chapter 2 : Spitfire F. Mk XVI - WarThunder-Wiki

The British Supermarine Spitfire was facing several challenges by mid The debut of the formidable Focke-Wulf Fw in late had caused problems for RAF fighter squadrons flying the latest Spitfire Mk Vb.

V is highly excellent kit. The particularly notable point is its nose cowl. The acciracy of its shape is the highest of any scale kit of early Merlin model. Moreover, dimensions or shapes of the fuselage, cross section, wing, empennage and airfoil are accurate. The box contains many variation parts: I selected early windscreen, normal intake, long spinner and Rotol prop. That is the characteristics of the early production of Castle Bromwich Aircraft Factory temperate model. Drawings Prior to the construction, I made drawings of Mk. Vb using a set of factory drawings. These factory drawings contain ordinate tables of fuselage and wing. I carefully read drawings and translated to my drawings. After that, CBAF aircraft has the late style windscreen. The starboard shows Supermarine or Westland built tropical mode after January The airfoil in the side view drawings shows virtual airfoil of fuselage center. The coolant access panel port upper cowl of the late production model changes to circle shape same as Mk. Some aircraft of the very early model has small blister of Coffman engine starter on the starboard cowl. Some aircraft has the small air-intake below windscreen port side only. The third stack of fish-tail exhaust is longer than first and second one. Some aircraft of Supermarine and Westland late production model may have unspecified wide root de Havilland propeller blades and semi-long spinner. Many of them may be sent to SEAC. There are some variation of details and shape of the Aboukir air filter. The "D" shape small access panel on the upper cowl rear end is found in existing restored Mk. The "K" shape rivet line on the upper skin of the wheel may be the characteristics of Mk. The parallel two reinforcement ribs on the upper skin of the wheel are retrofit at late period of WW2. So, the "front line fighter" of Mk. Air outlets on the lower wing shown in purple lines are early production model only. The shape of the lower blister of 20mm cannon is left-right asymmetric. But, very early production model had symmetric with small bulge letter QJ-S. The fuel valve and droppable fuel tank hooks under the mid fuselage shown in purple lines were introduced in August Landing lights on both sides were deleted since May Cross section shapes of fuselage frames are based on the ordinate table. Outline shapes of engine cowl of early Mk. IX and late Mk. This difference is not only upper cowl but side and lower cowl. IX kit distinguish upper cowl, but the side and lower cowl are the same. Cockpit At the beginning, the lower side wall was glued on the fuselage side. The cockpit was almost straight from the box. Fuselage and wing Left and right half parts were glued. The outline shape of upper cowl is very good in this angle. The thin shim was inserted between lower cowl and side cowl so as to let down the lower surface of cowl end by 0. The edge of lower wing part was bent to fit lowered cowl red arrow. Compare the upper cowl outline with above pic red circle. At the beginning, the aileron was tightly glued on the upper wing. Plastic sheet was inserted in the gap red arrow. Remove reinforcement ribs red arrow. Panel lines and rivet lines Kit panel lines were a little wide and blurring. So all of the surface was sanded and every line was re-engraved. The landing light was engraved with hand-made template which was cut by a cutting machine Graphtec Craft Robo. The hollow at the canon was filled with heated sprue. Rivets were engraved with 1 beading tool. Access panel fasteners were 4. Engine cowl fasteners were 1 on The shape of the tire blister was corrected with surfacer and Craft Robo template. Kit parts demarcation line is different from actual filet line red circle. The seat belt is Fine Molds Nano Aviation. Windscreen and slide hood This kit distinguishes the difference of the height between early and late windscreen. This is a highly assessable point. However, outline shapes of windscreen and slide hood are minor weak point of Airfix kit. As for the early windscreen, the kit bullet proof glass is thin and front shape is not correct; the width of the upper portion is too wide. As for the late wind screen, the front view shape of the rear frame is not correct; the width of the upper portion is too narrow. And the side frame of the bullet proof glass is parallel. The actual aircraft is tapered. And the demarcation line between fuselage is a little lower, therefore, the width of the hood bottom is wide. Red lines are Airfix kit and blue lines are actual aircraft. Green lines are Eduard Mk. IX and purple is Airfix. Blue dot-lines are actual aircraft. Eduard is correct as for the front shape of the bullet proof glass, but the width of the bottom is a little narrow. Anyway, these are very minor mistakes. Only Spitfire enthusiasts

question these issues. So, common modelers may ignore them. The rear fixed window was glued and sanded to be flat. Plastic piece was glued on the edge of the fuselage so as to rise the demarcation line. The shape of bullet proof glass was corrected. All frames were sanded to be flat. The bottom line was sanded. This black trim is a mark for sanding. Canopy parts were almost fit to the fuselage. The rear window was engraved and polished. The kit pilot seat was rather poor. So the seat was scratchbuilt with plastic sheet. The thin bullet proof glass became insufferable for me. So I decided to correct it. The bullet proof glass portion was cut from kit windscreen. The new bullet proof glass was cut from DVD case. The thickness of the new glass is 1mm 0. Each joint area of new bullet proof glass and kit windscreen was sanded at an angle. The lower portion of the new bullet proof glass was moved forward. Therefore, the angle of glass became shallow. Then the rear edge of side window was cut wedgewise 0. And the fuselage fitting line was re-adjusted. For that matter, the kit early Mk. I windscreen is not correct as well. The flat surface portion of the actual aircraft is rectangle and it is the same as front glass. But the kit flat portion is trapezoid like bullet proof grass. Window frames were engraved with hand-made double needles. The bullet proof glass frames were 0. Styrene plate of a DVD case is high degree of transparency. There is no distortion.

