DIGITAL COMBAT SIMULATOR

MOSQUITO
FB VI

Early Access Manual

EAGLE DYNAMICS

Dear User,

Thank you for purchasing the DCS: de Havilland DH 98 FB Mk. VI Mosquito!

The DCS: FB Mk. VI Mosquito is a thrilling simulation of the fastest, most powerful and most effective British fighter-bomber of the Second World War.

True to the DCS tradition of excellence, the DCS: Mosquito FB Mk. VI brings you a real sense of what it is like to fly and fight this iconic aircraft. Its devastating firepower, which includes four 20mm Hispano-Suiza cannons, four 7.7mm machine guns, and a range of bombs and rocket projectiles make it effective in pinpoint strike; anti-shipping; ground-attack, CAS and night-fighter missions.

As a pure air supremacy fighter, the Mk. VI Mosquito's speed, rates of climb and dive and overall handling meant it could hold its own against the enemy's best opposing fighters, including the Fw 190D-9 and the Bf 109K.

As members of The Fighter Collection, one of the largest collections of WWII remanufactured aircraft, and of the Eagle Dynamics development team, we have used our expert knowledge of WWII aviation to ensure that this simulation is one of the most accurate replicas ever made of the Mosquito FB Mk. VI. Documentation studies, hangar visits, and numerous consultations with TFC pilots have been invaluable in crafting this product. The content of this manual is based primarily on the surviving documentation for the DH 98 Mosquito FB Mk.VI.

Best regards,

DCS Development Team, DH.98 FB Mk.VI.

TABLE OF CONTENTS

INTRODUCTION

One of the most revolutionary and effective combat aircraft of WWII, the British de Havilland Mosquito was in service with the Royal Air Force (RAF) from 1940 to 1961. A brilliant and innovative design, the 'Mossie' left a bright and lasting mark in the history of aviation.

An airframe built mostly of wood to save on scarce metal supplies earned the Mosquito the nickname "The Wooden Wonder". It was also known as 'Freeman's Folly' after the Air Marshal who backed its production.

Armed with four 7.7mm (.303in) Browning machine guns and four 20mm (.79in) Hispano-Suiza cannons, this superbly versatile fighter-bomber could carry both bomb and rocket payloads over long distances at high speed – and deliver them with pinpoint accuracy.

The Mossie's ability to maintain a high cruising speed at high altitude made it very difficult for Luftwaffe fighters in service at the time to attack it.

The DCS: de Havilland Mosquito FB Mk VI fighter-bomber you will be flying is the most impressive variant of this aircraft to see action in WWII.A total of 2,140 were produced.

Equipped with more powerful Rolls-Royce Merlin 25 engines, the FB Mk. VI's excellent handling characteristics make it a real pleasure to fly.

AIRCRAFT HISTORY

AIRCRAFT HISTORY

A Warbird with Movie Star Looks

Some of the greatest warbirds ever built have had to fight to take wing. A dazzling concept for its time, the de Havilland Mosquito was one of these. Its designer, Geoffrey de Havilland's idea was simple: create a twin-engine medium bomber that was lighter and faster than any other aircraft in service, or that was likely be built before the war's end. Build one, in fact, that was so fast that it would not only be able to outrun enemy fighters, it would not even need to carry defensive armament. A mainly wooden construction would help keep the Mossie's weight down, increase its speed and rate of climb, and save scarce and valuable metals for other use.

Fresh thinking tends to frighten the conservative mind: some senior Air Ministry officials insisted that the new type had to be equipped with guns and turrets - and be made of metal, not wood. Brilliant original thinkers are few. Luckily for us, they do exist, and Geoffrey de Havilland was one of them. He was also persistent, resisting the doubters and keeping early development of the Mosquito going with his own money. The prototypes proved him right: equipped with twin 1,460 horsepower Rolls Royce Merlin 21 engines, in February 1941 the Mosquito comfortably outran a Spitfire Mk II in level flight, reaching a top speed of 392 mph against the Spitfire's 360 mph. A star was born.

Air Marshal Wilfred Freeman knew a good thing when he saw it: on 21 June 1941, the Air Ministry authorized production of 19 Mosquito photo-reconnaissance (PR) models and 176 fighters. Orders for a fast medium bomber variant, the FB Mk. VI, quickly followed. Almost all production Mossies had four Hispano Mk II 20 mm cannon housed under the nose, with a further four Browning .303 inch machine guns ranged above those. Fitted with a bomb bay, the Mossie could also carry a 1,000 lb payload over a range of more than 1,500 miles. Underwing rails also enabled it to strike with a salvo of eight rockets.

Figure 1: RAF Hunsdon, Hertfordshire: Armorers prepare to load four 500-lb MC bombs into the bomb-bay of De Havilland Mosquito FB Mk. VI, MM403 'SB-V', of No. 464 Squadron RAAF. [IWM CH 12407.jpg Public Domain]

The World's First True Multi-Role Combat Aircraft

A hit from the start, the Mosquito excelled in every role the war planners threw at it. These kept on growing to meet the ever-changing demands of battle. Having proved its worth in photo-reconnaissance, the Mossie was next employed as a night-fighter. Using its integral Airborne Intercept 'AI' and ground-based radar systems, it shot down an estimated 600 enemy aircraft in this role alone. As the aircraft's performance improved, with increasingly uprated Merlin engines and tweaks to its construction, the Mossie was able to deliver a single, 4,000 lb 'Highball' bomb on high-value targets. By 1944, it could also be fitted with racks to mount 60 lb 'RP' rocket projectiles.

Figure 2: Mosquito Mk. VI test firing its guns.

Intruder

As an 'intruder', the FB Mk. VI prowled occupied France and Nazi Germany, often at night, and with increasing frequency as D-Day approached. The aim was to cause maximum chaos and disruption to enemy lines of communication (trains were a target of choice), and to destroy other targets of opportunity. A favorite tactic was to linger in the vicinity of Luftwaffe air bases; wait until enemy aircraft were in the process of landing; and shoot them down.

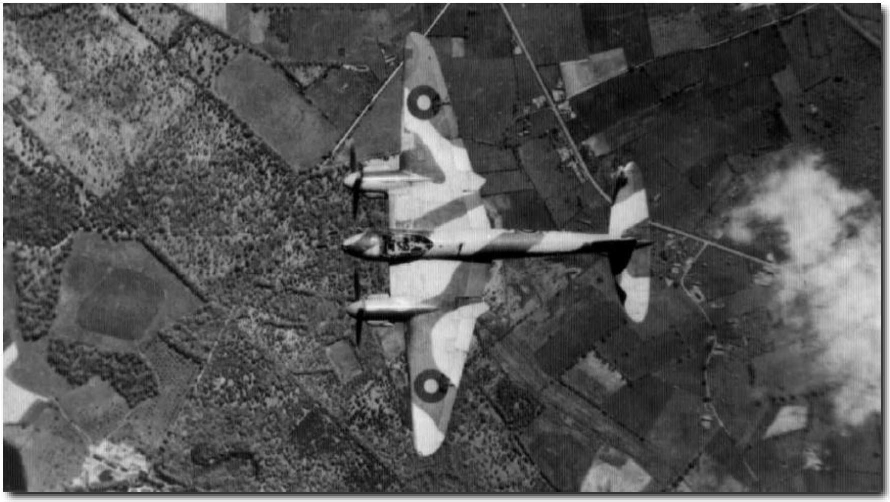


Figure 3: Mosquito FB Mk. VI after a raid on V-1 launch site in Pas-de-Calais, 1944. Third Reich pilots loathed and feared the Mosquito FB Mk. VI in equal measure.

Operation Jericho

One of the best examples of Mossie's extraordinary capabilities was the operation to free Allied prisoners facing execution from Amiens prison.

Figure 4: Mosquitos SB-U and SB-V of 464 Squadron crossing the Channel towards Amiens at wave top height. [Public Domain]

On the morning of 18th February 1944, nineteen Mosquito Mk VI fighter-bombers of No. 140 Wing, RAF 2nd Tactical Air Force, set out on one of the most daring raids of the Second World War. Attacking at very low level in three flights of six, 18 of the 'Mossies' were to breach the outer and inner walls of Amiens prison in Northern France; bomb the canteen where the German guards were having their midday meal; and give the prisoners a chance to escape. A final, photo-reconnaissance (PR) aircraft would film the entire mission, and, if it went well, broadcast the footage to help boost Allied morale.

Figure 5: 487 Squadron Mosquitos over Amiens Prison as their bombs explode, showing the snow-covered buildings and landscape. [IWM Public Domain]

Previous strikes on enemy factories, power stations, Gestapo headquarters and other high-value targets had already demonstrated the Mossie's astonishing ability to deliver high-explosive ordnance with pinpoint accuracy. But 'Operation Jericho' was on a whole new level of difficulty. Before take-off, the pilots studied a detailed plaster-of-paris model of the prison's layout, along with maps of the surrounding area. A long, die-straight road ran south-west to Amiens from the town of Albert and bordered one side of the prison. It would serve as an excellent marker for the final approach.

'We heard the details of this mission with considerable emotion...After four years of war just doing everything possible to destroy life, here we were going to use our skill to save it. It was a grand feeling and every pilot left the briefing room prepared to fly into the walls rather than fail to breach them. There was nothing particularly unusual in it as an operational sortie, but because of this life-saving aspect it was to be one of the great moments in our lives.' — *Wing Commander Irving Smith, No 487 Squadron RNZAF **

Four stories in height, Amiens prison was built in the shape of a Latin cross, with the cells in the longer section and the guards' canteen and quarters in the shorter arms. A 20-ft. brick perimeter wall surrounded the complex.

The raid was a combined British Commonwealth enterprise. The first wave of six Mosquitos from 487 Squadron, Royal New Zealand Air Force (RNZAF), had the task of breaching the eastern and northern perimeter walls. The job of the next wave of six aircraft from 464 Sqn Royal Australian Air Force (RAAF), was to smash open either end of the cell block and destroy the German garrison. The final, RAF element would act as back-up if the initial attacks failed. Each of the three Mossie flights had a squadron of Typhoon fighter-bombers assigned to protect it from enemy fighters.

In overall command of the attack, RAF Hunsdon's Station Commander Group Captain Percy Pickard would act as Master Bomber, orbiting the prison and directing operations.

At 12:01, the first section of three 487 Sqn Mosquitos attacked the eastern prison wall. A great column of smoke and flame billowed up. The second, 487 Squadron three-ship then bombed the northern wall. At 12:06, two aircraft from 464 Squadron re-attacked the eastern wall from an altitude of about 50 feet. With both walls now breached, two 464 Squadron Mossies ran in at 100 feet and bombed the main building. At least one bomb exploded directly on the guards' quarters. More bombs crashed into the cell blocks. Grabbing their chance for freedom, dozens of prisoners began running across the courtyard for the gaps blasted in the outer walls. The guards opened fire on them with machine guns, shooting many dead.

Viewed from the comfort of now, the raid was a mixed success. Of the 255 prisoners who escaped, around 180 were recaptured shortly afterwards. An estimated 150 prisoners died, caught either in the bombing or massacred by the guards, some 50 of whom also died.

One of the Fw 190 fighters that responded to the attack shot down and killed Group Captain Pickard and his navigator, Flight Lieutenant John Broadley as they headed for home. A second Mosquito navigator, Flight Lieutenant R. Sampson, RNZAF, was killed by enemy ground fire. One of the escort Typhoons disappeared into a snowstorm off Beachy Head, Sussex, and was never seen again. A further Typhoon was also brought down and its pilot lost.

Free The French

On the plus side, the many French Resistance members who did escape exposed more than 60 agents and informers who had been working undercover for the *Abwehr*. In the crucial run up to D-Day, this kneecapped Nazi counter-intelligence in the key Atlantic Wall sector.

Aces High

The greatest Mosquito ace of WW2 was Wing Commander Branse Burbrdige, DSO and bar, DFC and bar, who with the outstanding help of his navigator Squadron Leader Bill Skelton had 21 confirmed victories.

While the Mk VI could not routinely overmatch the Fw-190 or the Me-109 in a straight dogfight, in the right hands it had the speed, firepower and maneuverability to hold its own against these types. Which as any WW2 Spitfire or Hurricane pilot would have told you, is no mean feat. To give one example: on 15 January 1945, 30 Fw 190s from *Jagdgeschwader 5* pounced on No. 143 Squadron operating Mk VIs in the anti-shipping role. In the ensuing mêlée, 143 Squadron pilots shot down five Fw 190s while losing five of their own number (two of them reportedly to flak). But in the same engagement, the Mossies sank two German merchant ships and an armed trawler.

Figure 6: Mosquito FB Mk. VI attacks a surfaced German U-Boat.

One variant, the 'Big Gun' Mk Mosquito mounted an automatic 57mm 'Molins' or 'Airborne Six-Pounder Class M Gun.' Fitted to many RAF Coastal Command Mossies, the Molins was devastating against enemy shipping, and could even punch holes through the armor of German U-Boats. The Mossie's cannons, machine guns and salvos of rocket fire also decimated enemy shipping.

The Mk VI fighter-bomber also excelled in the 'target marking' role. This could mean dropping illumination bombs at either end of a given target area, so that the squadrons of heavy bombers following behind knew where to drop their bomb loads for maximum effect. Such techniques greatly improved the accuracy and effectiveness of air raids. On the night of 5-6 March 1943, an especially successful raid on the Krupp factories at Essen hit more than 50 separate buildings and laid waste to 160 acres of Germany's vital industrial site.

'Anti-Diver' Patrols

The list of tasks the Mosquito FB Mk. VI could perform is too long to cover completely here; but there is one vital role that must also be mentioned: anti-V-1, or 'Anti-Diver' patrols. ('Diver' was the Royal Observer Corps codename for V-1 'flying bomb' sightings).

The V-1 was the first of Hitler's so-called 'Terror' or 'Vengeance' weapons (*Vergeltungswaffen*). With a high-explosive Amatol warhead of 850 kg (1,874 lb), these early cruise missiles were launched - mainly against London - from sites in northern France. When they neared their target, the evil low growling sound their engines made cut out. The 'doodlebug' went into a nose-dive, and anything it landed on was blown into smithereens. Londoners watched in fear and dismay as the 'buzz bombs' appeared in the skies over their heads, fell silent and then plunged earthwards.

The V-1 campaign started on 13 June 1944, as a direct response to the Allied landings in Normandy. At its peak, more than 100 V-1s a day were being fired at Southeast England. Barrage balloons, AA guns and various other countermeasures were employed to meet the threat. But it was piloted aircraft that tipped the balance.

The V-1 had an average speed of about 350 mph and flew at an average altitude of 3000 ft. Only two types of Allied aircraft had the low-altitude speed, the firepower and the maneuverability to intercept and destroy them. One was the Hawker Tempest, which when the V-1 campaign began was in very short supply. The other was the Mosquito, which happily was not. On the short summer night of 14-15 June, flying a FB Mk VI with 605 Squadron, RAF, Flight Lieutenant J.G. Musgrave was the first pilot to shoot down a V-1. Musgrave went on to destroy 11 more of the flying bombs, becoming a 'V-1 ace' and saving many lives.

Figure 7: The aftermath of a V-1 attack on London.

Intercepting the V-1 was notoriously dangerous: machine gun bullets had little or no effect on its steel skin. Cannon shells, when they struck, could ignite the warhead, destroying the intercepting aircraft as well as the prey. Another and not much less dangerous tactic was to make a long turning dive on the V-1 to get ahead of it. You could then use the Mosquito's propellor wash to destabilize the buzz bomb's gyro systems and topple it. It was a good idea to complete this operation before British anti-aircraft guns opened up and shot you down, along with the V-1. Pilots could also sidle up to a V-1, slip one of their wingtips under one of its wings, and flip the 'doodlebug' over so that it crashed. Talk about nerves of steel.

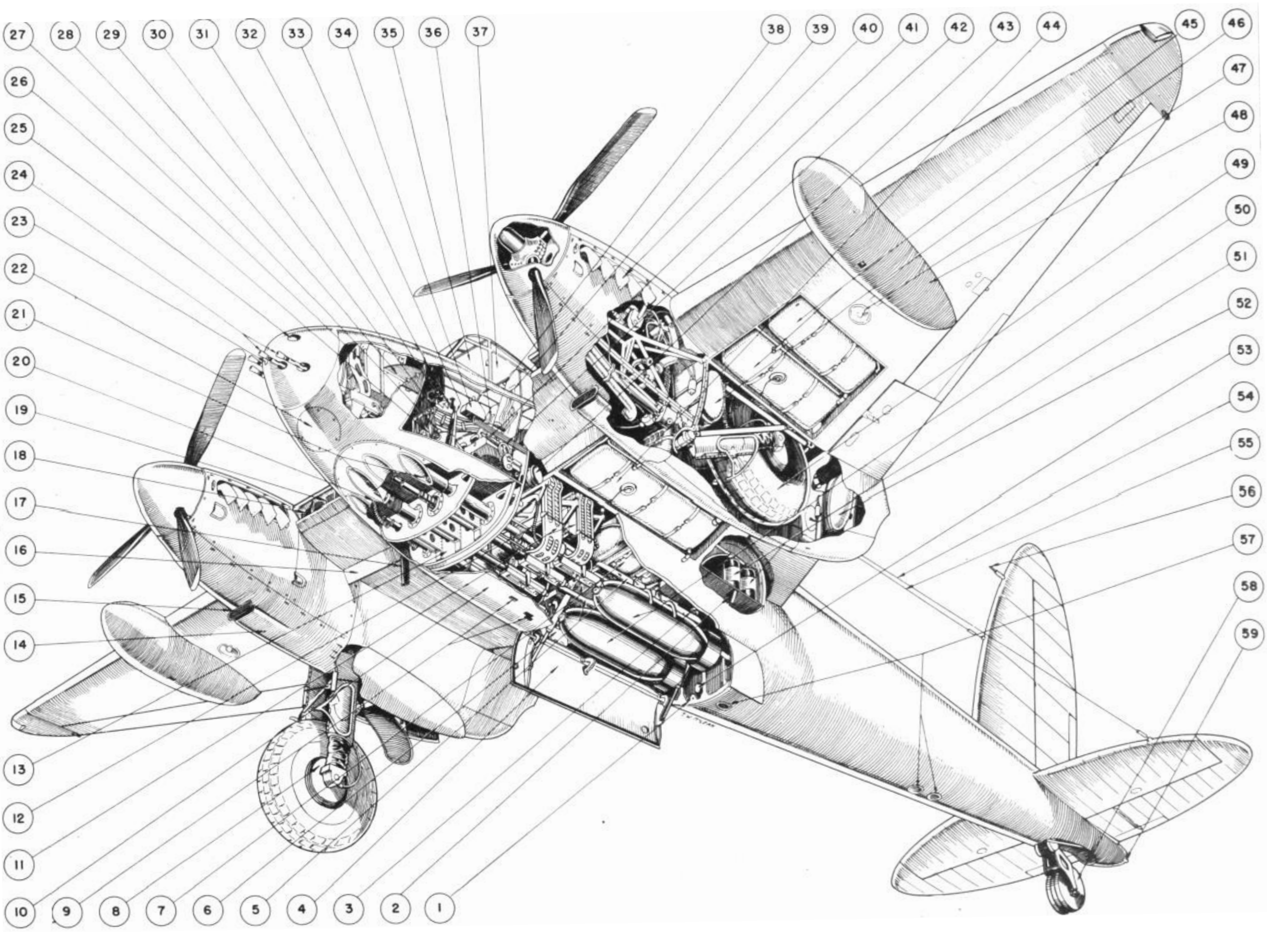
More than 9,000 V-1s were launched against the British mainland in 1944. Of these, 638 were shot down by Tempests. (No. 3 Squadron, RAF, destroyed 305 on its own.) The Mosquito Mk. VI ran the Tempest a close second, destroying a total of 623 flying bombs. With its ferocious combination of rockets, cannon, machine guns and bombs, the Mossie was also effective in the ground attack role against the V-1 launch sites.

Mosquito fighter-bombers flew their final sorties on the night of May 4, 1945. Following the cessation of hostilities, some squadrons of Nº. 2 Group became part of the new Royal Air Force Germany, and many of the remaining aircraft relocated to Belgium and Holland. The last squadron to operate the FB Mk. VI was 107 Squadron (later renamed e11 Squadron), which continued flying the Mossie until August 1950.

A total of 5,583 Mosquitos were built in 48 variants. Of this number, de Havilland Canada assembled 1,032 in Toronto, and de Havilland of Australia constructed another 1,032 from 1943 to 1945. Many of the workers on the aircraft assembly lines were women.

The world's first true multi-role combat aircraft, the mighty Mossie equipped 26 RAF squadrons and saw service all over the world. No WWII aircraft of the time was as versatile or as adaptable, and in flying the newly-released **DCS Mosquito FB Mk. VI module**, we are all of us helping to keep a legend alive.

AIRCRAFT CONSTRUCTION



AIRCRAFT CONSTRUCTION

Description

The de Havilland 98 Mosquito FB Mk. VI is a mid-wing monoplane constructed mainly of wood, with two Merlin 21, 23 or 25 engines and hydromatic three-blade propellers. Designed and equipped for duties as an intruder, long-range day fighter, night-fighter, ground-attack and long-range escort fighter, it carries a crew of two. The pilot and observer sit side by side, with the pilot on the port side.

Each Merlin engine is mounted on a steel tube frame attached to the front spar and undercarriage fixed structure. The oil and coolant radiators for each engine are built into the wing leading edges between the engine nacelles and the fuselage. The coolant temperature is regulated by electro-pneumatic jack-controlled flaps in the radiator duct exits. One bullet-proof oil tank is located in each undercarriage wheel well. A hydraulic pump is fitted to each engine for landing gear, wing flap and bomb door operation and a vacuum pump on each engine operates the gyroscopic instruments, the exhaust from the starboard pump being used for pressurizing the fuel tanks. The port engine drives a Heywood compressor for operating the guns, brakes, radiator cooling flaps, two-speed supercharger gear, and air intake control (if fitted). Electric starters and booster coils are fitted. Automatic Graviner fire extinguishers, which may also be operated manually from the cockpit, are fitted in each engine nacelle.

Power for the electrical services is supplied by a 24 volt/1,500 watt generator driven by the starboard engine. An alternator for operating the special radio equipment is driven by the port engine. A radio set, remotely controlled by the pilot, is installed in the rear fuselage compartment on the port side. An A.R.I.5083 pilot and observer intercom system is mounted on the front spar behind the pilot’s seat.

The Mossie’s standard armament consists of four 20 mm. cannons in the underside of the fuselage, and four .303 in. machine guns and a camera gun in the nose. The 20 mm. cannons are operated by a trigger, and the .303 in. guns by a push-switch on the control column. The master switch is located on the starboard instrument panel. The camera gun operates when either the 20 mm. or the .303 in. guns are fired, or it may be operated independently for practice purposes by a push-switch next to the gun-firing switch on top of the control column. All guns are fired electro-pneumatically. The heat supply to the guns is controllable from the cockpit. Other equipment includes electric windscreen wipers and de-icing spray system, oxygen apparatus, inflatable dinghy, and pyrotechnic items.

Two 250 lb. or two 500 lb. bombs, or alternatively, two small bomb containers are carried in the rear of the 20 mm. gun compartment; one 250 lb. or 500 lb. bomb may also be carried under each wing. The bomb selector switch panel is on the right of the instrument panel, covered with a curved Perspex flap. Two drop tanks can be carried in place of the wing bombs. Four 60lb or 25lb Rocket Projectiles can be carried under each wing in addition to the fuselage bombs.

A drift recorder is positioned in front of the observer.

An F.24 camera with reflector mirror is mounted in the rear fuselage forward of bulkhead No. 5.

Weight and dimensions:

Wing span	54.2’
Wing area	350.4 sq. ft.

Aircraft length	41’ 20”
Airplane height	17’ 5”
Empty weight	7,700 lbs.
Takeoff weight	10,820 lbs.

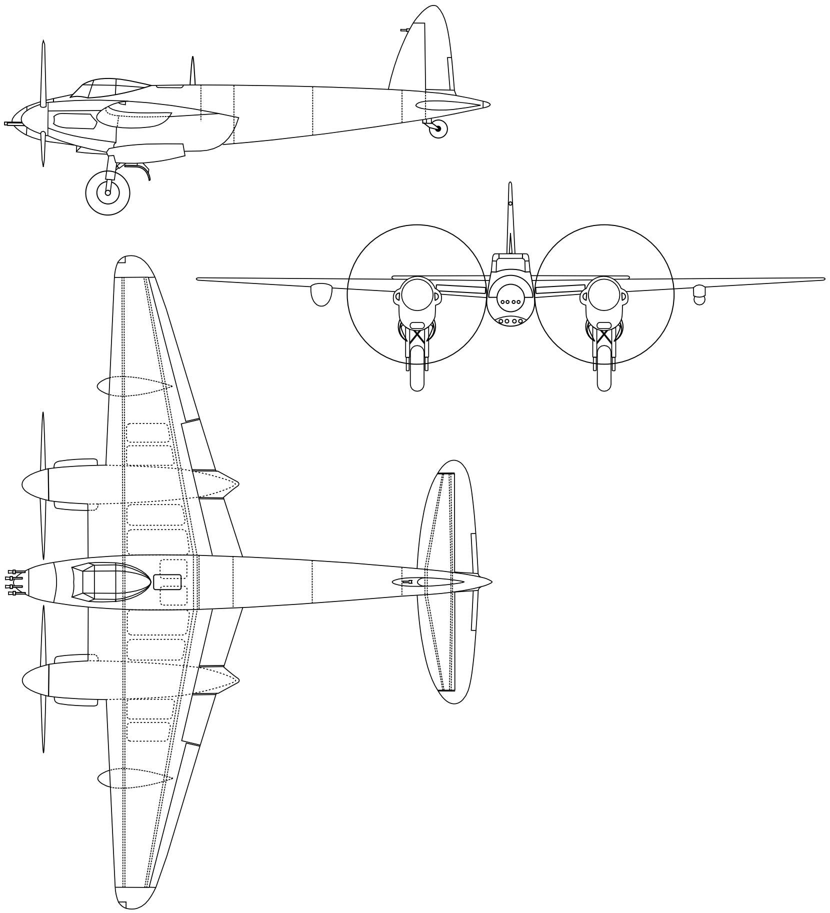


Figure 8: Mosquito Mk. VI 3-shapes-view.

Fuselage

The fuselage is constructed of balsa wood planking, sandwiched between two plywood skins; the nose section is spruce plywood and the remainder birch, the whole forming a monocoque with interspaced bulkheads and formers. The oval cross section is tapered with cut-aways to receive the wing and the cockpit canopy. It is made up in two halves, joined along the top and bottom center lines.

The ingress and egress door, which may be jettisoned in case of emergency, is fitted on the starboard side of the fuselage forward of the wing cut-away. A hatch behind the wing on the starboard side, provides access to the rear of the fuselage.

Access doors are provided on the upper nose portion, and side panels under the wing cut-away give access to the .303 in. and 20 mm. guns respectively.

The outer skin is covered with madapolam.

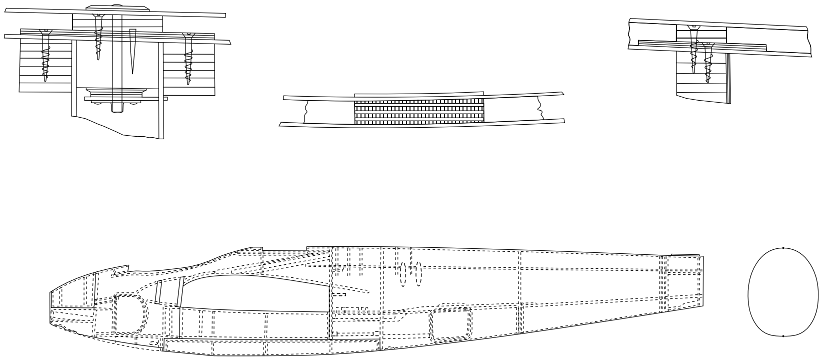


Figure 9: Mosquito Mk. VI fuselage.

Canopy

The cockpit canopy is a welded steel tubular structure bolted and screwed to the fuselage skin and covered with Perspex. Direct vision panels are provided and an emergency exit is incorporated in the roof.

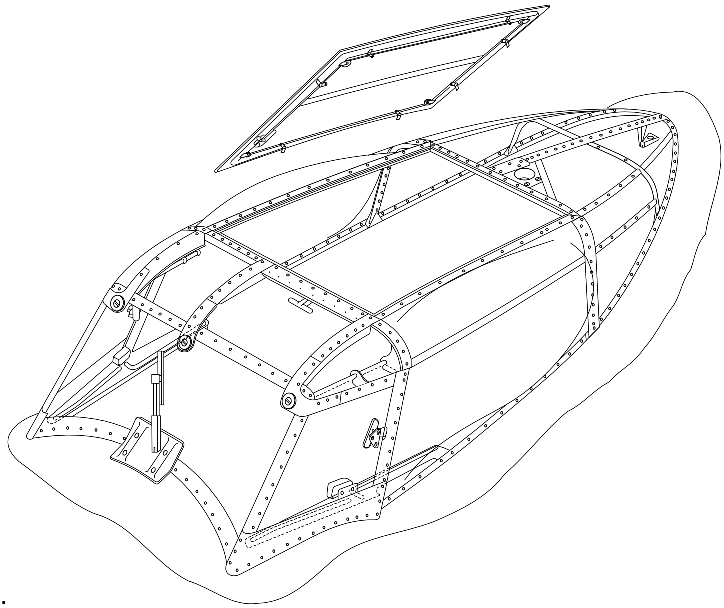


Figure 10: Mosquito Mk. VI canopy.

Armor

The bow compartment, in which the Browning .303 machine guns are installed, is separated from the cockpit by an armor plate bulkhead. The backs of both crew seats are also made of armor plate.

Wing

The wing is a one-piece cantilever structure consisting of two wooden box spars extending over the full span, with stressed plywood skin covering, reinforced by spanwise spruce stringers.

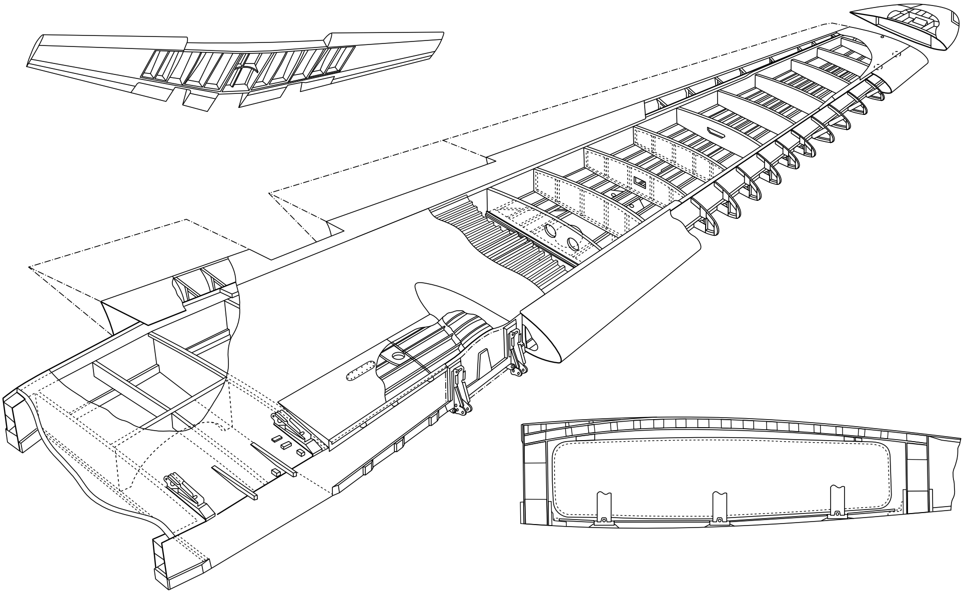


Figure 11: Mosquito Mk. VI Wing.

The wing is attached to the fuselage by four main bolts, and by additional bolts passing through the flanges of the inner ribs.

Ten bullet-proof fuel tanks are housed within the wing and are accessible via detachable panels in the underside which form part of the stressed skin.

The navigation lamps are housed within the wing tips with clear molded Perspex coverings.

The leading edges of the wing between the fuselage and the nacelles are made of aluminum alloy and form air intakes for the radiators located inside the wing. The outer leading edges are wooden with pressed plywood sheathing.

Shields are located on the trailing edge, between the nacelles and the fuselage.

The wing also houses landing lights, cables for electric and hoses for pneumatic and hydraulic systems and cables for the flight control system.

Flight Control System

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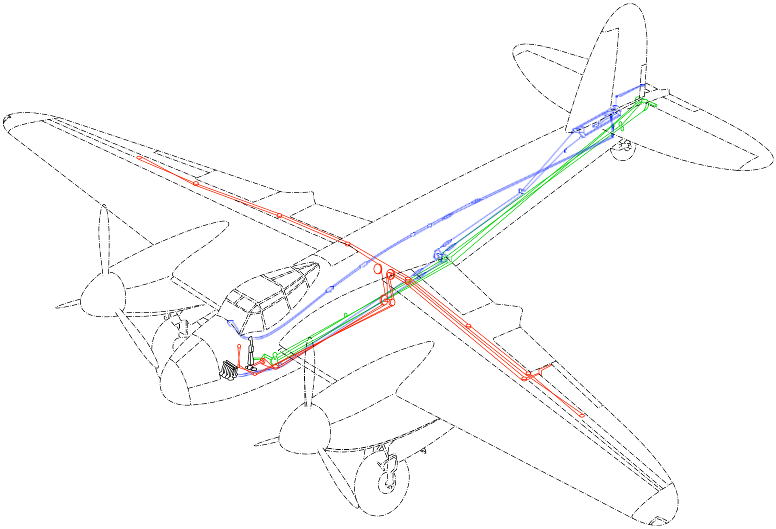

Figure 12: Mosquito Mk. VI flight controls.

The Mosquito FB Mk.VI has a traditional control system, which includes horizontal and vertical stabilizers, rudder, elevators, ailerons and flaps. The tail unit is wooden, with the exception of metal trim tabs.

Trim tabs are installed on all control surfaces except the starboard aileron, which has a balance tab.

The tail unit is of conventional design, without external bracing, and comprises the tail plane, elevator, fin and rudder. It is of wooden construction with the exception of the rudder, elevator and trimming tabs, which are metal. The tail plane and fin are not adjustable in flight.

The single fin is a symmetrical sectioned wooden cantilever structure comprising two box spars, spruce and plywood ribs and plywood covering. The front and rear spars are attached to Nos. 6 and 7 bulkheads respectively by two bolts per spar. Incidence adjustment is not provided. The pitot pressure head is mounted at the top of the fin leading edge and the connecting tubes attached to the rear face of the rear spar.

The rudder is made of Alclad with fabric covering and is movably mounted on the keel. It is equipped with trimmer and balance horn. Range of motion to the right 26°, to the left 26 +2-1°. Rudder trim range to the right is 16 ±2½°, to the left 16 ±2½°.

The horizontal tail is symmetrical and trapezoidal with rounded tips.

The stabilizer, like the fin, is a symmetrical cantilever one-piece wooden structure, consisting of two box spars with plywood sheathing. The front spar is attached at three points to the rear fuselage bulkhead, the rear spar is attached at two points to the adjustable tubes, which are also secured to the rear bulkhead. The stabilizer angle is ground-adjustable using tuning pipes.

The elevators, like the rudder, are made of Alclad, the elevator is covered with metal and equipped with a balance horn. The left and right rudders are rigidly connected. Maximum deflection down is 12 ½°, up 21½ +2-1°. Elevator trim range is 7½ ±¼° down, 7½ ±¼° up.

The ailerons are constructed with metal sheathing, and are interchangeable. Deflection range is between 11½° down and 26½ ±½° up.

The flaps are made of plywood and separately driven by hydraulic motors. The position of the flaps is controlled by a lever on the front panel of the cab. Standard takeoff position is 15°; landing position is completely deflected downward at 45 ±2°.

The control stick moves forward and backward for normal elevator control. Handle travel limits are 20.5° forward and 21.5° back. The stick also moves laterally to control the ailerons. Lateral handle travel limits are 20.5° forward and 21.5° back.

Rudder pedals are adjustable for pilot comfort.

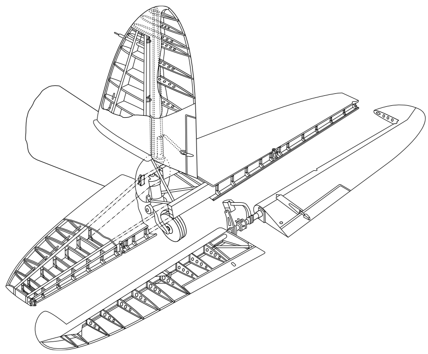

Figure 13: Mosquito Mk. VI empennage.

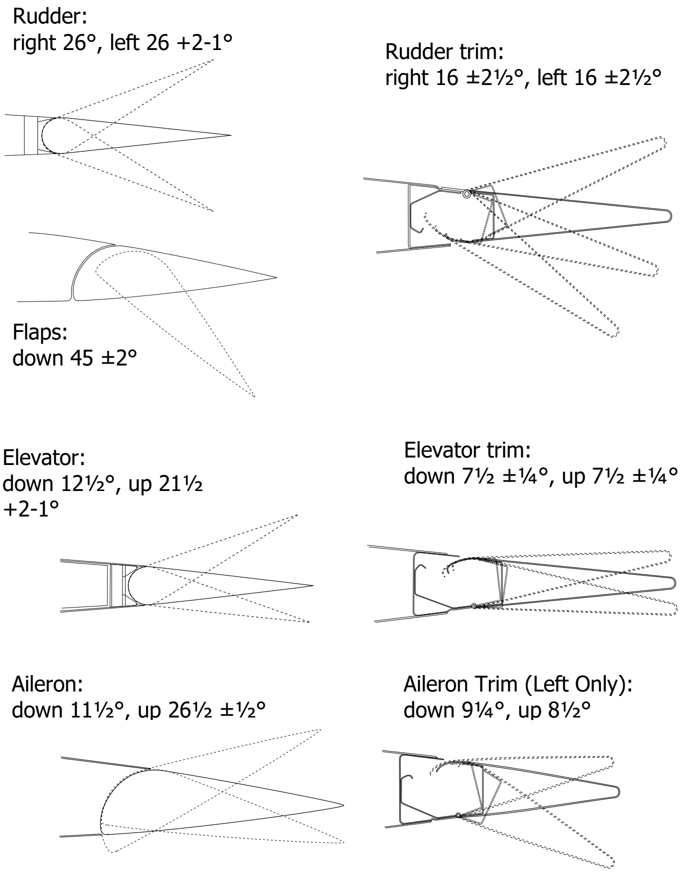

Figure 14: Control surface deflection angles.

Landing Gear

The undercarriage consists of two interchangeable units, one under each engine nacelle; each unit consists of two shock absorber struts, one on each side of the landing wheel with cross bracing tubes between them, two jointed radius rods, one hydraulic jack, axle, wheel and brake unit.

The undercarriage can be completely retracted within the engine nacelle fairings by the hydraulic jacks, the apertures being closed by automatically operated doors.

The compression rubber tail wheel unit is fully steerable and retractable. The wheel is mounted between a pivoted cantilever strut, with a single tie-rod and nuts for attachment. The fork pivots on the swivel fittings on the shock-absorber unit, and the landing load is taken on the piston ram attached to the fork fitting just above the wheel. The shock-absorber unit is attached to the rear bulkhead on a hinge bearing with the jack attachment point at the top of the unit. A spring loaded self-centering cam is incorporated internally at the top of the shock-absorber unit, which holds the tail wheel central in flight, but allows for full travel during taxiing.

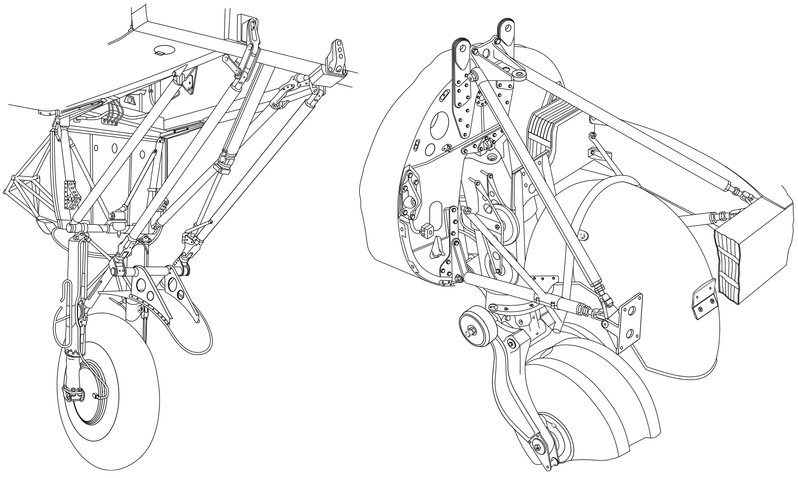

Figure 15: Mosquito Mk. VI undercarriage, main left and right wheel.

Main strut track 16’4”, pressurized rubber dampers (D.H. type)

Wheels of the main struts:

Type: Dunlop 10 × 16 AH.8079
Tires: Dunlop 15 × 16 IG.11 or Dunlop 1. G.T. R-11

Tail wheel unit:

Shock absorber: Rubber in compression (D.H. type)
Tail strut wheel:
Type: Dunlop 5 in. AH.10. 191
Tire: Dunlop, Marstrand

The main wheel brakes are Dunlop Pneumatic. Braking is controlled by the brake lever on the stick.

Engine

The aircraft is powered by two Rolls-Royce Merlin 25 engines.

The liquid cooled engines comprise 12 cylinders in a V configuration. Compression ratio is 6:1. Dry weight is 1430 lbs.

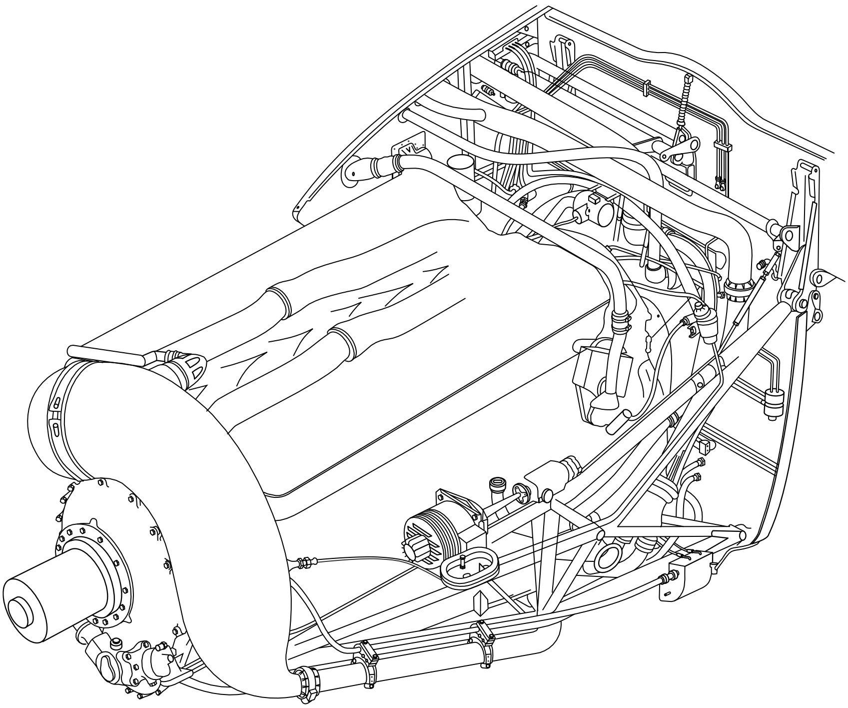

Figure 16: Rolls-Royce Merlin 25 engine.

With the exception of a separate turbocharger control unit, the Merlin SU double-choke up-thrust carburetor is fully automatic, minimizing pilot responsibility and the risk of engine damage as a result of improper control.

The drive box is mounted behind the crankcase and carries the magneto, coolant pump, generator drive, electric slewing gear and fuel pump assembly. It contains a spring drive and shafts through which the magneto, camshafts, electric generator, fuel, oil and cooling pumps are driven.

The ignition system consists of two magnets located on the drive box, one on the left and one on the right. Attached to these are high voltage spark plug harnesses with a dual-purpose metal shield that acts as a collector for the induced field around the high voltage wires, returns the resulting electrical current to ground, and prevents radio interference.

There are two spark plugs in each cylinder: one magneto provides a spark for the intake side spark plugs and the other for the exhaust side spark plugs to ensure that the engine remains operational if one of the magnets fails.

The throttle, fuel mixture and propeller pitch are controlled from the cockpit.

The aircraft is equipped with two de Havilland three-bladed propellers, fully featherable, with hydro-automatic control type 5000. In normal operation they are controlled by speed control levers. Normal angle range is 35°, additional feathered range 45°.