Chapter 3 : Supermarine Spitfire Mk I | Eric Stanley Lock - Model Aces

The Mk XVI entered production in September , and remained in production until August Early Mk XVIs were equipped with the "c" wing (four 20mm cannon or two 20mm cannon and fourin machine guns).

The need to keep pace with enemy fighter aircraft meant that there was a need for engines which could also evolve to provide more power more efficiently at all altitudes. There were 24 marks of Spitfire, but also, as will be seen, many sub-variants within the marks. The entire Spitfire family may be divided by the generation of Rolls-Royce engines which powered the aircraft. I, II and V as the most prominent fighter variants. Two-stage Merlins meaning the use of two-stage supercharger for increased altitude performance , from Merlin 61 to Merlin 70, provided the basis of mid-war development, Mks. Finally, the arrival of Rolls-Royce Griffon provided a basis for the final line of Spitfire development, exemplified by Mks. This article describes the initial Spitfire line powered by single-stage supercharged Merlin engines. It is notable that throughout the entire development process, which took place over twelve years, from through to , there were no outstanding failures of the basic design: Official photograph of a Spitfire Mk. I from contemporary publication. Note that the gun ports have been retouched to conceal the armament of the aircraft, [Crown Copyright] A few initial notes No discussion about the various Spitfire marks can be complete without referring to the different wing types, and indeed such references are made liberally throughout this article. The single-stage Melin Spitfires used four different wing types, A through to D which had the same dimensions and plan but different internal arrangements of armament and fuel tanks. Readers are advised to refer to my previous article Concise Guide To Spitfire Wing Types for an overview of the basic wing types of the Spitfire and the differences between them. Here is but a brief summary. A type The original wing design, the basic structure of which was unchanged until the C type in The armament to be carried was 8x. B type This was the A-type modified to carry a 20mm Hispano cannon. The alloy covered ailerons were standardised during the production of this wing type. This wing was structurally modified to reduce labour and manufacturing time plus allowing mixed armament options; A type, B type, or four 20 mm Hispano cannon. The fairings over the Hispano barrels were shorter and there was usually a short rubber stub covering the outer cannon port. D type Unarmed long-range wing for reconnaissance versions with the D-shaped wing structure ahead of the main spar converted to integral fuel tanks capable of carrying 66 imp gallons. Starting with the Mk. V some Spitfires had their rounded wingtips replaced by shorter, squared off fairings to improve low-altitude performance and enhance the roll rate. Also, readers should be advised that many Spitfires of one mark or variant may have been modified to another later in their career; for example, several of the first Mk Vbs were converted from Mk Ibs; the first Mk IXs were originally Mk Vcs, Mk. XVIs started their life as Mk. IXs and so on. All liquid capacities and measurements quoted herein are given in Imperial units. I in late with front-line service commencing in August Over the next three years a large number of modifications were made, especially as a result of wartime experience. The lead from the accumulator trolley was plugged into a small recess on the starboard side cowling of the Spitfire. The system of gun heating, was introduced on the 61st production Mk I. This canopy improved headroom and enabled better vision laterally and to the rear. A simplified design of pitot tube was introduced. The manual hand-pump for operating the undercarriage was replaced by a motorised hydraulic system. One of the earliest production Spitfires Mk. I displaying the characteristic initial features of this mark: All these elements, and more, were modified or replaced before the time of the Battle of Britain, leading to significant improvements in performance and combat-worthiness of the aircraft. The patches kept the gun barrels free of dirt and debris and allowed the hot air to heat the guns more efficiently. When the guns were fired the patches were shot through, and were always replaced by the ground-crew during rearming. The Aero Products wooden propeller was replaced by a lb kg de Havilland 9 ft 8 in diameter, three-bladed, two-position, metal propeller, which greatly improved take-off performance, maximum speed and the service ceiling. It also started the incremental weight increases which continued through the life of the airframe. Just before the Battle of Britain a de Havilland constant speed propeller, of the same diameter as the two-position unit, became available. Although this was a great deal heavier than the earlier types lb kg it gave

another substantial improvement in take-off distance and climb rate. A thick, laminated glass, bullet proof plate was fitted to the curved, one piece windscreen. A 3mm thick cover of light alloy, capable of deflecting light machine gun rounds, was fitted over the top of the upper fuel tank. From about mid, 73 pounds 33 kg of armoured steel plating was provided in the form of head and back protection on the seat bulkhead and covering the forward face of the glycol header tank. Rear view mirrors were added to the windscreen: This weighed about 40 lb 18 kg and could be identified by wire aerials strung between the tailplane tips and rear fuselage. With the new sets, the pilots enjoyed a much clearer reception. Modifications to the Spitfires Mk. I in service were introduced incrementally, resulting in a variety of interim configurations at the unit level during the period of Here, two Spitfires of No. This was more than offset by the improvements in take-off, climb rate and ceiling brought about by the two-position and constant speed propeller units. At the start of the war the engine ran on the then-standard 87 octane aviation fuel. From March increasing quantities of octane fuel, imported from the U. If the pilot resorted to emergency boost, he had to report this on landing and it had to be noted in the engine log book. Combat experience showed that the fabric covered ailerons seemed to lock solid in high speed dives: From November Supermarine started producing light-alloy covered ailerons as a which did not have this deficiency. I armed with two Hispano 20mm cannon during the Battle of Britain. These were known as the Mk. Ib, the eight machine gun Mk Is were retrospectively called the Mk. This early cannon installation was hampered by frequent jamming problems. In one engagement, only two of the 12 aircraft had been able to fire off all of their shells. Further cannon-armed Spitfires, with improvements to the cannon mounts were later issued to 92 Squadron and it was eventually realised that the best armament mix was an aircraft with two cannon and four machine guns. Most of these trial aircraft were later converted to the first of the Mk Vbs.

Chapter 4 : Supermarine Spitfire www.nxgvision.com, Eduard ()

This Supermarine Mk XVI Spitfire is an ex-wartime example, built at Vickers Armstrong's Castle Bromwich "shadow factory", near Birmingham, in late

Wing types[edit] The majority of the Spitfires from the Mk VIII on, used three basic wing types; C, D and E C type[edit] Also known as the "universal wing" the new design was standard on the majority of Spitfires built from mid This wing was structurally modified to reduce labour and manufacturing time and it was designed to allow mixed armament options: The fairings over the Hispano barrels were shorter and there was usually a short rubber stub covering the outer cannon port. Redesigned upper wing gun bay doors incorporated "teardrop" shaped blisters to clear the cannon feed motors, and the lower wings no longer had the gun bay heating vents outboard of the gunbays. The first series of Spitfire Mk IXs retained the bay doors first used on Spitfire VCs; these incorporated large blisters to clear the feed motors of two Hispano cannons. All later Spitfires had smaller, more streamlined blisters. To avoid the expansion of fuel in hot weather damaging the wing, pressure relief valves, incorporating small external vent pipes, were fitted near the wing tips. The outer machine gun ports were eliminated; although the outer machine gun bays were retained, their access doors were devoid of empty shell case ports and shell deflectors. Essentially the new wing allowed for a four cannon armament, although the inner bays also permitted the fitting of heavy machine guns. There were thus two possible weapon fits: The first trial installation modification was made in BS in November ; by mid-March the first service Spitfires to be modified were from NZ , and Squadrons. Spitfires with this armament were at first referred to as Spifire LF. While many "LF" Spitfires e. IX had the "clipped" wings, a number did not. The true distinguishing feature of "LF" versions was the fitting of low-altitude versions of the Rolls-Royce Merlin engine. Up until the end of , the RAF designations always used Roman numerals for mark numbers. From onwards, Arabic numerals were used exclusively. An intercooler was mounted behind the engine, on the supercharger casing. A small rectangular air scoop for a "Heywood" air compressor was fitted on the starboard upper engine cowling. The carburettor air intake on early to mid-production Spitfire IXs was a different shape from those of single-stage engined aircraft; they were shorter and had a wider air inlet. From , an "Aero-Vee" tropical filter in a long, streamlined fairing was introduced for the carburettor air intake. The exhaust units were changed to six "fishtail" stacks per side. Under the nose, the three piece cowling was changed to a one piece layout. The oil tank was no longer a part of the cowling structure. Early Mk IXs had a teardrop shaped blister for a Coffman engine starter [nb 1] on the lower starboard side cowling, just behind the propeller. This was replaced by an improved electric starter on most two-stage Merlin powered Spitfires and, from late the blister was seen on only a few aircraft. The Type C wing was fitted as standard. When fitted these rods supplemented an "Electric visual indicator" mounted on the instrument panel. A light for the retractable tailwheel was mounted on the instrument panel, just below the main visual indicator. Under the port wing a new radiator fairing housed a square oil cooler alongside the other half-radiator unit. When the engine was running at low speed, one radiator section provided enough coolant; a thermostatic switch turned off the starboard radiator section until more power was called for and extra engine cooling was required. A streamlined round rear-view mirror, with a bullet-shaped fairing replaced the rectangular version. On new production Mk IXs the small, teardrop shaped identification light behind the radio mast was removed. While early Mk IXs converted from Mk VCs had the original smaller elevator horn mass-balances, most had the enlarged version with the straightened leading edge. The internal structure was strengthened and revised. On the wings the ailerons were reduced in span by 8. There had been some instances of earlier models breaking up in the air in steep high speed dives, it was thought, because of aileron flutter. In combination with the wing tanks this gave a total internal capacity of gal In addition a 13 gal 64 l fuel tank was fitted in each wing leading edge between the wingroot and the inner gun-bay. In addition, the leg doors were slightly concave, allowing the undercarriage to sit lower in the wheel wells when retracted: The wheels themselves were a new strengthened Dunlop AH "four spoke" pattern, replacing the "five spoke" pattern used since the first Mk Is. Note the "pointed", extended wingtips and the cabin pressurisation air intake under the exhausts. VII or 71 H.