A two-speed, single-stage, liquid-cooled, high-speed centrifugal type supercharger is driven from the rear end of the crankshaft through a two-speed gearbox. Blower speed changeover is automatically controlled by electro-pneumatic actuators and an aneroid switch that operates at 15,000 feet in AUTO mode.

Switching blower control to MOD will disable the aneroid switch circuit.

On the left engine are installed:

Heywood compressor type SH6 / 2

Propeller adjuster type A.Y.105

Tachometer generator type Mk. IV A.C.

Lockheed hydraulic pump, Mk.IV

Generator A.C., type U, 80V, 500W

The right engine is equipped with:

Propeller adjuster type A.Y.105

Tachometer generator type Mk. IV A.C.

Lockheed hydraulic pump, Mk. IV

Electric generator 24V, 1500W, type KX

Fuel System

Fuel is contained in five pairs of CIMA protected aluminum alloy tanks, all of which are housed within the wing. The total capacity of these tanks is 453 gallons.

Additional tanks are carried under the wing at rib No. 8 and are referred to as "drop" tanks. They are attached to the wing bomb carriers and can be jettisoned when empty. The fuel in the drop tanks is transferred to the outer tanks by air pressure supplied from the port vacuum pump, the control for which is on the left side of the observer adjacent to the main fuel cocks. These tanks are of either metal or wood construction, the former having a capacity of 40 gallons and the latter 50 gallons.

A long-range tank can be carried in the 20 mm. gun bay aft of the guns. The contents of this tank are pumped to the fuel gallery by an immersion pump, controlled by an electric switch in the cockpit. The capacity of the long-range tank is 63 gallons.

The fuel pump unit, mounted on the left side of the wheel housing, consists of two separate pumps operating in parallel. Each pump can operate independently of the other, and each pump has sufficient capacity to deliver more than the required maximum amount of fuel.

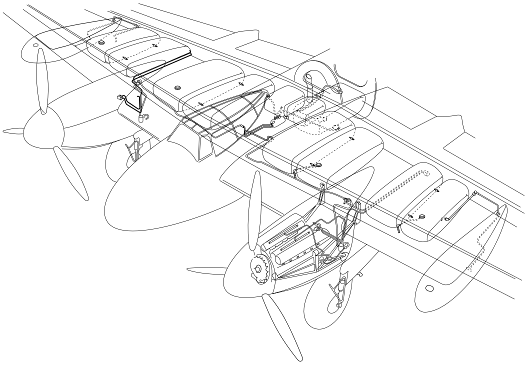

Figure 17: Mosquito Mk. VI fuel system.

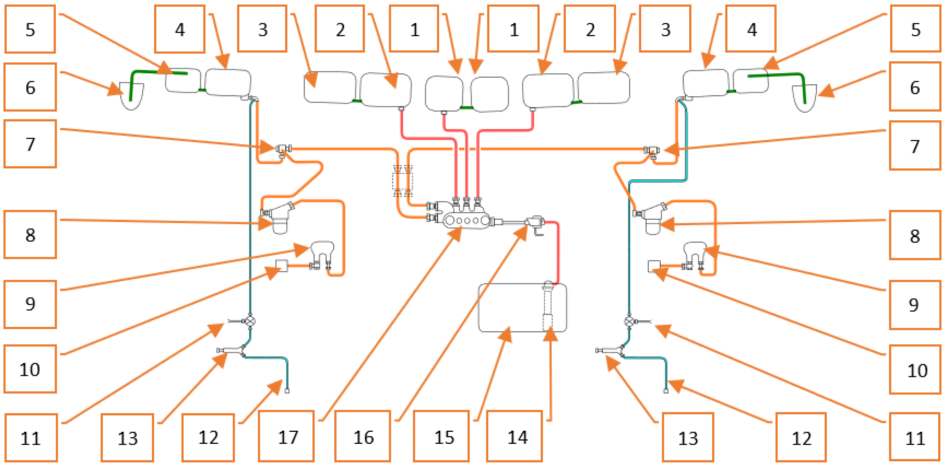

Figure 18: Mosquito Mk. VI simplified fuel system schematic.

1. 25 Gallons fuel tank
2. 78 Gallons fuel tank
3. 65 Gallons fuel tank
4. 34 Gallons fuel tank
5. 24 Gallons fuel tank
6. Drop tank
7. 4-way switch
8. Fuel filter
9. Fuel pump
10. Carburetor
11. External fuel supply
12. Connection to the supercharger
13. Ki-gass pump
14. Immersed pump
15. 63 Gallons fuel tank (for long range flights)
16. Non-return valve
17. Fuel collector box

A Ki-gass priming pump is fitted at each engine nacelle and is accessible through a hinged flap on the right-hand side. The Ki-gass pumps draw fuel from the outer wing tanks via a three-way cock next to the pump, alternatively, high volatility fuel can be pumped from a separate container.

Oil System

Two 15 gal. oil tanks are provided and are situated one in each engine nacelle. There are no oil cooler controls for the pilot, but the coolant radiator flaps also serve the oil coolers.

There are four oil circuits in the engine lubrication system: the main pressure circuit, low pressure supply circuit, front sump purge circuit, and rear sump purge circuit. The main and lower circuits are served by one injection pump and the corresponding safety valves, while each circuit purge is serviced by a dedicated purge pump.

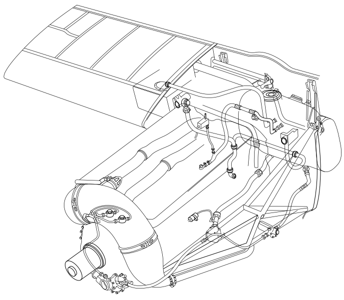

Figure 19: Mosquito Mk. VI oil system.

1. Long-range oil tanks
2. Valve
3. Clark-Valve
4. Oil cooler
5. Carburetor
6. Hydromatic oil pump
7. Constant speed unit
8. Engine
9. Oil separator
10. Valve

Low-pressure lines
- Feed
- Return

High-pressure lines
- Feed
- Return

- Oil dilution

Purging

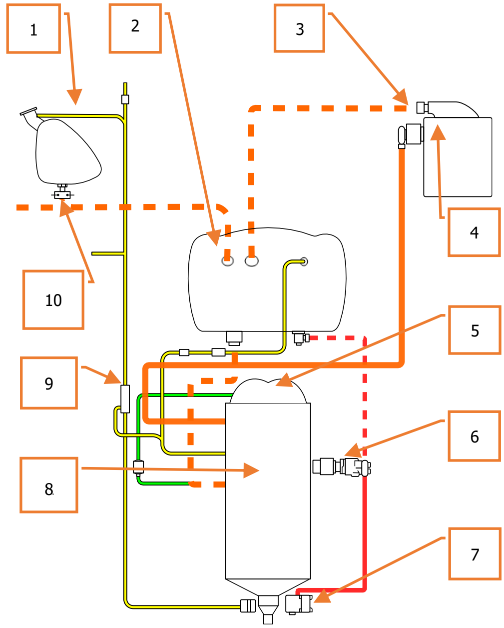

Figure 20: Merlin 25 oil system schematics.

Cooling System

A coolant tank is located ahead of each engine. When the tanks and coolant lines are full, the system contains 15½ – 16 gallons of coolant: 2.6 gallons is in the tank, 3.9 pints in the radiator and cabin heater and 4.5 pints in the engine. The liquid is composed of 30% ethylene glycol and 70% distilled water.

Temperature control is by means of a thermostat and a movable radiator air duct flap controlled by the pilot.

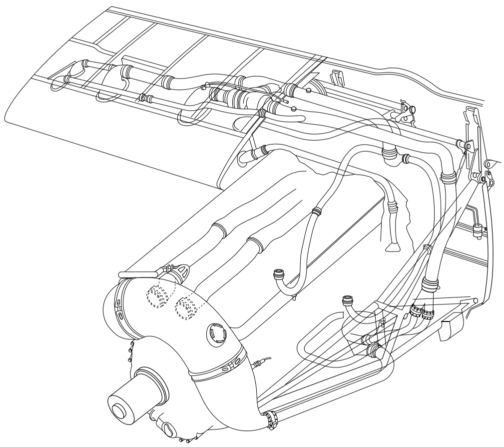

Figure 21: Mosquito Mk. VI cooling system.

Hydraulic System

The Lockheed "low pressure" hydraulic system operates the main and tail wheel units, the flaps and the bomb doors. The hydraulic system consists of two engine driven pumps, one each for each engine. A2½ gallon hydraulic fluid tank is located at the rear of the fuselage, connecting lines and control devices.

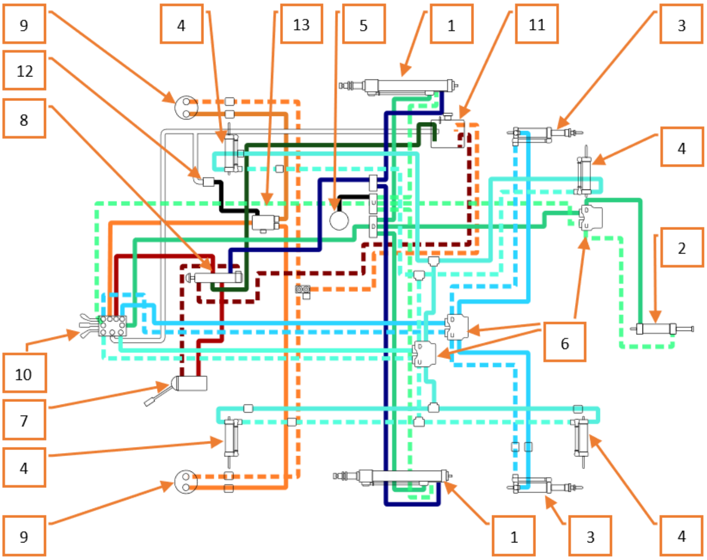

Figure 22: Mosquito Mk. VI hydraulic system.

1. Main undercarriage jacks
2. Tail wheel jack
3. Flap jacks
4. Bomb bay door jacks
5. Battery
6. Main selector valve
7. Hand pump
8. Emergency selector valve
9. Engine-driven pump
10. Flow control valve
11. Reservoir
12. Relief valve
13. Junction box

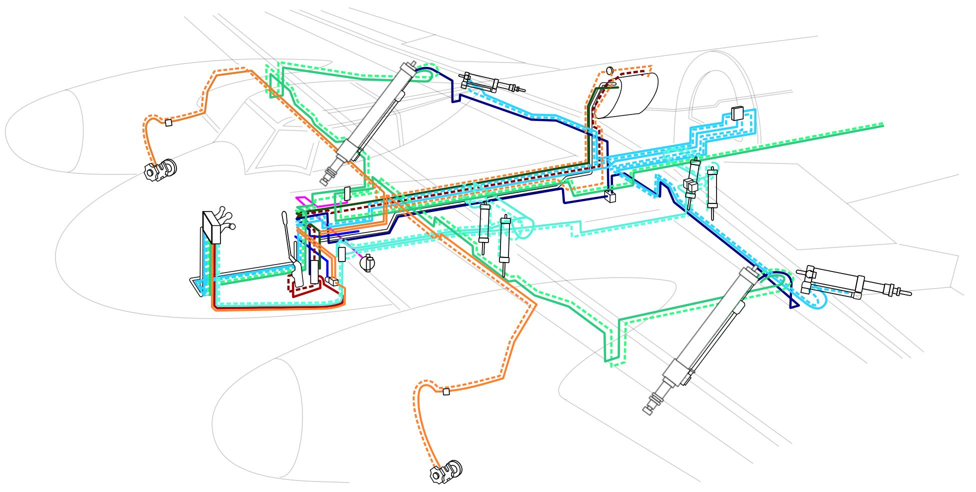

Figure 23: Mosquito Mk. VI hydraulic system components.

The system can still function if one of the two pumps fails, but efficiency will be reduced. If both pumps fail, the hydraulic system can be maintained by means of an emergency hand pump.

Hand-pumping the landing gear down takes 4 minutes.

Pneumatic System

The pneumatic system supplies pneumatic pressure to actuate the following components:

- wheel brakes
- supercharger control
- air intake control (if installed)
- radiator flaps
- .303" in. machine guns
- 20 mm. cannon

The air compressor is mounted on the port engine at the rear of the right-hand cylinder block. The air supplied by the compressor is stored in two cylinders, in the rear fuselage adjacent to the rear door, at a maximum pressure of 450 lb. per sq. in.

The system is equipped with water and oil traps that separate air from liquids that may have entered the system and filters.

Two vacuum pumps, one on each engine. The system is designed so that if any of the pumps fails, it is automatically disconnected from the system.

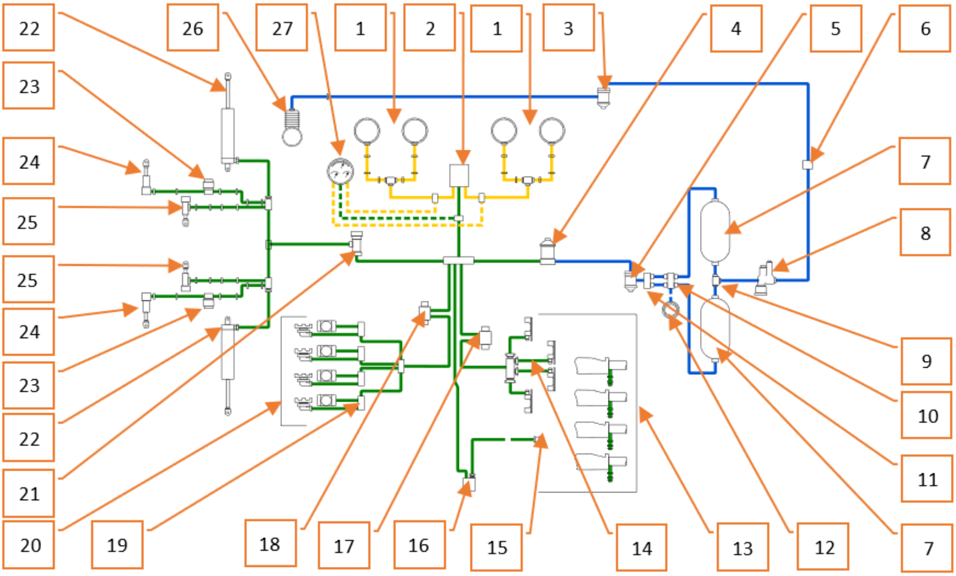

Figure 24: Mosquito Mk. VI pneumatic system diagram.

1. Wheel brakes
2. Differential unit
3. Oil trap
4. Pressure reducing valve
5. Air filter
6. Charging connection
7. Dunlop air container 450 LBS /" 620 CU.INS
8. Pressure regulator Heywood type A.R.5
9. Non-return valves
10. Junction block and test point
11. Non-return valves
12. Ground check pressure valve
13. 20-mm canon reload mechanism
14. 20-mm canon firing control mechanism
15. Dunlop hose
16. Cocking valve
17. E.P. firing valve
18. E.P. firing valve
19. Lag valve
20. Browning .303 block
21. Pressure maintaining valve
22. Pneumatic cylinder
23. Magnetic valve
24. Air intake control ram
25. Supercharger control ram

26. Heywood engine driven compressor
27. Brake pressure gauge

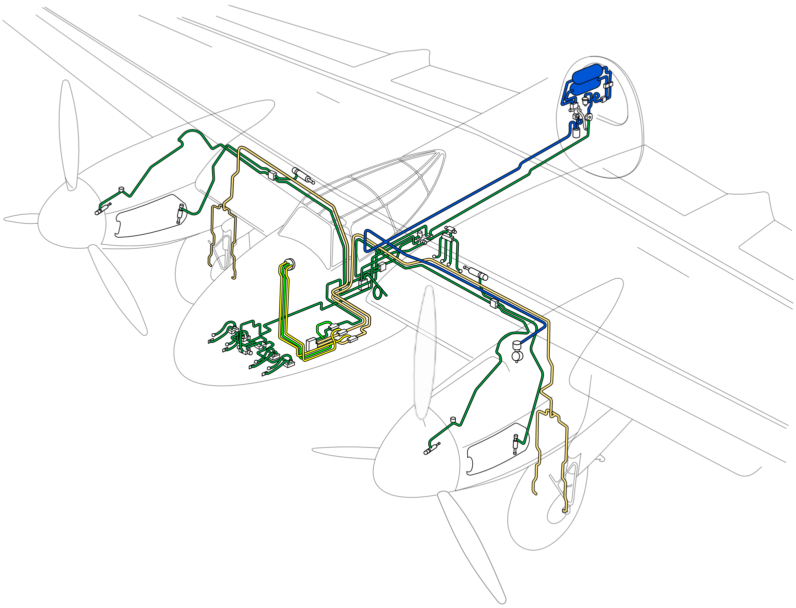

Figure 25: Mosquito Mk. VI pneumatic components.

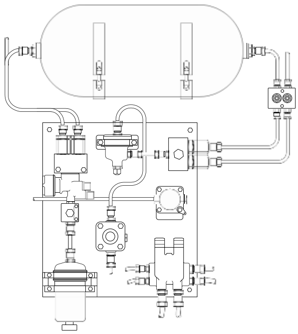

Figure 26: Layout of the hydro-pneumatic panel on the starboard side.

Electrical System

Power for electrical systems is provided by a 24V, 1500W generator located on the right engine. It provides 24V power for the following systems:

- Undercarriage warning lights and horn
- Fuel pressure warning light
- Oil dilution valves
- Engine starters and booster coils
- Solenoids for radiator shutter electro-pneumatic ram, air intake rams and supercharger rams
- Camera gun
- Gun firing mechanism
- Reflector gun sight
- Fire extinguishers
- Radio
- Pitot head heater
- Air recognition, identification and landing lights
- Instrument panel and ultraviolet lighting
- Feathering pump motor
- Windscreen wiper
- Dinghy release

A ground starter battery socket is provided on the port side of the rear fuselage.

Oxygen Supply System

Oxygen economizers Mk. II are provided at two positions in the aircraft for the observer and the pilot. These are supplied from a set of four interconnected cylinders positioned on either side of the rear fuselage aft of the rear spar. The supply is controlled by a high-pressure valve positioned behind the pilot's seat back at the observer's feet and is connected directly to the pressure regulators (Mk. VIIIA), one positioned next to the high-pressure valve, and one on the instrument panel below the undercarriage and flap indicators.

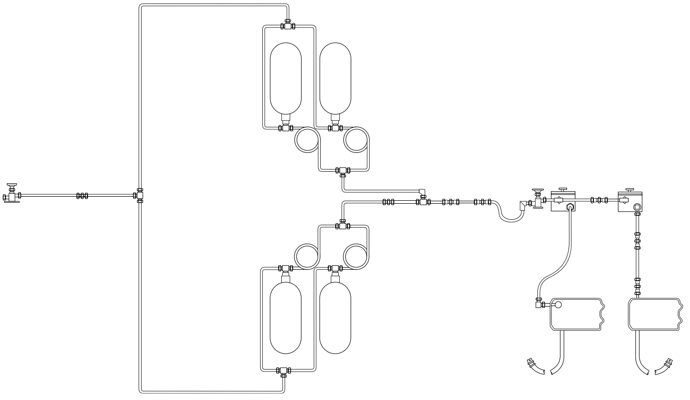

Figure 27: Diagram of the oxygen supply system.

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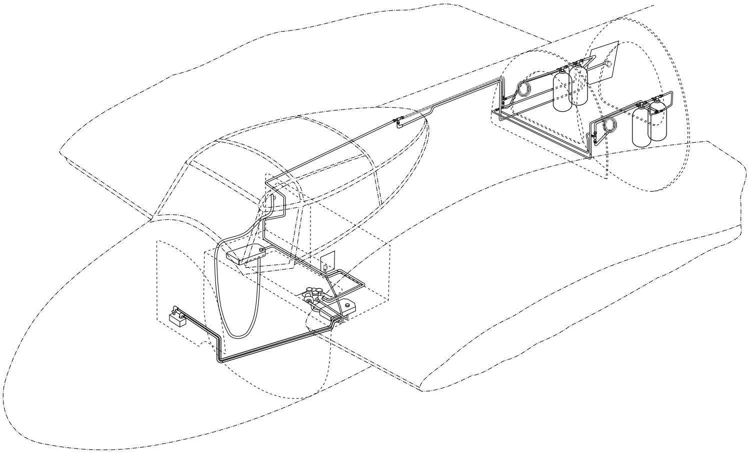


Figure 28: **Oxygen system components.**

Weapon Systems

Armament

The armament consists of four 20 mm. guns in the underside of the fuselage, and four .303 in. guns and a camera gun in the nose.

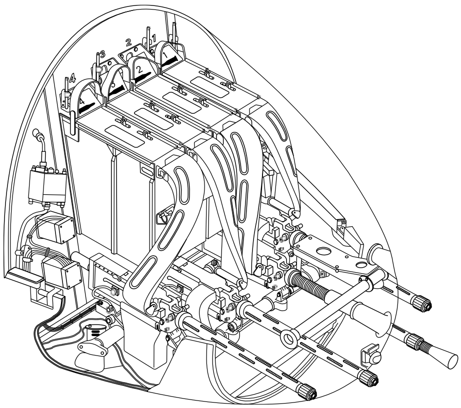


Figure 29: **Location of the Browning .303 guns.**

The 20 mm. guns are operated by a trigger, and the .303 in. guns by a push-switch on the control column. The gun master switch is located on the starboard instrument panel.

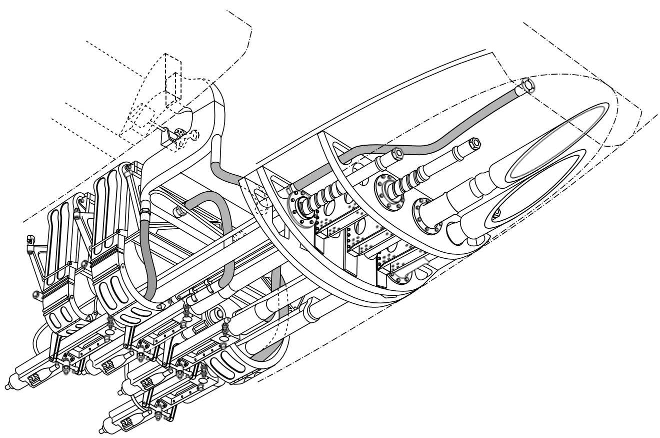


Figure 30: **Location of the Hispano Mk. I 20 mm cannons.**

All guns are fired electro-pneumatically. The heat supply to the guns is controllable from the cockpit. Other equipment includes electric windscreen wiper and de-icing spray, oxygen apparatus, inflatable dinghy, and the usual pyrotechnic items.