VII series engine with two-stage, two-speed superchargers. Other changes to the airframe are noted above. The Mk VII used a Marshall manufactured compressor for pressurising the cockpit; this was mounted on the right of the engine and drew its air through a long intake under the starboard exhaust stubs. Because the threat from high altitude bombers never materialised many Mk VIIs later reverted to the normal, rounded wingtip. While early Mk VIIs were fitted with a detachable canopy, secured by four pilot-operated catches, later Mk VIIs were fitted with a " Lobelle "-type hood which opened by sliding backwards, as on non-pressurised versions of the Spitfire. This was a big improvement on the clampdown cockpit of the Mk VI. The canopy was double-glazed and used rubber tubing to create a proper pressure seal against the fuselage. The canopy rails were bulkier than the standard Spitfire type. VII or Merlin 71 H. VII , the latter fitted with a Bendix-Stromberg "anti-g" carburettor. When the "interim" Mk IX proved itself to be adequate for the RAF it was decided to use the shadow factory at Castle Bromwich to produce that version only: They were of no practical value to the Mark VIII and simply reduced the aileron response and the rate of roll. Provision was made to allow the Mk VIII to carry a single "slipper" drop tank of 30, 90 or gal capacity. When carrying the 90 or gal tank the aircraft was restricted, once airborne and at cruising altitude, to straight and level flight. In trials, the new hood design was found to bring about great improvements to all-round visibility and with several modifications, was standardised on later Spitfires. A teardrop shaped blister for a Coffman cartridge starter can be seen just behind the propeller. This aircraft carries a gallon "slipper" drop tank under the fuselage. In the early months of , with the clear superiority of the Focke-Wulf Fw over the Spitfire VB, there was much pressure to get Spitfires into production using the new two-stage supercharged Merlin 61 engine. The performance increase was described by Jeffrey Quill as a "quantum leap" over that of the Mk VB and another Spitfire airframe, R was modified to take the new engine. The Air Ministry made the decision that Mk VC airframes should be converted to take the more powerful engine and, as a result, many of the early IXs were converted Mk VCs which did not have any of the refinements which later appeared. These could be identified by the Type C wing with the large double blisters over the inner cannon bays and the identification light on the fuselage spine, behind the aerial mast. The elevator horns were also smaller in size than that of most Mk IXs which had larger horn balances. On the level the Spitfire is considerably faster and climb is exceptionally good. It will climb easily to 38, feet and when levelled off there can be made to climb in stages to above 40, feet by building up speed on the level and a slight zoom. Its manoeuvrability is as good as a Spitfire V up to 30, feet and above is very much better. At 38, feet it is capable of a true speed of mph and is still able to manoeuvre well for fighting. Several major and large numbers of minor improvements were progressively introduced to Mk IXs, some of which were used on other Spitfire variants. The Merlin 61 was phased out early in in favour of the Merlin 63 and 63A. As a result of this the gun-camera was moved from the port wingroot to the starboard wingroot and a fuel cooler, fed by a small round air-intake was fitted in its place. This version first became operational in March with the Biggin Hill Wing, comprised at the time of and Free French Squadrons. This type was by far the most produced of the Spitfire IX variants, with over 4, built. F IX was powered by the specialised high altitude Merlin 70 and entered service in the Spring of Also introduced in early was a new Mark II Gyro gunsight. This gunsight calculated the correct angle of deflection to use when leading the target. Its introduction doubled the effectiveness of RAF gunnery and was a major factor in Allied air superiority. Jettisonable "slipper tanks" of 30, 45 or 90 gal could be carried under the centre-section. To further increase the combat radius some late production Mk IXs were fitted with additional internal self-sealing fuel tanks in the rear fuselage: The pilot was also warned to avoid instrument flying whenever possible. With the cut down fuselage the lower forward fuselage tank capacity was increased to 47 gallons, while the rear fuel tanks were decreased to a capacity of 66 gallons. As well as incorporating camera equipment, a wrap-around PR type windscreen was fitted and a larger oil tank was installed under the nose. All armament was removed and a PRU Blue finish applied. These aircraft lacked the "wet wing" tanks, meaning that the PR Mk IX relied on drop tanks for extra range. These aircraft were used for low altitude "Dicing" missions in tactical support of army operations. These were used exclusively by No. Irish Air Corps Spitfire T. The Spitfires provided transition training that included gunnery practice since the type was equipped with two. Most of the TR 9 aircraft passed to the ground technical training school at Baldonnel

where they were used as instructional airframes for the training of aircraft engineers for the Air Corps. Four of the IAC aircraft survived and two went on to join the warbird fleet in the s and later. The PR variant can be recognised by the larger-capacity deeper oil tank under the nose made necessary by the greater duration of the long-range reconnaissance flights. It had the pressurised Mk VII cockpit, with the Lobelle sliding canopy, and retained the fighter style windscreen with the bullet-proof glass panel. The long thin air intake to the cockpit pressurisation system was fitted under the exhaust stacks on the starboard cowling. All saw limited service in and Squadrons in a high altitude reconnaissance role. The Mk XI was the first PR variant to have the option of using two vertically mounted F52 cameras with inch-focal-length lens in the fuselage behind the cockpit. Booster pumps for the wing tanks were fitted and covered by teardrop shaped fairings under the wings. Retractable tailwheels were fitted as standard and the majority of the Mk XIs built had the later large-area pointed rudder. All of the Merlin 70 and of the Merlin 60 series aircraft were fitted with the Vokes Aero-Vee dust filter in the extended, streamlined carburettor air intake under the nose.

Chapter 5 : Supermarine Spitfire www.nxgvision.com Airfix 1/48

Note: Prices and availability are indications only. Also check if the product actually matches! In-Box Reviews.