Rockets and Bombs

Two 250 lb. or two 500 lb. bombs, or alternatively, two small bomb containers can be carried in the rear of the 20 mm. gun compartment; one 250 lb. or 500 lb. bomb may also carried under each wing. The bomb selector switch panel is on the right of the instrument panel, covered with a curved Perspex door. Two wing drop tanks can be carried in place of the wing bombs, or, when neither wing bombs nor wing drop tanks are carried, four rocket projectiles (R.Ps) can be mounted under each wing in addition to the fuselage bombs.

Radio Communications

Communication equipment is located behind and to the left of the observer. The equipment includes a T.1154 transmitter and an R.1155 receiver.

The slave antenna is located to the right of the observer's position and is equipped with an adjustment knob for antenna orientation.

The upper half of the observer's seat folds back to provide access to radio equipment.

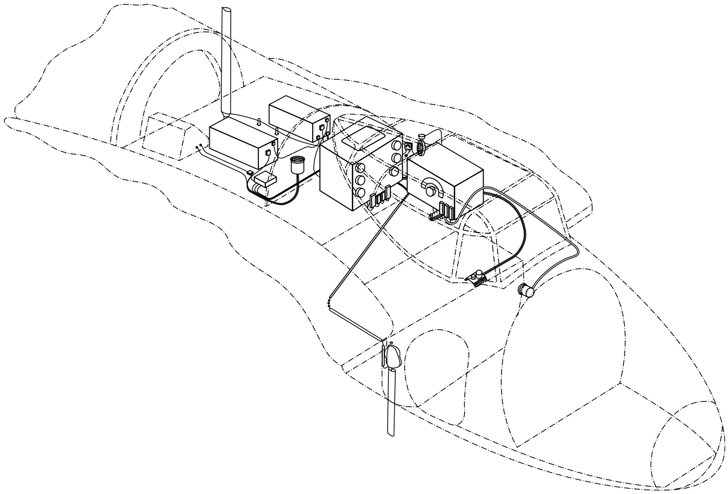


Figure 31: Radio system components.

Emergency Equipment

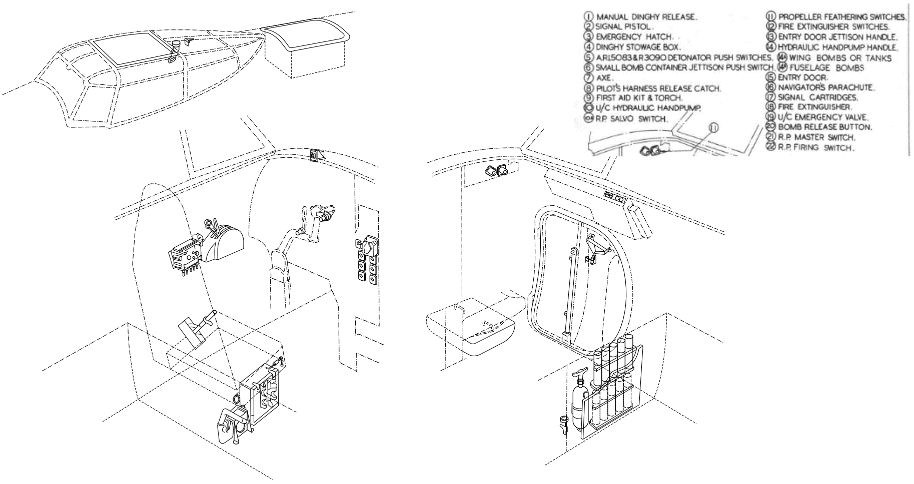


Figure 32: Emergency equipment components and location.

The aircraft is equipped with multiple means of rescue and emergency egress.

The crash exit is in the roof panel and is operated by releasing the strap, pulling down the red-painted lever, and pushing the panel out.

An inflatable dinghy is located in a container behind the canopy for a water landing.

The ingress and egress door is used as an emergency exit for the observer and pilot. The door is first jettisoned by pulling the red-painted handle. This releases the attachment pins. Do not touch the normal handle.

The cockpit contains a fire extinguisher, a flare gun with signal flares, a first aid kit, and the pilot's seat is equipped with an emergency release handle for the seat belts.

A hand pump is located under the seat in the event of a failure of the standard hydraulic pumps.

To jettison the bombs, place bomb doors selector down and check that the doors open with the warning light. First jettison small bomb containers by pressing the jettison button; then select all bombs and press the bomb release button on the control column; this will release the fuselage and wing bombs unarmed, and any drop tanks.

In the event of engine failure, feathering buttons bring each propeller to full coarse pitch to increase windmilling and improve drag characteristics.

Reflector Gunsight

The De Havilland Mosquito FB Mk.VI is equipped with a Barr & Stroud Mk. II (7A/1124) reflector gunsight.

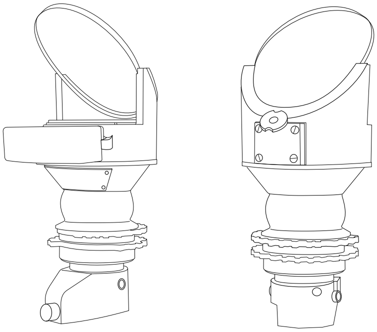


Figure 33: **Barr & Stroud Mk. II sight.**

The aircraft is equipped with a collimator sight Mk. II (7A / 1124), equipped with collimator and rangefinder.

The optical sight includes a crosshair, a lens, a reflector and a light filter. The crosshair has a circle, a center point, two short vertical hatches, and two long horizontal hatches. The symbology is etched into the opaque layer of the Plano convex lens. The crosshair is illuminated from below by a lamp. Light passes through the crosshair and lens to the reflector glass. The glass is installed at a 45° angle to the eyeline of the system. The reflector aims the light at the observer, who sees the illuminated crosshair, focused at infinity.

The rangefinder consists of two cams, horizontal sighting lines, two scales, and two handwheels. The mechanism changes the distance between the horizontal lines on the sight reticle. This changeable interval is used to measure the range to the target. The arc-distance between the ranging lines on the sight reticle depends on the range handwheel (upper knob) setting and the wingspan handwheel (lower knob). The rotation of the upper handwheel is indicated by the upper scale, the range scale, and the lower handwheel setting is indicated by the lower scale, the target size scale. The range scale is graduated in hundreds of yards, and the wingspan scale is in feet.

Camera and Gun Camera

The FB Mk. VI is equipped with a gun camera mounted in the nose compartment above the machine guns in the front left side along the side, and the F.24 camera, which is mounted at the rear of the fuselage.

Camera equipment is controlled by buttons located on the control handle.

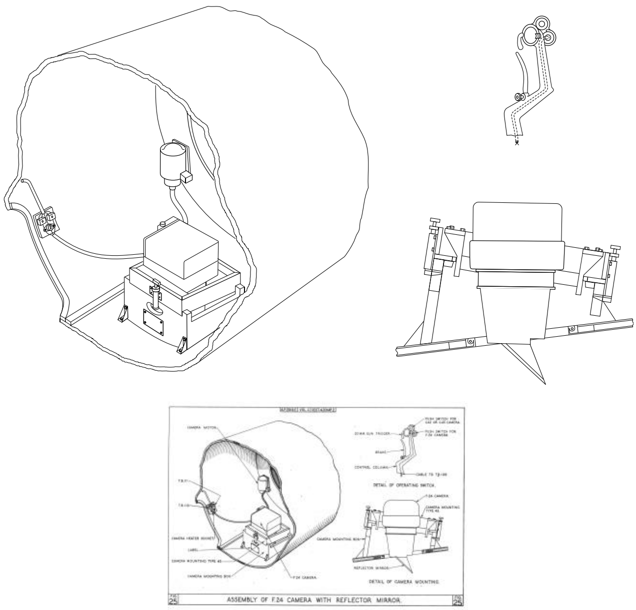


Figure 34: F.24 camera fuselage mount.

COCKPIT

COCKPIT

The aircraft controls are located on the front instrument panel, left and right sidewalls of the cockpit and on the rear bulkhead behind the crew seats.

Front Instrument Panel

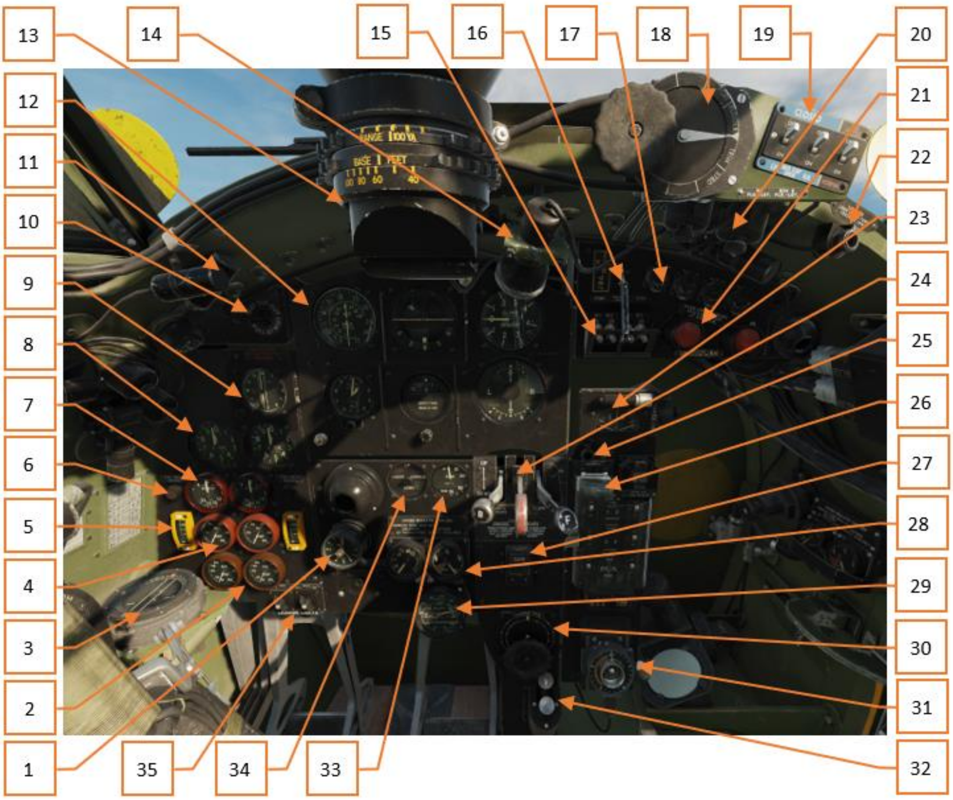


Figure 35: Front instrument panel.

1. Clock
2. Coolant temperature gauges
3. Magnetic compass
4. Oil temperature gauges
5. Oil pressure gauges
6. Fuel Pressure Warning Lights
7. Boost pressure gauges
8. RPM indicators

9. R.I. compass repeater
10. Boost cut-out
11. Ultra-violet lamp
12. Speedmeter
13. Sight reticle intensity
14. Ultra-violet lamp
15. Magneto switches
16. Electrical master switch
17. Starter switches
18. Rudder trim hand knob
19. Radiator cooling and air filter switches
20. Flood light JBB panel dimmer
21. Feathering buttons
22. Long range pump pressure warning lamp
23. Bomb panel
24. Undercarriage lever
25. Direction finder indicator
26. Bomb panel protective cover
27. Gun master switch
28. Oxygen regulator
29. Triple pressure gauge
30. Aileron trim
31. Footage indicator
32. De-icing pump
33. Flaps position indicator
34. Undercarriage position indicator
35. Landing light switches

Flight Instruments

The DH.98 is equipped with standard flight instruments. The panel is installed on anti-vibration mountings to reduce the effect of vibration on instrument readings.

The following flight and navigation instruments are installed:

Electrical Services Switch

The main onboard power supply switch controls the aircraft electrical system and is combined with the magneto toggle switch.

Figure 36: Electrical Services Switch.

Magneto Switches

Four magneto toggle switches, two for each engine, are protected by a gang bar that can be used to toggle all four switches simultaneously.

Figure 37: Magneto switches.

Engine Starter Buttons

Power must be supplied to the starter coil and the electric starter to start the motors. In the upper part of the dashboard, there are two buttons for each engine. The buttons are equipped with spring-loaded covers to prevent unintentional operation. The buttons alternate starter/boost coil left to right.

Figure 38: Engine starter buttons.

R.I. Compass Repeater

Figure 39: R.I. Compass Repeater.

Airspeed indicator Mk. IX F

The airspeed indicator (ASI) has dual concentric scales, calibrated in miles per hour. The outer scale indicates speeds from 60 to 280 mph, and the inner scale indicates speeds between 280 and 480 mph.

Figure 40: Airspeed indicator.

Artificial Horizon Mk. 1C

The artificial horizon indicates aircraft orientation. The Mk. 1C artificial horizon (6A/1519) is the primary instrument when flying in low visibility conditions, when it is used to maintain straight and level flight. The artificial horizon has no inertia or lag – it reacts instantly to changes in orientation and is not affected by accelerations or the forces of flight.

The artificial horizon is powered by a gyroscope mounted on a gimbal with three degrees of freedom. The gimbal is oriented to the earth's surface by a pendulum.

The instrument face consists of an illuminated horizon line against a black background. The pitch and roll angle of the horizon line changes as the aircraft pitches and banks. Conceptually, the horizon line represents what the horizon would look like out the window. On the bottom side of the bezel is a bank indicator and bank angle scale, with markings for 0°, 30°, and 60° of bank in either direction.

Figure 41: Artificial horizon.

Vertical Speed Indicator

The vertical speed indicator (VSI) displays the aircraft's rate of climb or descent. The VSI has a bellows with a calibrated valve that either pressurizes or depressurizes the bellows as the aircraft descends or climbs. Because of this, there is a small delay before changes in climb or descent rate are indicated.

In level flight, the needle will indicate zero.

The scale is graduated from zero to 4,000 feet per minute (positive and negative). Each tick mark represents 200 feet per minute.

Figure 42: Vertical speed indicator.

Altimeter

The altimeter measures barometric height above sea level.

Figure 43: Altimeter.

The Mk. XIV A altimeter (6A/685) has three pointers. The large pointer indicates hundreds of feet, the medium pointer thousands of feet, and the small arrow tens of thousands of feet.

The rotary knob under the dial is used to set the sea level pressure datum. When rotated, the pressure scale window above the knob moves. The pilot should set local sea level pressure to get an accurate altitude reading.

Gyrocompass

The Mk. 1A gyrocompass (6A/1298) indicates aircraft course. The instrument is powered by a horizontally-mounted gyroscope on a gimbal with three degrees of freedom.

Figure 44: Gyrocompass.

The face plate indicates heading. The scale is graduated by 10° with major tick marks, and 5° with minor tick marks. Numeric indications are printed every 30°. The scale and lubber line are illuminated.

Below the dial is a knob used to set the current heading against the magnetic compass. The gyrocompass does not naturally sense north, so its heading must be periodically corrected using the magnetic compass. The knob can also be used to cage the gyrocompass. This is necessary during taxiing, landing, and aerobatic maneuvers, to avoid damaging the assembly.

Magnetic Compass

The P.8.M magnetic compass (6A/726) is installed on its own bracket bottom-left of the dashboard.

Figure 45: Magnetic compass.

Turn and Slip Indicator Mk. IB

The Mk. IB turn and slip indicator (6A/1032) indicates rate of turn and lateral acceleration (or slip). The turn rate indicator is more responsive than the magnetic compass when beginning a turn. Using the turn and slip indicator, the pilot can make coordinated turns at a standard rate at any speed.

The turn rate indicator is powered by a gyroscope mounted on a gimbal with two degrees of freedom. The gyroscope's rotation axis is aligned with the longitudinal axis of the aircraft. The instrument is dampened against yaw fluctuations.

The slip indicator is powered by a pendulum that deflects when lateral forces are present.

Figure 46: Roll and slip indicator.

Hydraulic Controls

The hydraulic controls on the front panel are, from left to right:

- BOMB DOORS lever (opens and closes the bomb bay doors)
- CHASSIS lever (extends and retracts the landing gear)
- FLAPS lever (extends and retracts the wing flaps)

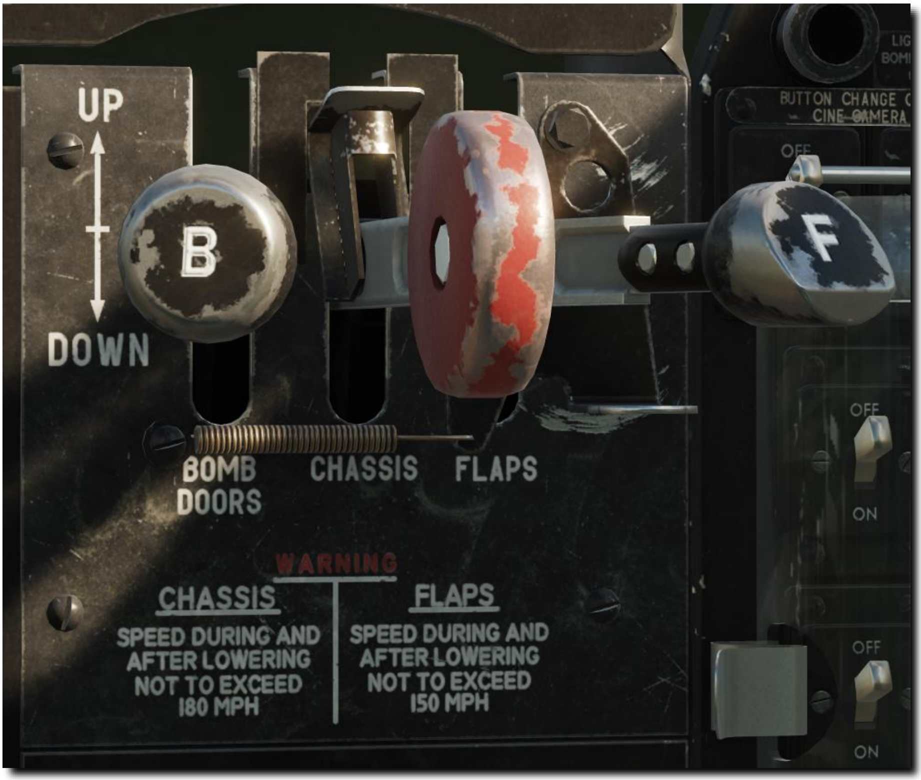


Figure 47: Hydraulic controls.

The upper lever position closes the bomb bay doors or retracts the gear/flaps. The lower position opens the bomb bay doors or extends the gear/flaps.

Warning notices next to the controls indicate maximum gear-and-flaps-extended speeds.

Landing Gear Indicator

The landing gear indicator signals the position of the main landing gear. The windows adjacent to the "UP" label illuminate when the gear is retracted, and the windows adjacent to the "DOWN" label illuminate when the gear is extended. A curtain is mounted on the upper portion of the faceplate to dim the indicators at night. When the aircraft is parked, a switch opens the circuit for the "DOWN" lights, preventing them from illuminating continuously.

The switch that opens the "DOWN" lighting circuit is located on the throttle lever. When the throttle lever is moved forward, the circuit is closed and the "DOWN" light illuminates on the ground. After taxiing and turning off the engine, the switch must be manually turned off to open the circuit and prevent unnecessary battery discharge.

Figure 48: Landing gear indicator.

Flaps Indicator

The flaps indicator shows the position of the wing flaps from 0° (flaps up) to 70°, with markings at 10° and every 20° thereafter.

Figure 49: Flaps indicator.

Pneumatic Gauge Mk. I C

The pneumatic gauge is a three-in-one indication of pneumatic system pressures. The gauge indicates the pressure of the aircraft pneumatic system, and the pressure of each pneumatic wheel brake. The aircraft system pressure is labeled from 0 to 220 psi, and each brake indicator is labeled from 0 to 130 psi. The scales are arranged so that at normal pressures, the needles form a distinctive shape, which is useful for quickly checking the status of the pneumatic systems.

The upper portion of the gauge contains an indicator of maximum allowable pressure.

Figure 50: Pneumatic gauge Mk. IC.

Tachometer Mk. IX G

The tachometers indicate the speed of each engine and propeller, in revolutions per minute. The smaller needle indicates thousands of rpm and the larger needles hundreds of rpm.

Figure 51: Tachometer Mk. IX G.

Boost Gauges

A pair of Mk. III L boost gauges (6A/1427) indicate the manifold pressure of each engine relative to ambient air pressure. The maximum value is +24 psi. Major tick marks are shown for every 2 psi, and minor tick marks for every 1 psi.

Figure 52: Boost gauges.

Low Fuel Pressure Lamps

To the left and right of the boost gauges are warning lamps that illuminate when main fuel pump pressure drops below 10 psi.

Figure 53: Low fuel pressure lamp.

Boost cut-out lever

The red sign 'BOOST ON-OUT NOT CORRECTED FOR MERLIN 25' below the lever warns this does not function with the Merlin 25 engines.

Figure 54: Boost cut-out lever.

Oil Temperature and Pressure Indicators Mk. XIV

Oil temperature and pressure for each engine are displayed in a row of gauges. The outer red gauges indicate oil pressure in psi, and the inner yellow gauges indicate oil temperature in °C.

Oil temperature and pressure are important indicators of engine health. An engine that is overworked or malfunctioning will show abnormal oil pressure or excess temperature indications prior to failure. The pilot should monitor these gauges and respond promptly to avoid engine failure.

Pressure is indicated from 0 to 150 psi, in 30-psi increments. Temperature is indicated from 0 to 120 °C in 20 °C increments.

Figure 55: Oil Temperature and Pressure Indicators.

Coolant Temperature Indicators Mk. VIII

These gauges indicate the temperature of radiator coolant, from 40 to 140 °C. The needle and labels are illuminated.

Figure 56: Coolant temperature indicators Mk. VIII.

Ultra-violet lamp

The lamp is equipped with a UV filter rheostat switch?

Figure 57: Ultra-violet lamp.

Rudder Trim Handle and Indicator

The combined device for setting and indicating the rudder trim position is located to the starboard or right of the sight. An upward deflection of the indicator arrow indicates that the trimmer is set to port, or left, and a downward deflection to starboard, or right. The arrow indicates the deflection angle.

Figure 58: Rudder trim handle and indicator.

Radiator and Air Filter Switches

The position of the radiator flaps is controlled by two toggle switches.

Toggle switches up - closed, down - open.

Figure 59: Radiator and air filter switches.

External Tank Pump Pressure Low Light

This low-pressure lamp illuminates when fuel pressure from the external tank drops, signaling to the pilot that the external tank has been emptied and the external tank pump should be deactivated.

Figure 60: External tank pump pressure low light.

Flood Lamps

The flood lamps illuminate the cockpit in low-light conditions. Flood lamps are installed on each side of the cabin as well as on the panels. They are equipped with a rotatable UV-filter.

Figure 61: Flood lamp.

Flood lamp rheostat

Rheostats along the sidewall are used to activate the flood lamps and control brightness.

Figure 62: Flood lamp rheostat.

Clock Mk. IV

The clock displays the current time in hours, minutes, and seconds. A setting and winding crown is below the faceplate. The clock is of mechanical spring-loaded design powered by an internal pendulum. The clock has an eight-day power reserve.

Figure 63: Clock.

Oxygen Indicators Mk. VIII B

The oxygen regulator supplies the pilot with oxygen at a breathable pressure. The regulator has two indicators: The left dial shows the oxygen flow rate as a function of altitude (e.g., a value of "15" indicates that the flow rate is appropriate for flight at 15,000 feet). The right dial shows the quantity of remaining oxygen.

Figure 64: Oxygen indicators Mk. VIII B.

Landing Light Switches

The port and starboard landing lights have separate on/off switches.

Figure 65: Landing light switches.

Gun Master Switch

To arm the guns, open the cover and flip switch from SAFE to ON.

Figure 66: Gun Master Switch.

Armament Control Panel

Figure 67: Armament control panel.

The armament control panel houses the weapons selection and bomb fuzing switches. In the upper right an emergency jettison button can be used to release external fuel tanks and munitions without arming them.

Toggle switches 1 and 2 to drop underwing bombs or tanks.

Toggle switches 3 and 4 select bomb bay release.

The lower pair of toggle switches select 'nose/tail' bomb fuzing. The left is the nose, the right is the tail.

Optical Gunsight

The Barr & Stroud Mk. II optical sight is equipped with knobs to set target wingspan size and distance. Two concentric knobs are located on the shaft beneath the sight glass. The upper knob is used to set target distance (0 to 500 yards), and the lower knob is used to set target size (wingspan 40 to 100 feet).

Figure 68: Optical gunsight Mk. II.

1. Sight glass
2. Target distance knob
3. Target wingspan knob

Rocket Salvo Switch

When switched to 'ON', the rockets will launch in salvo mode.

Figure 69: Rocket salvo switch.

Anti-Icing System (Not modeled)

Figure 70: Anti-Icing System.

Cockpit left side

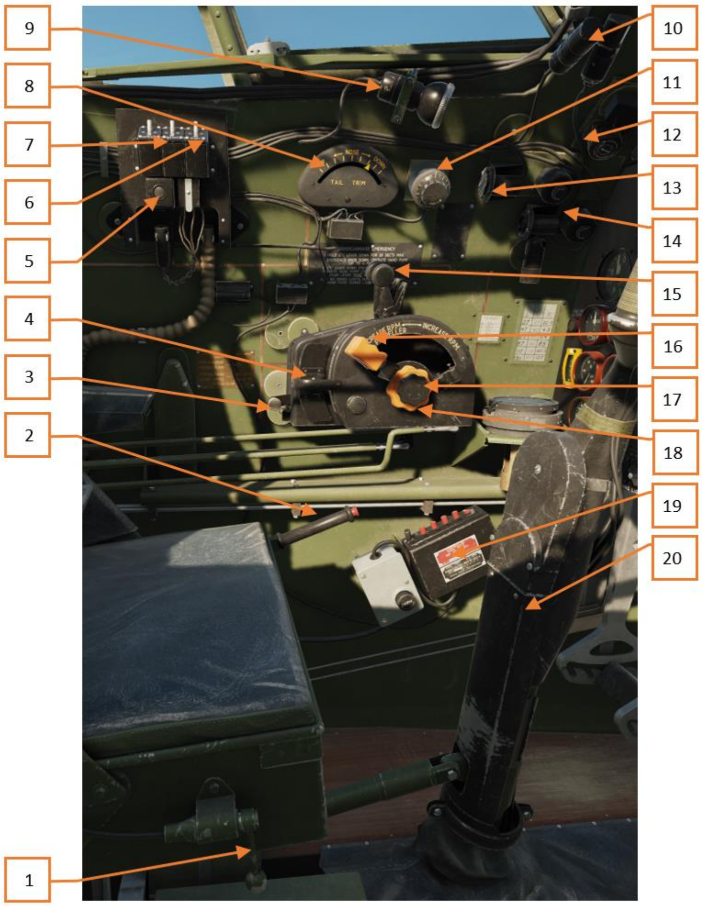


Figure 71: **Cockpit left side.**

1. Pilot harness release
2. Pilot's seat adjusting handle (not modeled)
3. Fuel mixture lever
4. Supercharger gear change switch
5. Push-to-talk button
6. Beam approach switch
7. R.I. compass switches
8. Elevator trim tab indicator
9. Ultra-violet lamp

10. Floodlamp
11. Beam volume approach switch
12. Compass flood light rheostat
13. Wing tank jettison button
14. Engine and undercarriage data plates
15. Propeller speed control
16. RPM control lever
17. Throttle friction
18. Prop pitch lever friction
19. Radio unit
20. Control column

Engine controls unit

The engine control unit contains the throttle control levers, the rpm control levers, the fuel mixture control lever, the blower mode switch and the friction controls.

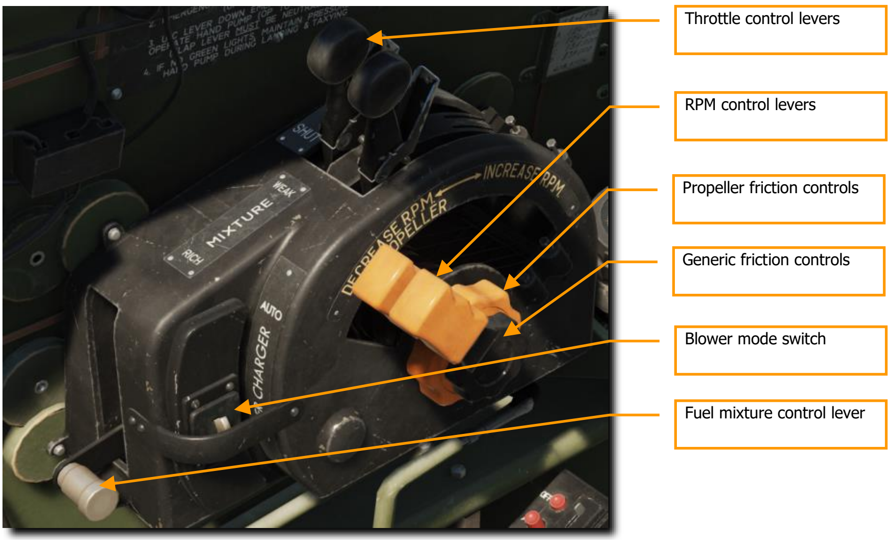


Figure 72: Engine control unit.

Radio control unit

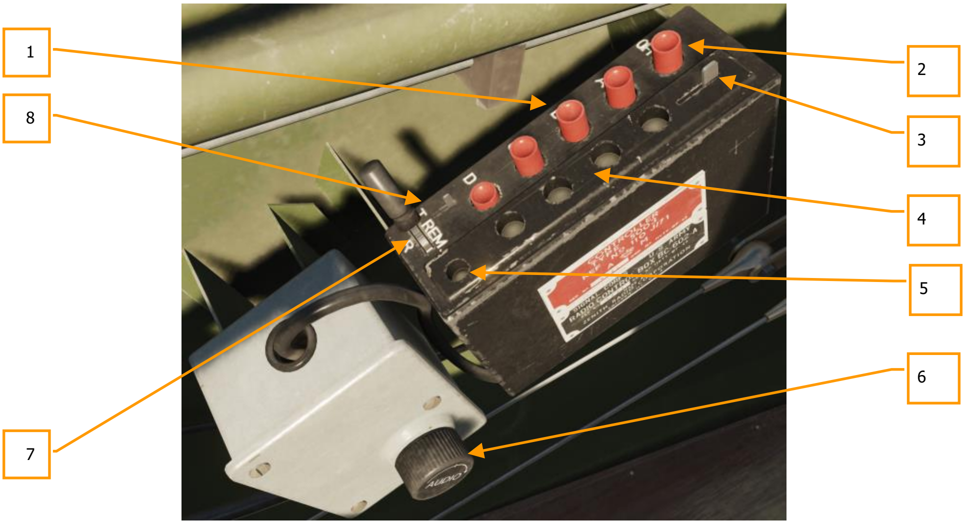


Figure 73: Radio control unit.

1. Channel selection buttons
2. Radio ON/OFF
3. Light filter knob
4. Selected channel indicator
5. Receive/transmit indicator
6. Radio volume
7. Mode switch
8. Locking switch of mode

The channel selection buttons select the required send/receive radio communication channel at the corresponding fixed frequency. Only one channel can be selected at a time.

- "A" - this channel is usually used for radio communication with ground (command) points and other aircraft.
- "B" - the main communication channel with VHF radio-equipped ATC stations. Typically used to obtain instructions for takeoffs and landings.
- "C" - the channel is often in use for radio connection with a homing station (or non-directional radio beacon)
- "D" - the channel is usually used for communication with ground direction finding stations.

The OFF button turns off the radio.

Channel indicator lamps indicate the selected radio communication channel.

The light filter control lever allows you to adjust the brightness of the indicator lamps. Reducing the brightness of the lamps can be useful when flying in the dark or in cloudy weather.

The mode selector lock latch is used to lock the position of the transmit-receive mode switch. In the forward position, the selector levers are locked in transmit-receive mode.

In the rear position, the transmit-receive mode switch is held in the R (receive) position and can be moved to the spring-loaded T (transmit) position, allowing the pilot to transmit voice messages as in manual mode should the microphone activation button on the throttle malfunction.

When held in the T position, the Rx? /Tx switch will return to the R position each time it is released to keep the radio in continuous receive mode. Correct?

If the lock lever is in the rearmost position, the RX-TX switch cannot be set to the REM position for manual operation with the microphone button.

The transmit-receive mode switch has three positions:

- R - constant reception
- T - constant transmission
- REM - manual

In the REM position, the radio mode is controlled using the microphone PTT button, see fig. (** insert when available) below. When pressed position this transmits radio messages, and when released it permits reception.

Rotating the audio switch adjusts the headphone volume.

Figure 74: Push-To-Talk button.

Elevator trimmer wheel

The elevator trim is controlled by the wheel located to the left of the pilot's seat.

Figure 75: Elevator trimmer wheel.

Elevator trim tab indicator

Serves for visual indication of the elevator trim position. The arrow in the front of the scale indicates that the trimmer is deflected for diving, in the rear, respectively, for pitching.

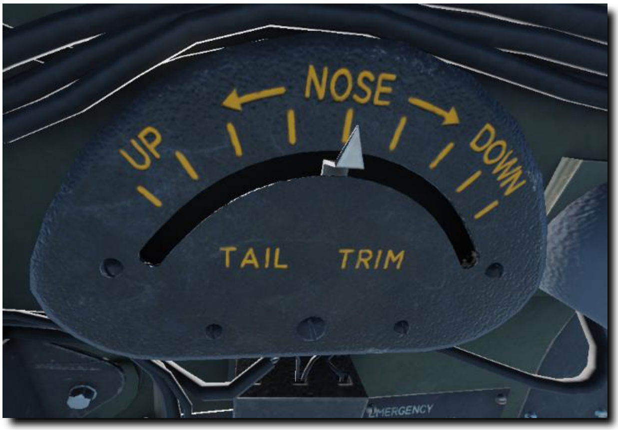


Figure 76: Elevator trim tab indicator.

Devices switch box

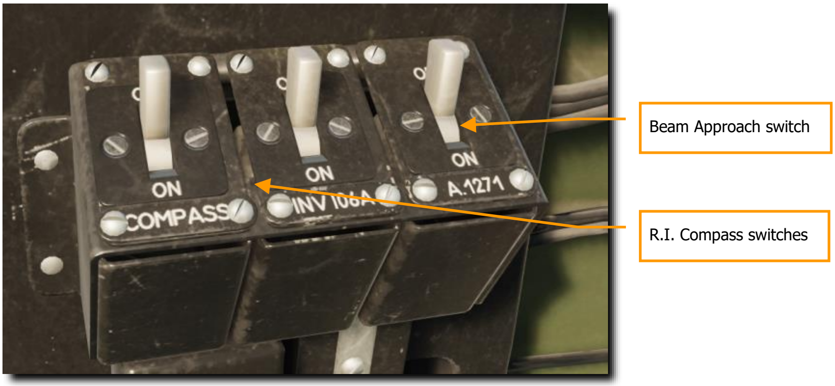


Figure 77: Devices switch box.

Beam approach rheostat

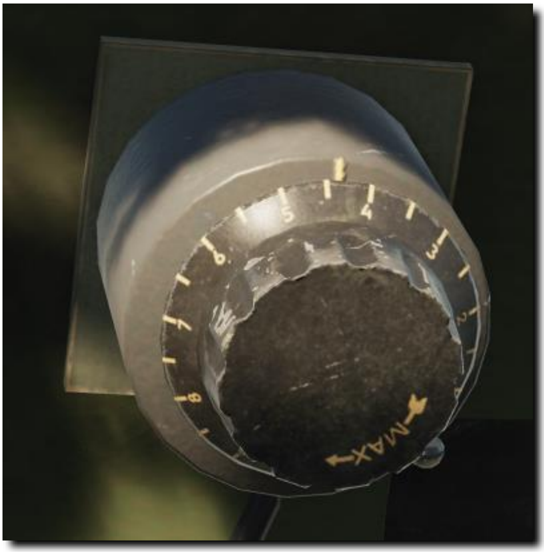


Figure 78: Beam approach rheostat.

Ultraviolet lamp

A toggle switch on the starboard panel activates the ultraviolet lighting to display device markings. Rotating the luminaire rim turns the UV filter on or off.

Figure 79: Ultraviolet lamp.

Wing tank jettison

To jettison wing tanks, lift the cover and press the button.

Figure 80: Wing tank jettison.

Pilot harness release

Figure 81: **Pilot harness release.**

Pilot Seat Adjustment Handle

Figure 82: Pilot seat adjustment handle.

Cockpit Right Side

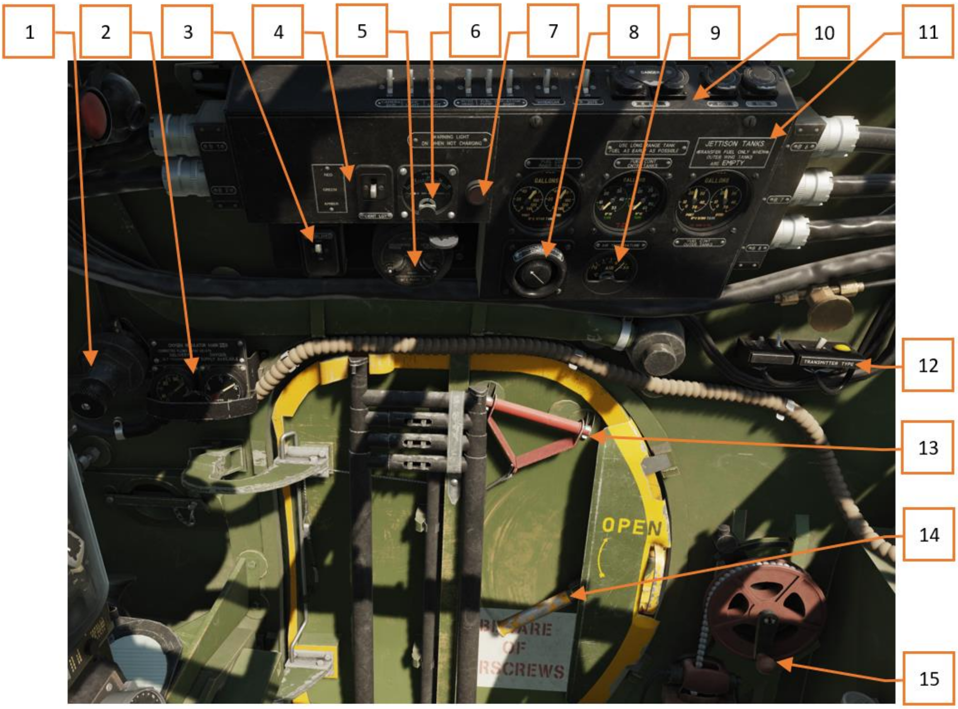


Figure 83: **Cockpit Right Side.**

1. High pressure oxygen master valve
2. Co-pilot oxygen regulator
3. Resin lamp switch
4. Identification lights selector switch
5. Identification switchbox and key
6. Voltmeter
7. Generator warning lamp
8. Windscreen wiper rheostat
9. Air temperature gauge
10. Switches panel
11. Fuel tanks gauges
12. Intercommunication jack
13. Door jettison handle
14. Entrance door handle
15. Antenna position control wheel

Oxygen high pressure valve

Figure 84: Oxygen high pressure valve.

Co-Pilot oxygen regulator

The co-pilot's oxygen supply regulator is similar to the pilot's.

Figure 85: Co-Pilot oxygen regulator.

Fuel Tank Gauges Mk. IV

The fuel gauges for the inner, center and outer wing fuel tanks are grouped on the starboard side of the cockpit. They are graduated from 0-146 gallon, 0-53, 0-63 and 0-59 gallon respectively.

Figure 86: Fuel tanks gauges.

Right-Hand Side Cockpit Controls

The top panel houses the switches that control the camera, navigation lights, interior lights, pitot heat, fuel pumps, gunsight illumination, nose landing light, and IFF. To the right of the switches are buttons for the left and right engine fire extinguishers, and IFF self-destruct (not implemented).

Figure 87: Buttons and switches on the top panel of the cockpit right side.

Voltmeter

The voltmeter indicates electrical system voltage.

Figure 88: Voltmeter.

Outside Air Temperature Gauge

This gauge shows the free air temperature, from -70 to +30 °C.

Figure 89: Air temperature gauge.

Intercom Jack

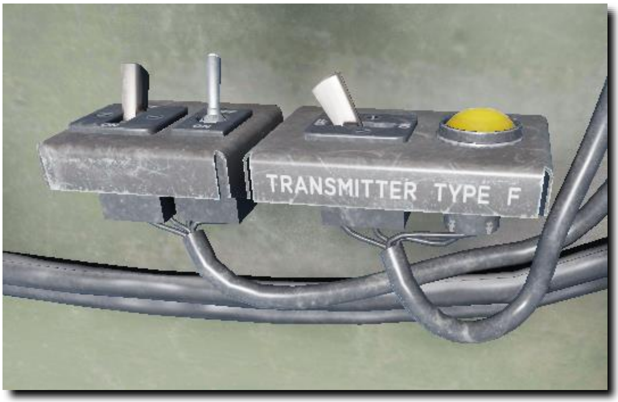


Figure 90: Intercom jack.

Switchbox Identification and Morse Key

Figure 91: Identification switchbox and Morse key.

UV Resin Lamp Switch

Figure 92: UV resin lamp switch.

Entrance Door

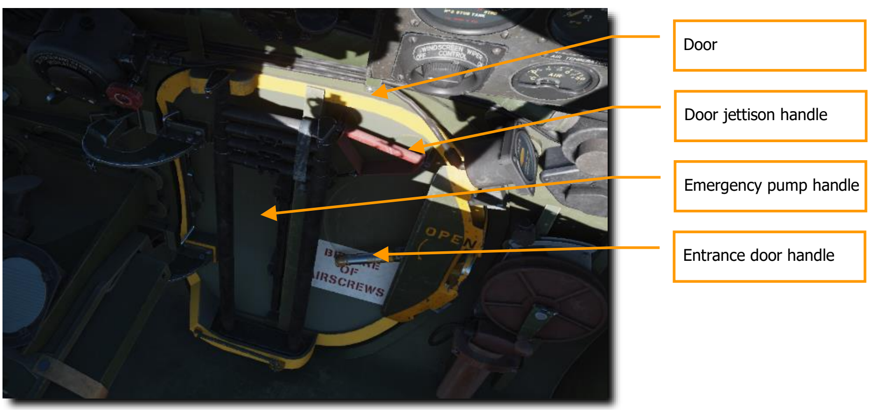


Figure 93: Entrance door.

Right cabin flood light

Figure 94: Right cabin flood light.

Weapon heating lever

To the right of the co-pilot's seat is the weapon heating lever. Warm air is drawn from the engine.

Figure 95: Weapon heating lever.

Antenna control

Figure 96: Antenna control.

Wiper Control

Windscreen wiper control knob. Counterclockwise stops the wiper; clockwise starts it.

Figure 97: Windscreen wiper control.

Fuel cocks

Valves that control the supply of gasoline from the tanks to the respective engine fuel pumps. The 'OFF' upper position cuts off fuel supply; the right 'OUTER' positions opens the fuel supply from the external tanks; setting them to the left opens the main fuel supply.

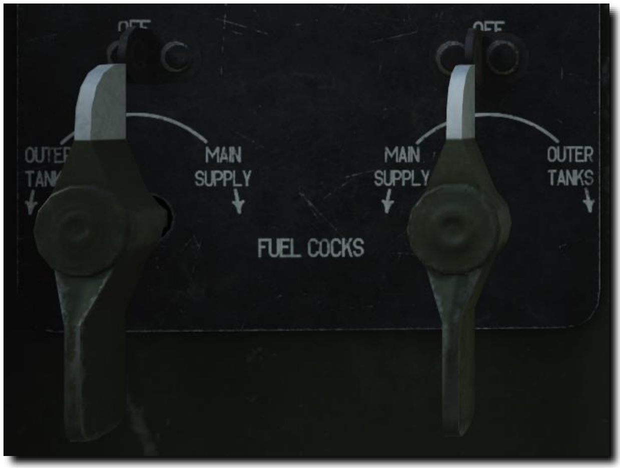


Figure 98: Fuel cocks.

Engine cut-out buttons

Pressing these buttons cuts the fuel supply to the left and/or right engine respectively.

Figure 99: Engine cut-out buttons.

Fuel transfer cock

When the cock is moved to the open position, the pumps transfer fuel from the underwing tanks to the outer wing tanks.

Figure 100: Fuel transfer cock.

Auxiliary oil supply levers

To enable the supply of lubricant from an external power supply, additional oil supply valves are provided.

Figure 101: Auxiliary oil supply levers.

Engine oil dilution buttons

For low temperature engine starts, engine oil must be diluted with fuel. This can be supplied separately to each engine.

Figure 102: **Engine oil dilution buttons.**

Fuel tank pressurization valve

To ensure normal fuel supply, the tanks must be pressurized by the incoming air flow.