Having built an early Mk. II, including a Coffman starter bulge, Rotol prop and a set of decals. Looking at the Tamiya Mk. I Spitfire kit, I thought it might be fun to convert it to a Mk. He is pulling back on the stick, so I slit and posed the elevators accordingly. Should have painted the seat red-brown, but caught that too late. The Coffman bulge and a scratch built oxygen tank were added to the right side of the fuselage. To improve the fit at the wing root, small pads of plastic were added on the inside at the step to tighten the joint at the mid-span, along with a strip of plastic to support later work on the cowl seam. The Tamiya exhausts are a little odd looking to me. Initially, I planned to replace them with a pair of fish-tail exhausts from the early Airfix Mk. I, but ended up using the more accurate early style exhausts from the new Airfix Mk. To get these to fit together properly the center legs on the Airfix parts must be shortened and the locating holes in the Tamiya exhaust recesses revised. Arguably it improves the appearance of the model, making the spine look a little less pinched at the forward end. The engine cowling on the Tamiya kit is both too square shouldered and a bit flat on top. First, I added a good swipe of Tamiya white filler putty to the top of the engine cover without doing any work to clean up the as glued seam. When done, several coats of Mr. Surfacer with sanding between evened everything out. With the cowl sorted, the rear transparency was taped in place temporarily while installing the cockpit, to prevent the headrest from riding too high. Only the front bulkhead was glued to the fuselage halves. The rear was left floating to provide some self adjustment. After that the rear cockpit arch was fixed in place, Sutton harness was made up from some wire and pie-pan aluminum, and threaded in place before the rear transparency was permanently glued. The gunsight and windscreen were also added at this point. Gaps at the front and sides of the armored glass framing were faired in with a small flashing strips made from pie-pan aluminum to represent the attachment brackets on the actual aircraft. When satisfied with the shape, the upper wing surface was sanded down to restore a thin trailing edge and more Mr. Surfacer used to smooth things out. Early on in the build I had thought the Mk. II used the later Mk. V style oil cooler, and modified an Airfix part to fit, but when further research revealed that this was a retrofit on surviving examples, I used the early style part from the kit. The first edition Airfix Mk. The Airfix fuselage codes and gun tape decals were masked with some Tamiya tape and lightly oversprayed with light coats of the appropriate shades of Vallejo Model Color paint before they were applied. This sounds odd, but Vallejo paints were developed for painting cartoon cells, and adhere well to decal film. The technique works well for any kind of custom marking, letting you create the art on a flat decal paper and apply it to the model afterward. All the decals were settled with Solvaset, and after a bath to remove decaling residue, the model got several light coats of Vallejo flat varnish. With the decorations complete, final details were added. The Airfix prop was modified to fit with a turned aluminum prop shaft, and the mating edge of the spinner was turned down slightly to match the Tamiya kit and fastener detail added. A more accurately sized antenna was sourced from the Airfix Mk. I kit, and the kit wheels replaced with Eduard Brassin parts, which are both better detailed and a better fit. As a finishing touch, the gun heater vents that can be seen at the outboard end of each wing were created from bits of resin and beer can aluminum, painted to match their locations and added with a touch of Minwax acrylic varnish as an adhesive.

Chapter 6 : Supermarine Spitfire Mk XVI: VH-XVI / TB - Temora Aviation Museum

semiscale R/C - Supermarine Spitfire Mk XVI The first fully printable airplane with suitable files prepared for your 3Dprinter. Flight characteristics are comparable or even better than classic build model airplanes.

I kit by Tamiya. This kit is set for release in December, and we hope to see more of it in Telford during the weekend. Revised nose shape compared with the Tamiya kit 1. Pre-war unarmored windscreen 2. Two styles of mirror are provided for the armored windscreen 3. Early style antenna mast 1. Different turtleback insert for hood in open position 2. Cockpit door open 3. Closed canopy and matching fuelage insert 1. Pilot figure is included Full cockpit interior 1. Three styles of windscreen 1. Early style of pitot tube 2. Main production style of pitot tube 3. Gun heating vent can be left out for early model Spitfires 1. Photoetched parts for the water cooler grille 1. Clever solution to a landing gear adjustment problem 2. This panel insert hides the landing gear assembly AND will provide a neatly faired-in carburettor intake 1. One-piece horizontal tail, Again, this caters for trouble. Early and late type harness is provided 3. Solid wheel covers retrofitted to some late-production Mk, Is 1. Three versions of squadron markings 2. Pre-cut canopy masks 3.

Chapter 7 : Supermarine Spitfire - Wikipedia

There's nothing quite like the whitsling sound of a Supermarine Spitfire as it dives down toward you on the ground. Crank the volume up on this one which sho.