Figure 103: Fuel tank pressurization valve.

Cabin heater lever

Cockpit heating is controlled by means of an air duct and a lever. Warm air is drawn from the engine.

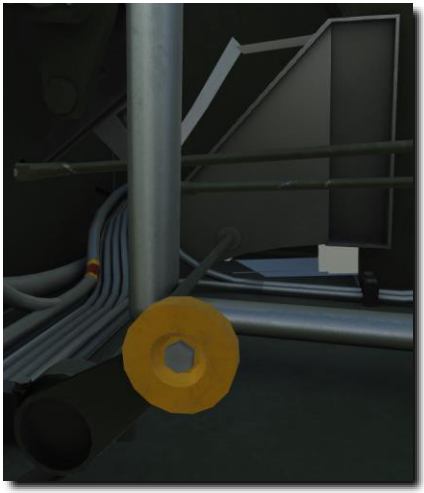


Figure 104: Cabin heating.

Behind the pilot's armored backrest, the co-pilot can access the radio equipment consisting of the T.1154 transmitter and the R.1155 receiver, antenna controls and IFF.

Figure 105: Radio equipment: T.1154 on the left, R.1155 on the right, swivel antenna in the center.

Antenna mode switch

An antenna mode switch is located between the Transmit and Receive radios.

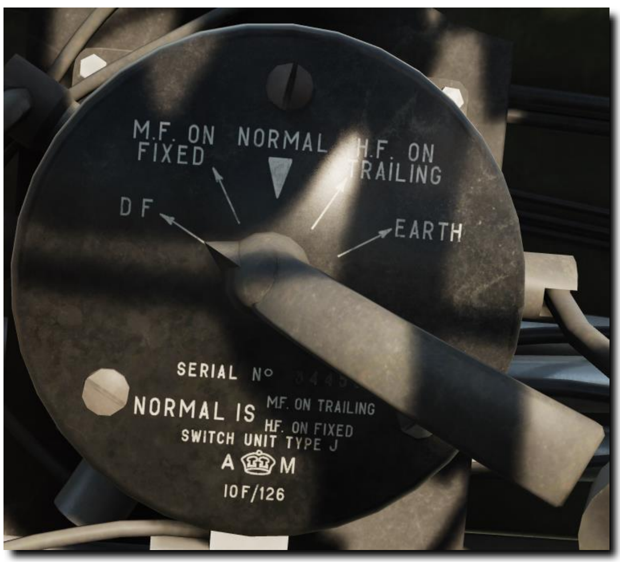


Figure 106: Antenna mode switch.

Receiver R.1155

R.1155 provides reception of radio signals and adjustment to the required reception parameters.

Figure 107: R.1155.

1. Frequency range switch
2. Heterodyne
3. Volume control
4. Meter amplitude
5. Filter switch
6. Meter balance
7. Setting indicator lamp
8. Aural sense switch
9. Meter deflection sensitivity switch
10. Meter frequency switch
11. Master selector switch
12. Frequency tuning knob
13. Frequency fine tuning knob

Transmitter T.1154

T.1154 provides transmission of radio signals and precise setting of the required parameters.

Figure 108: Transmitter T.1154.

1. Frequency range switch
2. Master oscillating tuning condenser (Range 1 - H/F frequency)
3. Master oscillator dial
4. Vernier adjustment switch
5. Master oscillating tuning condenser (Range 2 - H/F frequency)
6. Master oscillator dial
7. Vernier adjustment switch
8. Master oscillating tuning condenser (Range 3 - M/F frequency)
9. Master oscillator dial
10. Master oscillator dial
11. Output tuning condenser
12. Tap switch
13. Master oscillator dial
14. Output tuning condenser
15. Tap switch
16. Output tuning control
17. Anode tap switch
18. Tap switch
19. Master switch

ARI 5083 friend or foe recognition unit (IFF)

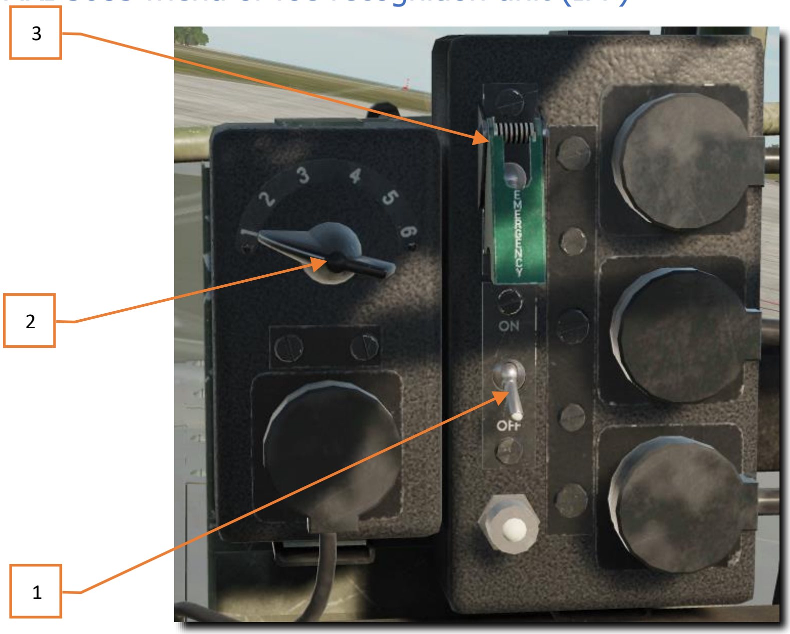


Figure 109: ARI 5083 friend or foe recognition unit (IFF).

1. Power switch
2. Detonator switch under protective cover
3. Channel selector

STANDARD PROCEDURES

STANDARD PROCDEDURES

Pre-flight procedures

Fuel system management

Start the engines on the outer tanks, warm up on the main tanks, taxi and take-off on the fullest tanks.

Use of the outer tanks

- Do not rely on outer tanks when flying at low altitudes; their capacity is small, and the gauges diminish in accuracy as the fuel level falls.

- The outer tanks are pressurized only when transfer of fuel is taking place from the wing drop tanks. When wing drop tanks are not used vaporization may cause engine cut-out at high altitudes, particularly in tropical climates.

- Interruptions of flow are most likely to take place in the early part of a flight at high altitude. When at dispersal, every effort should be made to shield the aircraft from the direct sunlight, as the fuel should be kept as cool as possible.

- Engine cut-out may occur during evasive action, at high power at altitude, and whenever the tanks are less than half full.

- It is not possible to cross-feed from the outer tanks should one engine fail, and they should therefore be used first. When they are nearly empty, change to the main supply.

Use of the wing drop tanks

- The contents of both wing drop tanks are transferred by pressure from the exhaust side of the port vacuum pump. Failure of this pump will be masked by the automatic isolation valve unless failure of No. 1 engine makes it obvious. Failure of this pump will only be revealed by the non-transfer of the contents of the wing drop tanks when transfer is selected.

- The contents of the wing drop tanks should be transferred as early as possible to avoid loss of fuel should they have to be jettisoned. In the event of failure of the port vacuum pump, fuel cannot be transferred, nor can it be cross-fed in the event of engine failure; turn on the transfer cock as soon after take-off as convenient. When the wing drop tanks have been emptied, shown by a fall in the contents of the outer tanks, turn off the transfer cock.

  Continue on the outer tanks until they are empty, then change to main supply.

- If automatic transfer is not provided, sufficient fuel must be used from the outer tanks before attempting to transfer, or fuel may be lost through the atmospheric vents. To transfer fuel, change to main supply and turn on the transfer cock. When the outer tanks are full, turn off the transfer cock and revert to outer tanks. Repeat the sequence until the wing drop tanks are empty.

Use of the long-range tank

- Select main supply and turn on the immersed fuel pump. As soon as the warning light comes on the immersed fuel pump should be switched off.

Checklist before take-off

- Elevator trim: Increase pitch as needed
- Rudder trim: Slightly right
- Aileron trim: Neutral

Starting and warming up the engine

- Turn on the parking brakes
- Turn on the electrical services switch

Make sure that:

- Voltmeter – should show 24V if battery is fully charged
- Bomb doors – Shut, selector neutral
- Bomb doors panel – All switches off. Guard closed
- Undercarriage – Emergency knob in normal position, safety catch engaged. Selector neutral, safety catch engaged.
- Air pressure – Normal pneumatic pressure 200 lb/sq. in.

Next, confirm:

- Main fuel cocks — OUTER TANKS
- Throttles — OPEN 1/2 INCH
- RPM Levers — MAXIMUM
- Superchargers — MOD. (low gear)
- Radiator shutters — CLOSED
- Pressure venting cock — OPEN
- Immersed fuel pump switch — OFF
- Bomb doors — SHUT, SELECTOR NEUTRAL

If the engines are to be started from an external source, have a ground starter battery plugged in, and then for each engine in turn:

- Open the cockpit window and order the ground crew to start pre-filling the fuel.
- Switch on the ignition and press the starter and booster-coil pushbuttons. Turning periods must not exceed 20 seconds with 30 second cooldown intervals.
- The ground crew should work the priming pump as rapidly and vigorously as possible while the engine is being turned.
- At air temperatures below freezing it will probably be necessary to continue priming after the engine has fired and until it picks up on the carburetor.
- Slowly increase power to bring the engines to 1200 rpm.

- Once the engines are warmed up, open the radiator flaps

While warming up:

- Radio — TEST
- Altimeter — SET
- Vacuum system — CHECK VALVE OPERATION
- R.I. compass — ON
- Direction indicator — SET AND CHECK, UNCAGE
- Set the direction indicator against the magnetic compass, and check it against the R.I. compass
- Bomb bay doors — CLOSE

It is recommended to alternate engine start order with each flight, to check for correct operation of the vacuum pumps.

Check generator operation after starting the right engine. The warning light should be out.

Exercising and Testing

Warm up to 15 °C. oil temperature and 40 °C. coolant temperature, and then for each engine in turn:

- At warmup rpm, test each magneto as a precautionary check.
- Open the throttle to the static boost reading (zero under standard atmosphere conditions) and check the operation of the supercharger by setting the switch to AUTO and tell the ground crew to press the test pushbutton in each engine nacelle. Rpm should drop slightly, and boost should rise when the change to high gear is made.
- At the same boost, exercise and check the operation of the constant speed unit by moving the rpm control lever over the whole range at least twice. Return the control lever to the maximum rpm position, then check that the rpm are within 50 of those normally obtained.
- At the same boost, test each magneto. If the single ignition drop exceeds 150 rpm but there is no undue vibration, a full power check should be carried out; if there is marked vibration the engine should be stopped, and the cause investigated. The full power check may also be carried out after repair, inspection other than daily, when the ignition drop at zero boost exceeds 150 rpm, or at the discretion of the pilot. If the checks at the static boost are satisfactory, no useful purpose will be served by a full power check.

The full power check should be carried out as follows:

- Open the throttle fully and check the take-off boost and rpm. Throttle back until a drop in rpm is apparent and test each magneto. If the single ignition drop exceeds 150 rpm the aircraft should not be flown.
- After completing the checks either at the static boost reading or at full power, steadily move the throttle to the fully closed position and check the minimum idling rpm. Then open up to 1,200 rpm.

Taxi Checks

Check the following before and during taxiing:

- Brake pads — REMOVED
- Brakes — CHECK
- Direction indicator — CORRECT IN TURNS
- Artificial horizon — CORRECT
- R.I. compass — CORRECT IN TURNS
- Pitot heat — ON AS REQUIRED

Takeoff

- Before takeoff, check the following:
    - Trims — CHECK
        - Elevator — 1 to 1½ units forward (nose down)
        - Rudder — Slightly right
        - Ailerons — Neutral
    - Air intakes — AS REQUIRED
    - Propeller levers — FULL FINE
    - Fuel level and fuel selectors — CHECKED
    - Flaps — UP OR 15°
    - Blower – MOD.
    - Radiator flaps — OPEN
    - Heading indicator — SYNCED TO MAG COMPASS
    - Hatches — CLOSED
    - Seat belts — SECURED

- Taxi forwards a few yards to straighten the tailwheel.
- Open the throttles slowly, checking any tendency to swing by coarse use of the rudder and by differential throttle movement. There is little tendency to swing if the engines are kept synchronized.
- When comfortably airborne, raise the undercarriage, check that the undercarriage locks up; if it does not, hold the selector lever up for five seconds.
- Safety speed at a weight of approximately 17,000 lbs. flaps up or 15° down at +9 psi boost is. 155 knots. At +18 psi boost it is 170 knots. These speeds however, may vary considerably with individual aircraft.
- Before raising the flaps, if used, trim the aircraft slightly tail heavy.

Climb

- The speed for maximum rate of climb is 150 knots.
- Climb in low gear at 2,850 rpm and +9 psi boost. When the maximum obtainable boost has fallen to +7 psi, change to AUTO. Above 18,000 ft. decrease the airspeed by 2 knots per 1,000 ft.
- When climbing for maximum range, climb in low gear at 2,650 rpm and +7 psi boost, using the airspeeds recommended above. When the maximum obtainable boost has fallen to +4 psi set the supercharger gear change switch to AUTO and re-adjust the throttles.
  Above 18,000 ft. increase power to +9 psi and 2,850 rpm and reduce airspeed as recommended. Although less fuel is used to reach a given altitude by climbing at high power, the total fuel used and the time taken on the subsequent cruise is the same, whether the aircraft is climbed at 2,650 rpm and +7 psi boost or at 2,850 rpm and +9 psi boost.
- When climbing with a boost setting of less than +9 psi, the automatic boost control cannot open the throttle valves fully and the boost will begin to fall off before full throttle height is

reached; the throttle levers should be progressively advanced to the gate to maintain the desired boost.

- For operational necessity at any altitude, select AUTO and 3,000 rpm and move the throttles fully forward.

General Flight

- Stability
  - Stability about all axes is satisfactory, but with the center of gravity aft longitudinal stability deteriorates on the climb.
- Changes of trim
  - Undercarriage up — Slightly nose up
  - Undercarriage down — Nose down
  - Flaps up — Strongly nose down
  - Flaps down — Nose up
  - Radiator shutters open — Nose up
  - Radiator shutters closed — Nose down
  - Bomb doors open — Slightly nose up
  - Bomb doors closed — Slightly nose down
- Controls
  - The controls are light and effective, and maneuverability is good. The rudder should not be used violently at high speeds. When two-tier R.P. or rails are carried, aileron control is poor at low speeds, i.e., during take-off and approach to land.
- Flying at reduced airspeeds
  - Speed should be reduced to 175 knots, flaps lowered 15° and the rpm controls set to 2,650 rpm. Speed may then be reduced to 130 knots.

Stalling

- The approximate stall speeds at 18,000 feet and idle power are as follows:
  - Undercarriage and flaps retracted: 105 knots
  - Undercarriage and flaps extended: 95–100 knots
  - Typical approach: 90–95 knots
- Warning of the approach of the stall is given by pronounced buffeting of the control surfaces, the onset of which can be felt some 10 knots before the stall itself. At the stall the aircraft pitches, the A.S.I. fluctuates and the nose drops gently. There is little tendency for the wing to drop unless the control column is held back. Recovery is easy and normal in all cases.

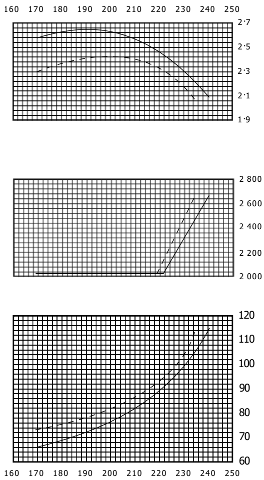
Cruise Flight

- For any required airspeed, the maximum weak mixture boost (+7 psi) together with the lowest practicable rpm provide the most economical conditions. Note: When cruising at low rpm, the engines should be cleared every 30 mins. at +12 psi boost and 2,850 rpm for 30 secs.
- At any height the speed for maximum range is 170 knots at a weight of 17,000 lbs., but below 10,000 ft this speed can only be obtained at an uneconomical boost setting, even when using minimum rpm. Speed should therefore be increased to approximately 200 knots.

- Fly with the supercharger gear change switch in the MOD position, unless the recommended airspeed cannot be obtained without exceeding 2,650 rpm, when high gear should be engaged by switching to AUTO.

Flight Planning

Recommended cruise speeds are shown below for the following configurations: Weight — 17,000 lbs. and 20,000 lbs. Altitudes, first-stage blower — Sea level, 10,000 feet, and 20,000 feet. Altitudes, second-stage blower — 25,000 feet.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2·5
2·3
2·1
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2 600
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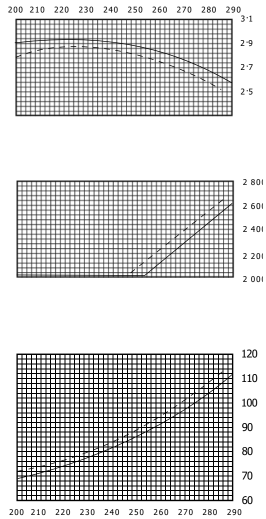
160 170 180 190 200 210 220 230 240 250


200 210 220 230 240 250 260 270 280 290
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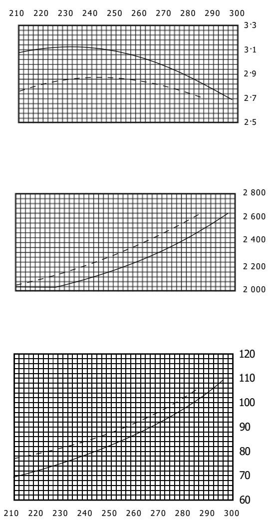
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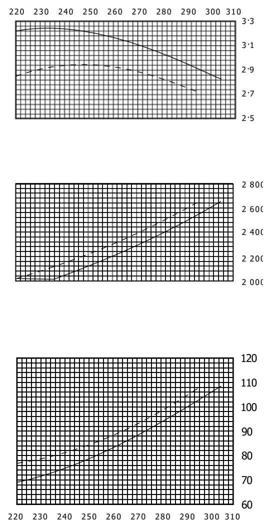
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Landing Procedures

Approach and landing

- Before landing, check the following:
  - Brake pressure: 200 psi (minimum)
  - Blowers — MOD
  - Radiator flaps – OPEN

- Slow down to 155 knots and check the following:
  - Undercarriage – Down and locked. Undercarriage indicator lights are green.
  - Propeller speed controls – Fully Open
  - Fuel – Turn cocks to fullest tanks
  - Flaps – Fully Down: considerable nose down trim will be required

Approach speeds

The approach speeds at 17,000 lb (approximately half fuel and no bombs) are:

	Flaps down	Flaps up
Engine assisted	125 m.p.h. (109 knots)	140 m.p.h. (122 knots)
Glide	140 m.p.h. (122 knots)	150 m.p.h. (130 knots)

At full load speed should be increased by about 10 m.p.h. (9 knots).

With the undercarriage and flaps down the rate of descent is very high. If undershooting, corrective action entails the use of more power than might be expected.

- After landing and clearing the runway, do the following:
  - Flaps — UP, LEVER NEUTRAL
  - Propeller levers — FULL FINE
  - Pitot heat — OFF
  - Brake pressure — CHECK

Balked Landing

The aircraft will climb satisfactorily at approximately 120 knots with flaps and undercarriage down at climbing power.

- Open the throttles to +9 psi boost (take off position).
- Raise the undercarriage immediately.
- Climb at about 140 m.p.h. (122 knots).
- The flaps come up quickly and should not be raised until safe height is reached. They may be kept at 25° to complete the circuit; there is then no need to retrim.

Engine Shutdown

- If the serviceability of the engine is in doubt, run-up checks as may be necessary should be carried out. In all cases, however, the engines should be idled at 1,000 rpm for a short period and during this period if no other check of the ignition has been made, the magnetos should be tested for a dead cut.

- To stop the engines the slow-running cut-outs should be pulled out until the engines have stopped, after which they should be released smartly.
- After stopping the engines, do the following:
  - Ignition — OFF
  - Radiator flaps — CLOSED
  - Electrical systems — ALL OFF
  - Main battery — OFF
  - Fuel valves — CLOSED
  - Direction indicator — CAGED
  - Brake pads — INSTALLED
  - Brakes — RELEASED
  - Control locks — INSTALLED

Oil Dilution

- Adjust the oil level in the tanks to 12½ gallons.
- To ensure a cold start at the following temperatures the oil should be diluted for the times quoted below:
  - Between -10 °C and -15 °C: 1 minute
  - Between -15 °C and -26 °C: 2 minutes
- During the next start after 2 minutes dilution, the minimum partial boiling-off period at 2,000 rpm is 10 minutes. After 1 minute dilution, no special partial boiling-off precautions are necessary.

Limitations

Operational limitations of the Merlin 25 engine

Mode	RPM/min	Boost, psi	Max Coolant temperature, °C	Max Oil temperature, °C
Max Take-Off	3000	+18		
Intermediate (1 hr. limit)	2850	+9	125	90
Max Continuous	2650	+7	105 115 – for a short period	90
Operational Necessity (5 min. limit)	3000	+25	125	105

The minimum oil pressure in flight is 30 psi.

The minimum temperature during take-off is 15 °C, and minimum coolant temperature is 60 °C.