General info Spitfire F. Mk XVI in the Garage. It was in the game since the start of the Open Beta Test prior to Update 1. The main purpose, usage and tactics recommendations General play style The Spitfire F Mk XVI is a very unique plane with an awkwardly unique role and design. Virtually identical to the Spitfire LF Mk. IX, aside from the clipped wings, the Mk XVI combines the low-altitude capabilities of the aforementioned fighter with the fantastic roll, dive, and speed capabilities of the German Focke-Wulfe series. IX regarding armament and performance at low-altitude. Low-altitude climb acceleration is fantastic, climb rate is very good, and armament is extremely effective. The main distinguishing feature of the XVI is its clipped wings. These wings give the Mk XVI some distinct advantages- a great roll rate and amazing dive and level speed and acceleration. The roll rate makes evasion a very easy task- rolling manoeuvres can easily evade most tail-end attacks by any fighter in the 4. Even more, the clipped wings of the XVI provide for very good low-altitude speed and acceleration performance- this fighter climbs like a rocket and dives like a hornet below m. However, the clipped wings can provide some significant disadvantages to flying, as well. Compared to similar Merlin Spitfires the turn rate is far worse, higher-altitude performance is abysmal, and climb performance is worse, though marginally. Weaponry is standard, except for the 2 M2 As a matter of fact, the two M2s provide a significant increase in fire power. When equipped with Omni or Stealth they provide excellent "soft" ground target dispatching performance while proving effective as a last-ditch weapon. II 20mm cannons which are highly effective against most fighters, especially when utilizing the "Air Targets" belt. Thus, the Spit F Mk. XVI is not a suitable BnZ nor high-altitude fighter; it works best as a low-altitude fighter-bomber that can effectively take out ground targets while providing good fighter cover. BnR is by far the best recommended tactic.

Chapter 8 : Supermarine Spitfire

The Supermarine Spitfire Mk I is the most famous British fighter of the Battle of Britain, even though the Hurricane actually played a bigger role in the battle. The Mk I was the first over over twenty versions of the Spitfire.

Mitchell designed the Supermarine Type to fill this role. This design was submitted to the Air Ministry in July , but was not accepted. They soon discovered that the Spitfire [nb 4] [21] was a very good aircraft, but not perfect. Interim reports were later issued on a piecemeal basis. Although full-scale production was supposed to begin immediately, there were numerous problems that could not be overcome for some time, and the first production Spitfire, K, did not roll off the Woolston , Southampton assembly line until mid Supermarine was a small company, already busy building Walrus and Stranraer flying boats, and Vickers was busy building Wellington bombers. The initial solution was to subcontract the work. The managements of Supermarine and Vickers were able to convince the Air Ministry that production problems could be overcome, and a further order was placed for Spitfires on 24 March The two orders covered the K, L and N prefix serial numbers. In this informal request for major manufacturing facilities was turned into a formal scheme, known as the shadow factory plan , to boost British aircraft production capacity under the leadership of Herbert Austin. He was given the task of building nine new factories, and to supplement the existing British car manufacturing industry by either adding to overall capacity or increasing the potential for reorganisation to produce aircraft and their engines. Although it would take some time to resolve the problems, in June , 10 Mk IIs were built; 23 rolled out in July, 37 in August, and 56 in September. CBAF went on to become the largest and most successful plant of its type during the â€”45 conflict. As the largest Spitfire factory in the UK, by producing a maximum of aircraft per month, it built 12, aircraft of this type, before its closure in During the Battle of Britain, the Luftwaffe made concerted efforts to destroy the main manufacturing plants at Woolston and Itchen , near Southampton. The first bombing raid, which missed the factories, came on 23 August Over the next month, other raids were mounted until, on 26 September , both factories were destroyed, [40] with 92 people killed and a large number injured. Most of the casualties were experienced aircraft production workers. A purpose-built works, specialising in manufacturing fuselages and installing engines, was built at Star Road, Caversham in Reading. This site also had an aircraft assembly hangar where many prototype and experimental Spitfires were assembled, but since it had no associated aerodrome no Spitfires ever flew from Hursley. Four towns and their satellite airfields were chosen to be the focal points for these workshops: An experimental factory at Newbury was the subject of a Luftwaffe daylight raid, but the bombs missed their target and hit a nearby school. Completed Spitfires were delivered to the airfields on large Commer " Queen Mary " low-loader articulated lorries trucks , there to be fully assembled, tested, then passed on to the RAF. He oversaw a group of 10 to 12 pilots responsible for testing all developmental and production Spitfires built by the company in the Southampton area. He co-ordinated a team of 25 pilots and assessed all Spitfire developments. After a thorough pre-flight check I would take off and, once at circuit height, I would trim the aircraft and try to get her to fly straight and level with hands off the stick Then I would make a careful check of the power output from the engine, calibrated for height and temperature Personally, I never cleared a Spitfire unless I had carried out a few aerobatic tests to determine how good or bad she was. The production test was usually quite a brisk affair: Then the aircraft received a final once-over by our ground mechanics, any faults were rectified and the Spitfire was ready for collection. I loved the Spitfire in all of her many versions. But I have to admit that the later marks, although they were faster than the earlier ones, were also much heavier and so did not handle so well. You did not have such positive control over them. One test of manoeuvrability was to throw her into a flick-roll and see how many times she rolled. With the later and still heavier versions, one got even less. The essence of aircraft design is compromise, and an improvement at one end of the performance envelope is rarely achieved without a deterioration somewhere else. In the mids, aviation design teams worldwide began developing a new generation fighter aircraft. The French Dewoitine D. They also featured refinements such as retractable undercarriages, fully enclosed cockpits, and low drag, all-metal wings. German bombers would have to fly to the UK over the North Sea , and Germany did not have