Flying Limitations

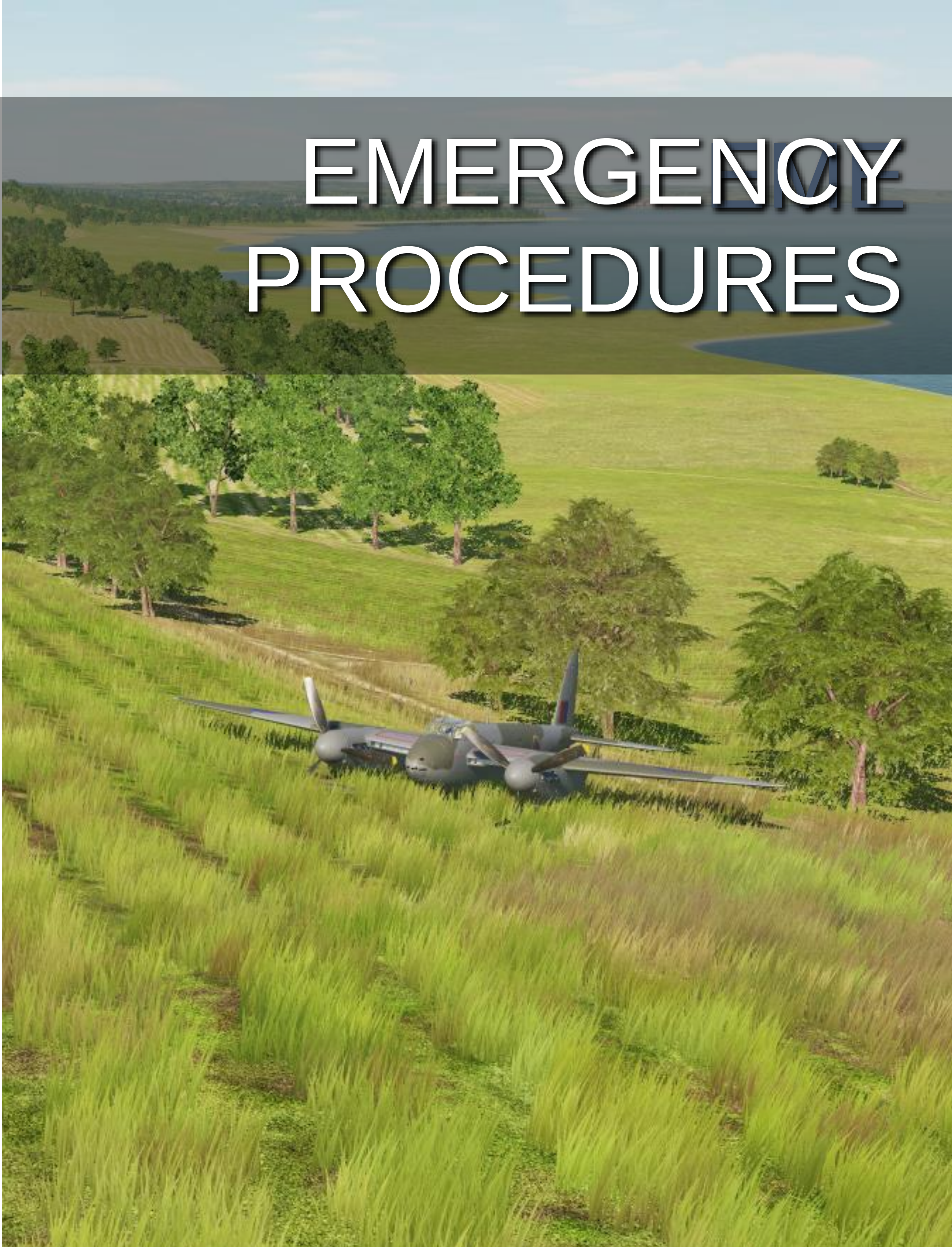
- Deliberate spinning is prohibited, and an incipient spin should be checked by immediate recovery action.
- Although aerobatics are permitted at weights below 19,100 lbs. without bomb load, underwing stores or wing drop tanks, they are not recommended owing to the possibility of damaging the special equipment.
- The controls are light and effective, and care should be taken to avoid excessive accelerations in turns and recovery from dives. At high speeds violent use of the rudder and large angles of yaw must be avoided.
- Maximum weights:
    - Takeoff and non-aerobatic flight: 20,500 lbs.
    - All maneuvers: 19,000 lbs.
    - Landing: 20,500 lbs.
- Maximum speeds:
  (a) Without underwing stores or with 2 250-lb or 500-lb G.P. bombs with standard wing bomb fairings
  (b) With 2 100-gal wing drop tanks
  (c) With underwing R.P. or depth charges
  (d) With underwing stores

(e)

Height, ft	(a)	(b)	(c)	(d)
From sea level to 10,000	370	330	350	305
From 10,000 to 15,000	350	330	350	305
From 15,000 to 20,000	320	320	320	305
From 20,000 to 25,000	295	295	295	295
From 25,000 to 30,000	260	260	260	260
From 30,000 to 35,000	235	235	235	235

- Other maximum speeds:
    - Bomb doors open: 305 kts
    - Undercarriage down: 155 kts
    - Flaps not more than 25° down: 175 kts
    - Flaps fully down: 130 kts
- Firing of RP is prohibited whilst carrying drop tanks and until at least one minute after they have been jettisoned.
- Wing drop tanks should only be jettisoned in level flight without yaw, at speeds between 175 and 260 knots.

EMERGENCY PROCEDURES



EMERGENCY PROCEDURES

Any situation where system failure or combat damage results in an inability to maintain level flight is an emergency. In an emergency, you can attempt to land the aircraft or bail out. Specific emergencies are discussed below.

Feathering

- Close the throttle.
- Hold the feathering pushbutton in only long enough to ensure that it stays in by itself, then release it so that it can spring out when the feathering is complete. If it does not spring out, it must be pulled out.
- Turn off the fuel cock.
- When the engine has stopped, or nearly stopped, switch off the ignition and close the radiator shutter.

Unfeathering

- Set the throttle slightly open and the rpm control lever fully back, and then switch on the ignition.
- Hold the feathering pushbutton in until rpm rises to 800–1,000 and ensure that it springs out fully.
- Turn on the fuel.
- If the propeller does not return to normal constant-speed operation it must be feathered and unfeathered again, releasing the pushbutton at slightly higher rpm.
- It is advisable to unfeather at speeds below 175 knots to avoid risk of engine overspeeding.
- Idle the engine at approximately 1,800 rpm until the temperatures reach the minimum for cruise power.

Engine failure during take-off

- The handling characteristics of individual aircraft differ considerably according to age and load. Except in cases where it is known to be less; at approximately 17,000 lbs., safety speed should be assumed to be 155 knots at +9 psi boost and, if the engines have not been de-rated, 170 knots at +18 psi boost.
- If safety speed has been attained, the aircraft will climb away on one engine at climbing power at about 135-140 knots provided that:
    - The propeller of the failed engine is feathered, and the radiator shutter closed.
    - The flaps are fully up.
- The drag of a windmilling propeller is very high and unless feathering action is taken immediately, control can only be maintained at the expense of a rapid loss in height.
- The aircraft accelerates slowly to the safety speed at +18 psi boost. If high power is used for take-off, it is recommended that climbing power is used as soon after take-off as is possible.

Engine failure in flight

- Close the throttle and feather the propeller of the failed engine.
- Open the radiator shutter and keep a careful watch on the temperature of the operating engine.

- At full load, altitude can be maintained on either engine up to 12,000 ft. using climb power at about 150 knots.

Single-engine landing

- While maneuvering with the flaps and undercarriage up, speed must not be allowed to fall below 140 to 150 knots.
- A normal circuit can safely be made irrespective of which engine has failed. The checks before landing should be carried out as for a normal landing, but it should be remembered that the undercarriage will take longer to lower on one engine — approximately 30 seconds at 2,850 rpm — and, owing to its high drag, altitude will be lost once it has started to lower.
- When across wind, flaps may be lowered 15° and the live engine used carefully to regulate the rate of descent. Speed should not be allowed to fall below 135 knots until the airfield is within easy reach; flaps may then be lowered further as required and power and speed reduced as height is lost, aiming to cross the airfield boundary at the speeds quoted for an engine assisted landing.

Single-engine go-around

A go-around is only possible if the decision is made while ample height remains and before more than 15° of flap is lowered. The height is required in order to maintain the speed above the critical speed, for the high power necessary, while the undercarriage and flaps are retracting. When the decision to go around has been made:

- Ensure that the speed is not less than 135 knots, and then increase power on the live engine to +9 psi boost and 2,850 rpm.
- Raise the undercarriage.
- Increase speed to 140-150 knots.
- Raise the flaps and re-trim.
- If the engines are not de-rated, power higher than +9 psi should only be applied carefully and within the limits of rudder control.

Flapless landing

The approach with flaps up is very flat, and difficulty may be experienced in maintaining a steady airspeed. At the maximum landing weight, the final approach should be made at 115 knots. At light loads, this speed may be reduced by 5 knots. The touchdown is straightforward and the landing run, although lengthened, does not become excessive.

Bombs, R.P., and wing drop tank jettisoning

- Bombs and wing drop tanks
    - Select bomb doors DOWN.
    - Check doors open with warning light.
    - Jettison small bomb containers by pressing the bomb containers and wing drop tanks jettison button.
    - Select all bombs and press the bomb release button on the control column; this will release the fuselage bombs unfused, and the wing bombs or wing drop tanks.
- R.P.
    - Rocket projectiles cannot be jettisoned except by firing.

Fire Extinguishers

The engine fire-extinguishers are on the electrical panel on the cockpit starboard wall. They operate automatically in the event of a crash. A hand fire-extinguisher is provided to the right of the pilot's seat. Mod. 1145 introduces a fire warning light which is positioned in the center of each feathering pushbutton. When this light glows red it indicates an outbreak of fire in the appropriate engine.

A semi-automatic fire-extinguisher system will be introduced under Mod. 1398.

Bailout

Exit should be made through the entrance door, which must first be jettisoned by pulling the red handle and kicking out. If possible, feather the starboard propeller before leaving the aircraft.

Do not touch the normal handle.

Crash exit

Through the roof panel — pull down the red lever in front of the panel and push out.

Ditching

- The aircraft may be successfully ditched but, whenever possible, it should be abandoned by parachute.
- When ditching, jettison the roof panel but keep the entrance door closed.
- Lower the flaps 15°.
- The harness should be tight and locked.
- Ditching should be along the swell or into wind if the swell is not steep.
- If power is available, it should be used to reduce speed of touchdown as far as possible.

Crash landing

Cases have occurred of paddle-bladed propellers breaking on impact when still under power. In this scenario the port propeller is liable to cause injury to the pilot's legs. The engines should therefore be throttled fully back before touching down.

IFF

The demolition switches for the IFF are on the electrical panel aft of the master switch.

COMBAT EMPLOYMENT

COMBAT EMPLOYMENT

This section discusses the methods of using the DH FB Mk.VI weapons.

The main armament of the aircraft is its machine guns and cannons. The Mosquito can also carry bombs and rockets.

Machine guns and cannons

Using the machine guns and cannons:

Open the safety cover and move the weapons switch to the lower position

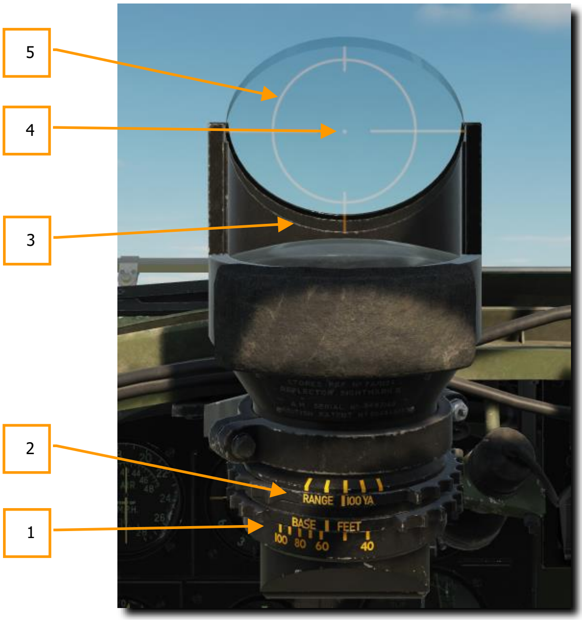
Figure 110: Open the safety cover, depress the switch.

Turn the gunsight on with the toggle switch on the starboard panel

Figure 111: Reflector sight switch

Detect and identify the target visually.

Using the target base scale flywheel, set the value corresponding to the wingspan of the target aircraft on the lower sight.



1. Target wingspan in feet
2. Target distance in 100s of feet
3. Sight reticle ring
4. Center point
5. Range finder ring

Figure 112: Mosquito Reticle.

Maneuver the aircraft to bring the target inside the rangefinder ring; keep the center of the reticle on the target and rotate the range flywheel at the base of the upper sight until the ring diameter matches the target's size.

Allowing for the angle and speed of the target, take a lead and open fire.

Bombs

Open the safety cover and move the weapons switch to the lower position

Figure 113: Open the safety cover, depress the switch.

Open the bomb panel cover

Figure 114: Bomb armament panel cover opened.

Select the desired suspensions and fuse settings.

Open the bomb bay doors by moving the lever down.

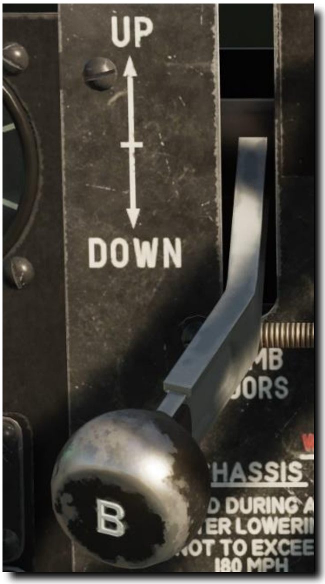


Figure 115: Bomb bay doors open - lever in lower position.

As soon as the bomb bay doors have opened correctly, the lever will automatically return to the middle, neutral position.

Check the bomb bay doors indicator lamp to make sure that the bomb bay doors have fully opened.

Figure 116: From left to right: Bomb bay doors closed; cover closed; cover open; bomb bay doors open.

Perform the bomb attack run.

Close the bomb bay doors.

Avoid slip during the bomb release at all costs. Danger of bombs striking the propellers are imminent!

RADIO COMMANDS

RADIO COMMANDS

The player can use the in-game radio in one of two ways, Simplified or Realistic. The player may select one of these modes in the Settings menu of the game by checking or unchecking the box for "Easy Communication" under the Gameplay tab. If this option is disabled, in-game radio communication will be set to realistic by default. The selected mode also determines the key bindings used to activate the in-game Radio menu.

Simplified Radio Communications

The radio communications window is accessed by pressing the **[\]** backslash key (for US keyboards; other keyboard layouts may vary). After selecting a radio command, the appropriate radio or interphone will be selected and tuned (if required) automatically. The **[\]** key will close the radio command menu when open.

When the radio menu is displayed, recipients are color-coded as follows:

- White: Recipients tuned to the same frequency as at least one of the player's radios.
- Gray: Recipients not on the same frequency as any of the player's radios, but who can be contacted after tuning the correct frequency.
- Black: Recipients who cannot be contacted due to terrain masking, earth's curvature, etc.

Each recipient will also have their frequency and modulation (AM or FM) listed. When you select a recipient, the appropriate radio will automatically be tuned to communicate with them.

When Easy Communications mode is enabled, the following quick-access shortcuts are also available:

- **[LWIN + U]** Request AWACS vector to home base.
- **[LWIN + G]** Command flight to attack ground targets.
- **[LWIN + D]** Command flight to attack air defense targets.
- **[LWIN + W]** Command flight to cover me.
- **[LWIN + E]** Command flight to execute the mission and return to base.
- **[LWIN + R]** Command flight to execute the mission and rejoin.
- **[LWIN + T]** Command flight to open/close the formation.
- **[LWIN + Y]** Command flight to rejoin the formation.

Realistic Radio Communications

When playing with realistic radio comms enabled, the radio menu is displayed by pressing the PTT (Push to Talk) button **[RAlt + \]** located on the throttle.

The recipient list is displayed without color coding and without showing the correct frequencies. This is a more realistic play mode that requires you to know and tune the proper frequency for each recipient.

Radio Communications Window

Top Level Recipient List:

If using "Easy Communications", recipients not present in the mission will not be listed.

F1. Wingman...
F2. Flight...
F3. Second Element...
F5. ATC...
F8. Ground Crew...
F10. Other...
F12. Exit

Hotkeys can also be bound to issue any command within the menu hierarchy. Those hotkeys can be found in Input Options.

To exit radio communications, you can also press the **[Esc]** key.

F1 Wingman

Upon selecting **F1 Wingman** from the main radio communications menu, you are presented with top-level categories of orders you can issue to your wingmen. These are:

F1. Navigation...
F2. Engage...
F3. Engage with...
F4. Maneuvers...
F5. Rejoin Formation
F11. Previous Menu
F12. Exit

F1 Navigation...

These commands direct your wingmen to fly to different locations.

F1. Anchor Here. Your wingman will orbit at its current location until you issue another Navigation command.
F2. Return to Base. Your wingman will return to and land at the destination airbase set in the flight plan.
F11. Previous Menu
F12. Exit

F2 Engage...

These commands direct your wingman to attack a specific target types. After issuing the order, the wingman will attempt to locate the specified target type and attack it.

F1. Engage Ground Targets. Wingman will attack any enemy ground unit it can locate.
F2. Engage Armor. Wingman will attack any tanks, infantry fighting vehicles (IFV), and armored personnel carriers (APC) it can locate.
F3. Engage Artillery. Wingman will attack any tube artillery or multiple rocket launchers (MRLS) that it can locate.
F4. Engage Air Defenses. Wingman will attack any enemy anti-aircraft artillery and surface to air missile units that it can locate.

F5. Engage Utility Vehicles. Wingman will attack any supply, transport, fuel, power generation, command and control, and engineering units it can locate.
F6. Engage Infantry. Wingman will attack hostile infantry units. Note that the infantry units are very difficult to detect unless they are moving or firing weapons.
F7. Engage Ships. Wingman will engage enemy ships. Note that most naval targets are heavily armed and pose a heavy threat to the Mosquito.
F8. Engage Bandits. Wingman will engage any enemy fixed-wing and rotary-wing aircraft it can locate.
F11. Previous Menu
F12. Exit

F3 Engage With…

Whereas the **F2 Engage** commands are basic orders for your wingman to attack a target type, the **F3 Engage With** commands not only allow you to specify target type, but also the direction of attack and what weapon to use. This is done in a tiered manner by first selecting target type, then weapon type, and finally the attack heading. The wingman will then attempt to locate targets of the specified type and attack them according to your parameters. While the **F2 Engage** options are fast to issue, the **F3 Engage With** orders provide much greater control.

Target Type. These options mirror those of the **F2 Engage** orders and allow you to determine the type of ground target you want your wingman to engage.

F1. Engage Ground Targets. Wingman will attack any enemy ground unit it can locate.
F2. Engage Armor. Wingman will attack any tanks, infantry fighting vehicles, and armored personnel carriers it can locate.
F3. Engage Artillery. Wingman will attack any tube artillery or multiple rocket launchers that it can locate.
F4. Engage Air Defenses. Wingman will attack enemy anti-aircraft artillery and surface to air missile units that it can locate.
F5. Engage Utility Vehicles. Wingman will attack any supply, transport, fuel, power generation, command and control, and engineering units it can locate.
F6. Engage Infantry. Wingman will attack hostile infantry units. Note that the infantry units are very difficult to detect unless they are moving or firing weapons.
F7. Engage Ships. Wingman will engage enemy ships. Note that most naval targets are heavily armed and pose a heavy threat to the Mosquito.

Weapon Type. Once you have selected the target type, you will be given a list of weapon types that you want your wingman to engage the target with. These include:

F2. Unguided Bomb…
F4. Rocket…
F6. Gun…

Attack Heading. After you've selected the weapon your wingman should employ, the final step is to determine the attack heading that you wish your wingman to use. This can be useful to help it avoid overflying enemy defenses. The options include:

F1. Default. Wingman will use the most direct heading to attack the target.
F2. North. Wingman will attack the target from south to north.

F3. South. Wingman will attack the target from north to south.
F4. East. Wingman will attack the target from west to east.
F5. West. Wingman will attack the target from east to west.

F4 Maneuvers…

Although your wingman will generally do a good job of reacting to threats and maneuvering for attacks, there may be times when you want to have it fly a specific maneuver. This could be in response to a threat (fire from enemy anti-air defenses or fighter aircraft) or to better set up an attack.

F1. Break Right. This command will order your wingman to make a maximum-g break to the right.
F2. Break Left. This command will order your wingman to make a maximum-g break to the left.
F3. Break High. This command will order your wingman to make a maximum-g break high.
F4. Break Low. This command will order your wingman to make a maximum-g break low.
F7. Clear Right. Your wingman will perform a 360° turn to the right of the current flight path while searching for targets.
F8. Clear Left. Your wingman will perform a 360° turn to the left of the current flight path while searching for targets.
F9. Pump. Your wingman will perform a 180° turn from its current heading and fly 10 nautical miles in the opposite direction. Then it will fly another 180° turn to return to its original heading.

F5 Rejoin Formation

Issuing this command will instruct your wingman to cease its current task and rejoin formation with you.

F2 Flight

Upon selecting **F2 Flight** from the main radio communications menu, you are presented with top-level categories of orders you can issue to your entire flight. These are:

F1. Navigation…
F2. Engage…
F3. Engage with…
F4. Maneuvers…
F5. Formation
F6. Rejoin Formation
F11. Previous Menu
F12. Exit

F1 Navigation…

These orders direct your flight to fly to navigate to specific locations.

F1. Anchor Here
F2. Return to Base
F11. Previous Menu
F12. Exit

These orders are identical to their counterparts under **F1 Wingman**.

F2 Engage…

These commands direct your flight to attack a specific target types. After issuing the order, the flight will attempt to locate the specified target type and attack it.

F1. Engage Ground Target
F2. Engage Armor
F3. Engage Artillery
F4. Engage Air Defenses
F5. Engage Utility Vehicles
F6. Engage Infantry
F7. Engage Ships
F8. Engage Bandits
F11. Previous Menu
F12. Exit

These orders are identical to their counterparts under **F1 Wingman**.

F3 Engage With…

These orders are identical to their counterparts under **F1 Wingman**. See that section for a description of the commands under this menu.

F4 Maneuvers…

F1. Break Right
F2. Break Left
F3. Break High
F4. Break Low
F7. Clear Right
F8. Clear Left
F9. Pump
F11. Previous Menu
F12. Exit

These orders are identical to their counterparts under **F1 Wingman**.

F5 Formation

These orders allow you to set the flight's formation, with you as the lead ship.