any single-engine fighters with the range to accompany them. To carry out the mission of home defence, the design was intended to allow the Spitfire to climb quickly to intercept enemy bombers. The streamlined, semi-monocoque , duralumin-skinned fuselage featured a number of compound, vertical curves built up from a skeleton of 19 formers , also known as frames, starting from frame number one, immediately behind the propeller unit, to the tail unit attachment frame. The first four frames supported the glycol header tank and engine cowlings. Frame five, to which the engine bearers were secured, supported the weight of the engine and its accessories. This was a strengthened double frame which also incorporated the fireproof bulkhead and, in later versions of the Spitfire, the oil tank. This frame also tied the four main fuselage longerons to the rest of the airframe. Each of these nine frames was oval, reducing in size towards the tail, and incorporated several lightening holes to reduce their weight as much as possible without weakening them. The U-shaped frame 20 was the last frame of the fuselage proper and the frame to which the tail unit was attached. Frames 21, 22 and 23 formed the fin; frame 22 incorporated the tailwheel opening and frame 23 was the rudder post. Before being attached to the main fuselage, the tail unit frames were held in a jig and the eight horizontal tail formers were riveted to them. The fuselage plating was 24, 20 and 18 gauge in order of thickness towards the tail, while the fin structure was completed using short longerons from frames 20 to 23, before being covered in 22 gauge plating. From February flush riveting was used on the fuselage, affecting all Spitfire variants. The removable wing tips were made up of duralumin-skinned spruce formers. An elliptical planform is the most efficient aerodynamic shape for an untwisted wing, leading to the lowest amount of induced drag. The ellipse was skewed so that the centre of pressure, which occurs at the quarter- chord position, aligned with the main spar, preventing the wings from twisting. In any case it would have been simply asking for trouble to have copied a wing shape from an aircraft designed for an entirely different purpose. Aerodynamically it was the best for our purpose because the induced drag caused in producing lift, was lowest when this shape was used: To reduce drag we wanted the lowest possible thickness-to-chord, consistent with the necessary strength. But near the root the wing had to be thick enough to accommodate the retracted undercarriages and the guns Mitchell was an intensely practical man The ellipse was simply the shape that allowed us the thinnest possible wing with room inside to carry the necessary structure and the things we wanted to cram in. And it looked nice. As the wing thinned out along its span, the tubes were progressively cut away in a similar fashion to a leaf spring ; two of these booms were linked together by an alloy web, creating a lightweight and very strong main spar. The resultant narrow undercarriage track was considered an acceptable compromise as this reduced the bending loads on the main-spar during landing. At the time the wing was designed, this D-shaped leading edge was intended to house steam condensers for the evaporative cooling system intended for the PV-XII. This used the cooling air to generate thrust , greatly reducing the net drag produced by the radiators. When the two-stage Merlin was introduced in the Spitfire Mk IX the radiators were split to make room for an intercooler radiator; the radiator under the starboard wing was halved in size and the intercooler radiator housed alongside. Under the port wing a new radiator fairing housed a square oil cooler alongside of the other half-radiator unit. The two radiator flaps were now operated automatically via a thermostat. XIX displayed at an air show in The black and white Invasion stripes are visible. Another wing feature was its washout. As the wing roots started to stall, the separating air stream started to buffet vibrate the aircraft, warning the pilot, allowing even relatively inexperienced pilots to fly it to the limits of its performance. The problems increased when the work was put out to subcontractors, most of whom had never dealt with metal-structured, high-speed aircraft. By June , most of these problems had been resolved, and production was no longer held up by a lack of wings. It was also felt that air combat would take place at relatively low speeds and that high-speed manoeuvring would be physically impossible. Flight tests showed the fabric covering of the ailerons "ballooned" at high speeds, adversely affecting the aerodynamics. Replacing the fabric covering with light alloy dramatically improved the ailerons at high speed. The Spitfire had detachable wing tips which were secured by two mounting points at the end of each main wing assembly. Flaps were normally lowered only during the final approach and for landing, and the pilot was to retract them before taxiing. Both the elevators and rudder were shaped so that their centre of mass was shifted forward, reducing control-surface flutter. This wing was tested on a modified F Mk 21, also called the F Mk 23, sometimes referred to as "Valiant" rather

than "Spitfire". The increase in performance was minimal and this experiment was abandoned. These laminar flow airfoils were the Supermarine I used at the root and the II used at the tip. Later, a new fuselage was designed, with the new fighter becoming the Supermarine Spiteful. This meant a Luftwaffe fighter could simply "bunt" into a high-power dive to escape an attack, leaving the Spitfire behind, as its fuel was forced out of the carburettor by negative "g". RAF fighter pilots soon learned to "half-roll" their aircraft before diving to pursue their opponents. While it did not cure the problem of the initial fuel starvation in a dive, it did reduce the more serious problem of the carburettor being flooded with fuel by the fuel pumps under negative "g". Further improvements were introduced throughout the Merlin series, with Bendix -manufactured pressure carburettors , designed to allow fuel to flow during all flight attitudes, introduced in While this prevented overheating of the cordite used in British ammunition, it allowed cold air to flow through the barrel unhindered. Red fabric patches were doped over the gun ports to protect the guns from cold, dirt and moisture until they were fired. Keith held various appointments with the RAF dealing with designing, development and technical policy of armament equipment. He organised a conference, with Air Commodore Tedder in the chair, on 19 July He says "I think it can be reasonably contended that the deliberations of that conference made possible, if not certain, of the winning of the Battle of Britain, almost exactly six years later". Even if the eight Brownings worked perfectly, pilots soon discovered that they were not sufficient to destroy larger aircraft. Combat reports showed that an average of 4, rounds were needed to shoot down an enemy aircraft. The cannon suffered frequent stoppages, mostly because the guns were mounted on their sides to fit as much of the magazine as possible within the wing. Nevertheless, 30 more cannon-armed Spitfires were ordered for operational trials, and they were soon known as the Mk IB, to distinguish them from the Browning-armed Mk IA; they were delivered to No. The Hispanos were found to be so unreliable that the squadron requested an exchange of its aircraft with the older Browning-armed aircraft of an operational training unit.

Chapter 9 : Supermarine Spitfire (late Merlin-powered variants) - Wikipedia

After a long break having a leak fixed in the fuel tanks, Kermit Weeks Supermarine Spitfire MK XVI is started up and taken for a short taxi run.

Tweet Although it was only a front line fighter for eighteen months, the Spitfire I earned one of the most enduring reputations of any aircraft. Its sleek lines, graceful appearance and impressive performance combined with its role in the battle of Britain to make it a British icon. The Mk I Spitfire was in constant development during its production run. Amongst the pre-war changes the most visually obvious was the replacement of the level cockpit of the prototype with the instantly familiar curved bubble cockpit. Of perhaps more importance to the pilot, armour plating was added behind the engine and a bullet proof windscreen was fitted. From the th aircraft the engine was changed from the hp Merlin II to the similar Merlin III, which could take either the de Havilland propeller or a more advanced Rotol propeller. These changes increased the performance of the Spitfire at different speeds, as the angle of the propeller blade could be altered to suit high or low speed situations. The maximum speed of the Mk I was reduced from mph at 18, in early version to mph at 20, feet after the new armour and other extra equipment was added, but the decrease would have much more significant without the new propellers. The de Havilland propeller had increased the maximum speed by 10 mph; the Rotol propeller had a huge impact on rate of climb. One change that did not work out was an attempt to install two 20mm cannon in the Spitfire I. The cannon were unreliable and prone to jam, and would not enter front line service in the Spitfire until the IIb. The first production aircraft was completed in June By the outbreak of war on 3 September , Spitfires had been delivered of which 36 had already been written off! The RAF went into the war with only eight Spitfire squadrons. Over the next nine months the most important battles facing the Spitfire were the battle of production and the political battle to keep them out of France. The production battle was slowly won â€" in all Spitfire Is were produced before the type was phased out in favour of the Mk V. The Hurricane was still being produced quicker, and despite heavy losses in France was still more numerous during the battle of Britain. Just as crucial was the political battle. As the battle in France developed into a crisis, the RAF came under intense pressure to sent Spitfire squadrons to France. Fortunately Air Marshal Hugh Dowding, the head of Fighter Command, was able to resist this pressure, and the Spitfires were retained for home defence. Here, home based squadrons could reach the beaches, admittedly at extreme range. Their presence changed the balance of the fighting in the air. The Hurricane squadrons had suffered heavily in France, partly because of the rapid German advance, so it was over Dunkirk that the Bf finally met an equal. Worse would soon follow. In fairness one must remember that the Hurricane was responsible for the majority of German losses, but it was the Spitfire that captured the imagination. The Spitfire did perform better against the Bf , accounting for of the around Bf s shot down by the two types of British fighters. Head to head comparisons of fighter losses during the battle of Britain are misleading. The Spitfire and Hurricane were designed to intercept and destroy incoming bombers, and at that they excelled. On any given day of the battle, the bulk of German losses would be amongst the bombers. Worse for the Germans, every bomber carried several highly trained crew members, all of whom were lost, as were any fighter pilots shot down. In contrast, many of the British pilots were able to bale out of their damaged fighters and return to the action. During the battle of Britain the Spitfire was outnumbered in British service by the Hawker Hurricane. The two aircraft had a lot in common â€" both used the Merlin III engine, both carried eight. In theory the Hurricane had a higher service ceiling than the Spitfire I, but its performance was poor at height. The Hurricane was at its best at around 15, feet, the Spitfire at 18, This meant that the Hurricane was idea for intercepting the German bombers, who usually flew in at or below 17, feet, leaving the Spitfires to deal with the higher flying Bf s. Post war studies suggest that the two aircraft scored victories in proportion to the numbers present in the battle, suggesting that they were very well matched. Pilot accounts from both sides suggest that the Hurricane, Spitfire and Bf were so close in performance for pilot skill and the element of surprise to decide most combats. The statistics support the idea that the Spitfire was better able to deal with the Bf The German fighters shot down Spitfires and Hurricanes, reflecting the numerical dominance of the Hurricane. However, the Spitfire

shot down Bf s, the Hurricane only This would suggest that the Bf was superior to both British fighters. This was not the case. However, as the attacker the Germans normally had the advantage of numbers, and often of altitude. The Spitfire I owes at least part of its fame to the devoted loyalty of its pilots. The Spitfire was a beautiful aircraft to fly. It combined agility, manoeuvrability and speed with a generally forgiving nature. Many pilots described flying a Spitfire as like strapping on wings. In contrast the Bf , also loved by her pilots, may have been agile, but was also unforgiving. The Spitfire would remain a front line high performance fighter throughout the entire war, something not achieved by any other fighter of the Second World War.