F1. Go Line Abreast
F2. Go Trail
F3. Go Wedge
F4. Go Echelon Right
F5. Go Echelon Left
F6. Go Finger Four
F7. Go Spread Four
F8. Open Formation
F9. Close Formation

F11. Previous Menu
F12. Exit

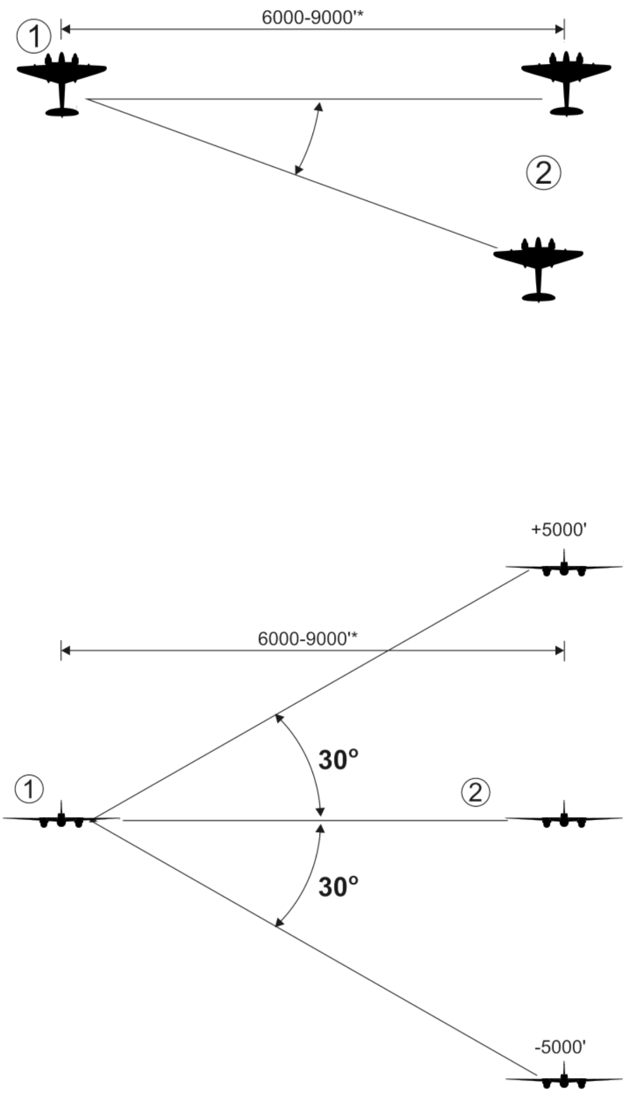


Figure 117: F1. Go Line Abreast

Figure 118: F2. Go Trail. Spacing may be modified by flight lead within a 5,000 foot to 2 NM range.

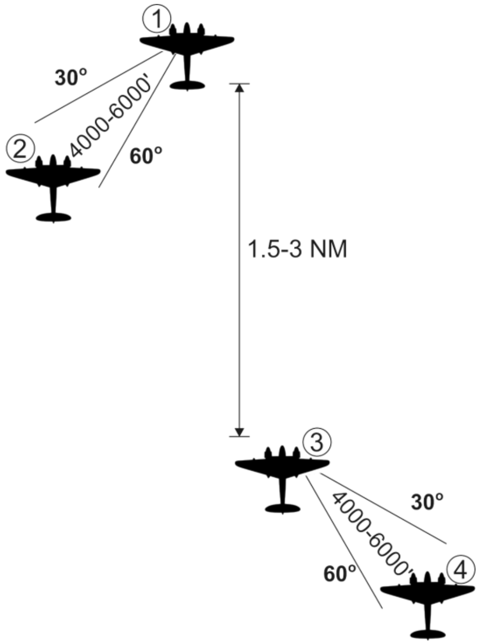


Figure 119: F3. Go Wedge

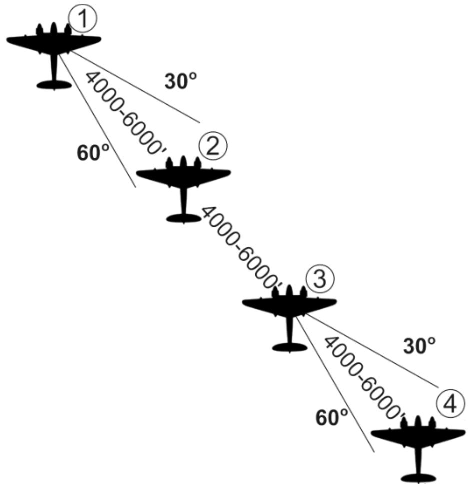


Figure 120: F4. Go Echelon Right

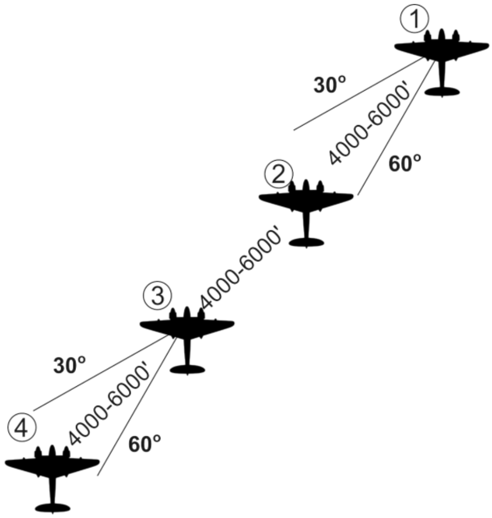


Figure 121: F5. Go Echelon Left

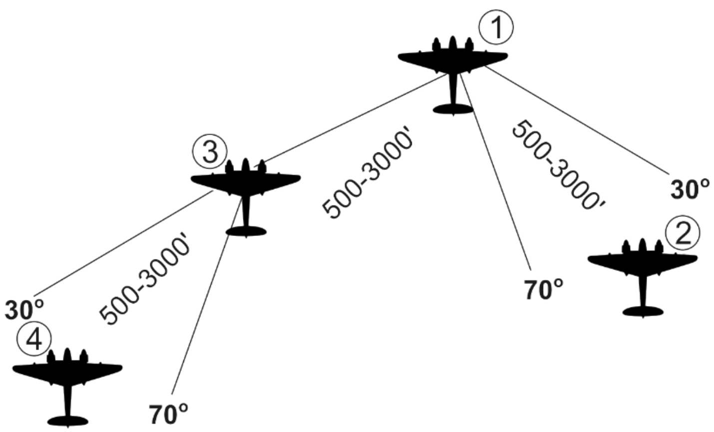


Figure 122: F6. Go Finger Four

Position may be modified within a 1500-4000m envelope by flight lead

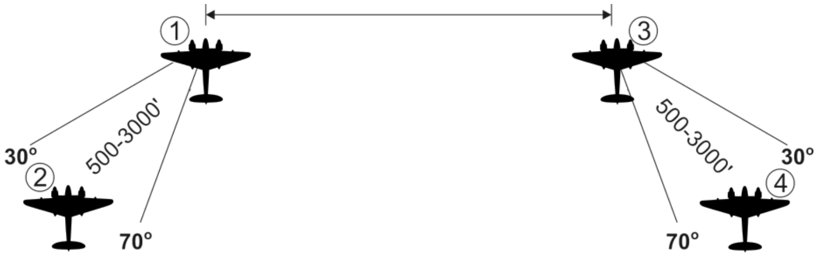


Figure 123: F7. Go Spread Four. Spacing may be modified by flight lead within a 5,000 foot to 2 NM range.

F8. Open Formation. Increase the spacing between each aircraft in the current formation.
F9. Close Formation. Decrease the spacing between each aircraft in the current formation.
F6. Rejoin Formation. Issuing this command will instruct your flight to cease their current task and rejoin formation with you.

Flight Member Responses

After sending an order to any of your flight members, you will receiving one of two responses:

[Dash number], acknowledged. When a flight member will carry out the order, it will respond with its dash number and "acknowledged" (e.g., "2, acknowledged" for the second aircraft).

[Dash number] unable. When a flight member cannot carry out the order, it will respond with its dash number and "unable" (e.g., "2, unable").

F5 Air Traffic Control (ATC)

These commands are used to request clearance from ATC for engine start, taxi, takeoff, approach, and landing.

The ATC system in DCS is context-sensitive to your location on the airbase: on the ramp, at the runway, or airborne. ATC will only function at an airbase if the required facilities are present and undamaged (e.g., there will be no ATC at airbases where the control tower is destroyed).

Starting from the ramp

Before you can establish communications with ATC and get clearance to start your engine, you must first have your radio powered and on. When power has been applied and the radio is on, press **[\]** or **[RALT + \]** to bring up the radio menu and then press **F1 Request Engine Start**.

If you are part of a flight, your other flight members will also start their engines.

After the aircraft has been started and configured, select **F1 Request Taxi to Runway**. Once you receive permission, you can taxi to the hold-short bars just short of the runway entrance.

If you are part of a flight, your other flight members will follow you to the runway.

When at the hold-short bars, press **[\]** or **[RAlt + \]** and **F1 Request Takeoff**. When clearance is received, you can taxi on to the runway and takeoff.

Air Start and Landing

If you are not starting from the parking ramp, you can access ATC by pressing the **[\]** or [RAlt + \] key. Upon doing so, you can select **F5 ATC**.

If you are using Easy Communications, a list of airbases will be shown along with their contact frequencies. Select the airbase you wish to contact. If not using Easy Communications, you will first need to manually set the proper ATC frequency.

Once the airfield ATC is selected, you can either send them an **Inbound** message to indicate that you intend to land there, or a **Request Azimuth** message to receive guidance to the airfield.

When you select **Inbound**, the ATC will respond with the following information:

- The heading to fly to the initial approach point.
- Range to the initial approach point.
- The QFE, or atmospheric pressure at the airfield. Setting this value in your altimeter's Kollsman window will cause your altimeter to indicate altitude above field elevation (AFE).
- Which runway is active.

Upon reaching the initial approach point (from the 5-km control radius), the ATC will transmit "contact tower." After this message, the pilot must respond with **Request Landing** to receive landing clearance. If the pilot does not intend to land at the airfield, they should respond with **Abort Landing**.

If the runway is clear, ATC then issues a landing clearance and reports the runway heading as well as the direction and speed of the surface winds. If the runway is occupied, ATC will deny landing clearance and issue an order to go around.

Calling **Request Azimuth** instructs ATC to use their direction-finding equipment to issue you a bearing to the airport. This is typically used when a loss of navigation instruments leaves the pilot unable to locate the airport normally, especially when flying at night or in adverse conditions.

After landing, you may taxi to the ramp and shut down the aircraft.

F6 Ground Crew

After landing at a friendly airfield and taxiing to a ramp area, you can communicate with the ground crew to rearm and refuel by pressing **F6 Ground Crew**. Ground crew commands include the rearm/refuel window and connecting/disconnecting ground power.

Additions

LIST OF TERMS AND ABBRIVATIONS

%Q	Percent Torque
AC	Alternating Current
ACB	Automatic Circuit Breaker
ADF	Automatic Direction Finder
AGL	Above Ground Level
Ah	Ampere x hour
AI	Artificial Intelligence
ALT	Alternator
ALT	Altitude/Altimeter
ALTM	Altimeter
AM	Amplitude Modulation
AMP	Ampere
ANT	Antenna
ATTD	Attitude
AUTO	Automatic
AUX	Auxiliary
AVGAS	Aviation Gasoline
BAT	Battery
BDHI	Bearing Distance Heading Indicator
BFO	Beat Frequency Oscillator
BL	Butt Line
BRIL	Brilliance
BRT	Bright
C	Celsius
CARR	Carrier
CAS	Callibrated airspeed

CCW	Counter Clockwise
CDI	Course Deviation Indicator
CG	Center of Gravity
CL	Centerline
CMPS	Compass
CNVTR	Converter
COLL	Collision
COMM	Communication
COMPT	Compartment
CONT	Control
CONT	Continuous
CONV	Converter
CW	Clockwise
DC	Direct Current
DCP	Dispenser Control Panel
DECR	Decrease
deg	degree
DELTA A	Incremental Change
DET	Detector
DF	Direction Finding
DG	Directional Gyro
DIS	Disable
DISP	Dispense
DSCRM	Discriminator
ECM	Electronic Countermeasures
EGT	Exhaust Gas Temperature
ELEC	Electrical
EMER	Emergency
END	Endurance
ENG	Engine
ESS	Essential

EXH	Exhaust
EXT	Extend
EXT	Exterior
F	Fahrenheit
FAT	Free Air Temperature
FCU	Fuel Control Unit
FITG	Fitting
FM	Frequency Modulation
FOD	Foreign Object Damage
fpm	feet per minute
FPS	Feet per Second, or Frame per Second
FREQ	Frequency
FS	Fuselage Station
ft	feet
ft/min	Feet per minute
ft-in	Feet & inches
FUS	Fuselage
FWD	Forward
G	Gravity
gal	Gallon
GD	Guard
GEN	Generator
GND	Ground
GOV	Governor
GPU	Ground Power Unit
GRWT	Gross Weight
GW	Gross Weight
HDG	Heading
HF	High Frequency
HIT	Health Indicator Test
HTR	Heater

HVAR	High Velocity Aircraft Rocket
HYD	Hydraulic
Hz	Herz
IAS	Indicated Airspeed
ICS	Interphone Control Station
IDENT	Identification
IFF	Identification Friend or Foe
IGE	In Ground Effect
in	Inch
INCR	Increase
IND	Indication/Indicator
INHG	Inches of Mercury
INOP	Inoperative
INST	Instrument
INT	Internal
INT	Interphone
INV	Inverter
INVTR	Inverter
IR	Infrared
IRT	Indicator Receiver Transmitter
ISA	International Standard Atmosphere
KCAS	Knots Calibrated Airspeed
kHz	Kilohertz
KIAS	Knots Indicated Airspeed
km	Kilometer
kN	Kilonewton
knots	Nautical Miles per Hour
kp	Kilogram-force
KTAS	Knots True Airspeed
kVA	Kilovolt-Ampere
kW	kiloWatt

kW	Kilowatt
L	Left
LABS	Low-altitude Bombing System
lbf	pound-force
lbs	Pounds
LClick	Left (button) Click Mouse
LDG	Landing
LH	Left Hand
LSB	Lower Sideband
LT	Lights
LTG	Lighting
LTS	Lights
MAG	Magnetic
MAN	Manual
MAX	Maximum
MED	Medium
MHF	Medium-High Frequency
MHz	Megahertz
MIC	Microphone
mil	millirad, 1\6400 part of a circle
MIN	Minimum
MIN	Minute
MISC	Miscellaneous
mm	Millimeter
MON	Monitor
MPC	Manual Pip Control
MWO	Modification Work Order
N1	Gas Turbine Speed
N2	Power Turbine Speed
NAV	Navigation
NET	Network

NM	Nautical Mile
nm	Nautical Mile
NO	Number
NON-ESS	Non-Essential
NON-SEC	Non-Secure
NORM	Normal
NR	Gas Turbine Speed
NVG	Night Vision Goggles
OGE	Out of Ground Effect
PED	Pedestal
PLT	Pilot
pph	Pounds per Hour
PRESS	Pressure
PRGM	Program
psi	Pounds per Square Inch
PVT	Private
PWR	Power
QTY	Quantity
R	Right
R/C	Rate of Climb
R/D	Rate of Descent
RClick	Right (button) Click Mouse
RCVR	Receiver
RDR	Radar
RDS	Rounds
REL	Release
REM	Remote
RETR	Retract
RETRAN	Retransmission
RF	Radio Frequency
RH	Right Hand

RI	Remote Height Indicator
RPM	Revolutions per Minute
SAM	Surface to Air Missile
SEC	Secondary
SEC	Secure
SEL	Select
SENS	Sensitivity
SL	Searchlight
SOL	Solenoid
SQ	Squelch
SQFT	Square Feet
SSB	Single Sideband
STA	Station
STBY	Standby
T/R	Transmit-Receive
TAS	True Airspeed
TEMP	Temperature
TGT	Turbine Gas Temperature
TRANS	Transfer
TRANS	Transformer
TRANS	Transmitter
TRQ	Torque
UHF	Ultra-High Frequency
USB	Upper Sideband
V	Volt
VAC	Volts, Alternating Current
VDC	Volts, Direct Current
VHF	Very High Frequency
VM	Volt Meter
VNE	Velocity, Never Exceed (Airspeed)
VOL	Volume

VOR	VHF Omni Directional Range
WL	Water line
WPN	Weapon
XCVR	Transceiver
XMIT	Transmit
XMSN	Transmission
XMTR	Transmitter
ΔF	Increment of Equivalent Flat Plate Drag Area

Metric to Imperial Conversion

Distances

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 in
1 meter = 10 decimeters = 39.37 in
1 decameter = 10 meters = 32.8 ft
1 hectometer = 10 decameters = 328.08 ft
1 kilometer = 10 hectometers = 3,280.8 ft

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Volumes

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 decaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Areas

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. in
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. ft
1 sq. decameter (are) = 100 sq. meters = 1,076.4 sq. ft
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Volumes

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. in
1 cu. meter = 1000 cu. decimeters = 35.31 cu. ft

Conversion Factors

FROM	TO	FACTOR
in	centimeters	2.540
ft	meters	.305
yards	meters	.914
miles	kilometers	1.609
knots	km/h	1.852
square in	square centimeters	6.451
square ft	square meters	.093
square yards	square meters	.836
square miles	square kilometers	2.590
acres	square hectometers	.405
cubic ft	cubic meters	.028
cubic yards	cubic meters	.765
fluid ounces	milliliters	29,573
pints	liters	.473
quarts	liters	.946
gallons	liters	3.785
ounces	grams	28.349
pounds	kilograms	.454
short tons	metric tons	.907
pound-ft	Newton-meters	1.356
pound-in	Newton-meters	.11296
ounce-in	Newton-meters	.007062
centimeters	in	.394
meters	ft	3.280
meters	yards	1.094
kilometers	miles	.621
km/h	knots	0.54
square centimeters	square in	.155
square meters	square ft	10.764
square meters	square yards	1.196
square kilometers	square miles	.386
square hectometers	acres	2.471
cubic meters	cubic ft	35.315
cubic meters	cubic yards	1.308
milliliters	fluid ounces	.034
liters	pints	2.113
liters	quarts	1.057

FROM	TO	FACTOR
liters	gallons	.264
grams	ounces	.035
kilograms	pounds	2.205
metric tons	short tons	1.102

Airbase Data

AIRFIELD	RUNWAY	TACAN CHANNEL	ILS	TOWER COMM FREQUENCIES, MHZ
UG23 Gudauta - Bambora (Abkhazia)	15-33, 2500m			130.0/40.20/209.00
UG24 Tbilisi - Soganlug (Georgia)	14-32, 2400m			139.0/42.0/218.0
UG27 Vaziani (Georgia)	14-32, 2500m	22X (VAS)	108.75	140.0/42.20/219.0
UG5X Kobuleti (Georgia)	07-25, 2400m	67X (KBL)	07 ILS - 111.5	133.0/40.80/212.0
UGKO Kutaisi - Kopitnari (Georgia)	08-26, 2500m	44X (KTS)	08 ILS - 109.75	134.0/41.0/213.0
UGKS Senaki - Kolkhi (Georgia)	09-27, 2400m	31X (TSK)	09 ILS - 108.9	132.0/40.60/211.0
UGSB Batumi (Georgia)	13-31, 2400m	16X (BTM)	13 ILS - 110.3	131.0/40.40/210.0
UGSS Sukhumi - Babushara (Abkhazia)	12-30, 2500m			129.0/40.0/208.0
UGTB Tbilisi - Lochini (Georgia)	13-31, 3000m		13 ILS - 110.3 31 ILS - 108.9	138.0/41.80/217.0
URKA Anapa - Vityazevo (Russia)	04-22, 2900m			121.0/38.40/200.0
URKG Gelendzhik (Russia)	04-22, 1800m			126.0/39.40/205.0

AIRFIELD	RUNWAY	TACAN CHANNEL	ILS	TOWER COMM FREQUENCIES, MHZ
URKH Maykop - Khanskaya (Russia)	04-22, 3200m			125.0/39.20/204.0
URKI Krasnodar - Center (Russia)	09-27, 2500m			122.0/38.60/201.0
URKK Krasnodar - Pashkovsky (Russia)	05-23, 3100m			128.0/39.80/207.0
URKN Novorossiysk (Russia)	04-22, 1780m			123.0/38.80/202.0
URKW Krymsk (Russia)	04-22, 2600m			124.0/39.0/203.0
URMM Mineralnye Vody (Russia)	12-30, 3900m		12 ILS - 111.7 30 ILS - 109.3	135.0/41.20/214.0
URMN Nalchik (Russia)	06-24, 2300m		24 ILS - 110.5	136.0/41.40/215.0
URMO Beslan (Russia)	10-28, 3000m		10 ILS - 110.5	141.0/42.40/220.0
URSS Sochi - Adler (Russia)	06-24, 3100m		06 ILS - 111.1	127.0/39.60/206.0
XRMF Mozdok (Russia)	08-27, 3100m			137.0/41.60/216.0

AIRFIELD	RUNWAY	TACAN, CHANNEL	ILS	TOWER COMM FREQUENCIES, MHZ
KXTA Groom Lake AFB (USA)	14L-32R 3500 m	18X (GRL)	32 ILS - 109.30 (GLRI)	252.0/123.0/38.8
KINS Creech AFB (USA)	13-31 1500 m, 08-27 2700 m	87X (INS)	13 ILS - 108.5 (ICRS)	251.0/122.0/38.6
KLSV Nellis AFB (USA)	03L-21R 3000 m, 03R-21L 3000 m	12X (LSV)		254.0/125.0/39.2
KLAS McCarran International (USA)	07R-25L 3100 m, 07L-25R 3300 m 01L-19R 2500 m, 01R-19L 2500 m	116X (LAS)	25 ILS – 111.75 (IRLE)	253.0/124.0/39.0

Credits

Executive Board

Nick Grey	Project Head, Director of The Fighter Collection
Igor Tishin	Director of Eagle Dynamics (Russia)
Katarina Perederko	Director of Eagle Dynamics (Russia)
Sergei Gerasev	Project Manager
Andrei Chizh	Development Assistant & QA Manager, Producer, Technical Documentation
Matt “Wags” Wagner	Executive Producer, Game and Technical Documentation, Game Design
Matthias “Groove” Techmanski	Global Localization Manager

Programmers

Alexander Oykin	Senior Programmer
Roman "Made Dragon" Deniskin	Aircraft Settings, Aircraft Systems and Flight Models
Dmitry "Yo-Yo" Moskalenko	Mathematical Models: Dynamics, Systems, and Ballistics
Maksim Zelensky	Aircraft, Aircraft AI, Flight and Damage Models
Dmitry Baikov	Systems, Multiplayer, Sound Engine

Designers

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Yevgeniy "GK" Khizhnyak	Aircraft, Vehicles
Alexander "Skylark" Drannikov	GUI, Graphics, Aircraft

Sound

Konstantin "btd" Kuznetsov	Sound Director, Composer

Quality Control

Valery "USSR_Rik" Khomenok	Lead Tester
Alexander "BillyCrusher" Biliyevsky	Tester

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Additional aircraft skins

Greg “Reflected” Gale

Latart

C-TE-B

Dominic “CHSubZero‟ Wirth

Mike “MJDixon” Dixon

Oliver “golani79” Hoelzl

Anthony “JG13~Wulf” Francois

Marc “Laz” Lloyd

DaveyWaveyBoo

Mibburo