

AEROPLANE HEAVEN



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SPITFIRE

Prototype THE EARLY YEARS MkI

A HIGH DEFINITION SIMULATION OF THE SUPERMARINE SPITFIRE PROTOTYPE AND EARLY MkI FOR MICROSOFT FLIGHT SIMULATOR 2020

COCKPIT GUIDE & FLYING NOTES

Introduction.
In this simulation we have endeavoured to capture the Spitfire as it was in perhaps its most important phase of development- the early years of WW2.

We begin with the Prototype as it was rolled out of the factory and first flown at Eastleigh in 1936 and end with the Mk1A “standard” production Spitfire which fought alongside that other venerable fighter, the Hawker Hurricane, in the Battle of Britain. The Prototype.

On the morning of the 5th of March, 1936, at Eastleigh aerodrome in England, the big V12 Rolls Royce Merlin of Spitfire prototype K5054 roared as Capt. Joseph “Mutt” Summers opened the throttle of Reginald Mitchell’s inspired design and took off into a 35 degree crosswind. Thus began a love affair between pilot and aeroplane that would last for the next 70 years and more.

The prototype airframe was unpainted save for a coat of yellow/green primer on parts of the fuselage and wings. This remains a much disputed area as it is actually unclear just how the airframe was finished except for a few references such as Jeffrey Quill’s recollection that it was in “Works finish.. that is to say it was unpainted except for its primer coats...” The landing gear was locked down and carried no spats or covers. There was a simple curved plexiglass windscreen and flat-topped canopy. The airframe was fitted with a basic tailskid and carried no armament or radio equipment.

In the cockpit most items appeared as they would throughout the production life of the Spitfire. There was a large tachometer and oil gauge in front of the pilot for testing purposes but the basic layout was to remain unchanged for the life of the type.

After making his first and perfect three-point landing, Summers was reputedly heard to say “leave everything as it is” others have recorded his words as “touch nothing”. Whatever he did say passed into Spitfire legend. Those that can recollect or retell the story believe that actually what happened was that he left the aircraft (probably for a comfort stop!) and simply asked that nothing be touched until he got back. History, rather apocryphally records it as meaning that the design was perfect and that no further work was required.

In reality, the prototype was to be steadily upgraded with a broad range of improvements, alterations and additions over the course of its career.

The aircraft appeared at the Hendon Air pageant in June, dressed overall in a blue/grey gloss finish, sporting a set of folding wheel spats and oleo covers and it was around this time that the wings were first fitted with the famous eight-gun package of Browning 030 machine guns that were to be the nemesis of so many enemy aircraft in the dogfights of the Battle of Britain.

By the time the first production Spitfires were being delivered to RAF squadrons, K5054, now finished in the new camouflage scheme designed for all RAF fighters, fell victim to an accidental crash on the 4th September 1939 and was written off.

The Early Mk1
The first production Spitfires were delivered to 19 Squadron RAF in early 1938. These early models were powered by the RR Merlin II, developing 1020hp and turning a fixed-pitch wooden two-blade Watts propeller.

These airframes had no armour protection for the pilot, simple single-pane Perspex windscreens and the flat top canopy of the prototype. The landing gear was manually operated by a long “wand”-like lever used to pump the hydraulic system. Nervous or novice pilots inevitably wrapped their knuckles on the cockpit side as they furiously pumped the lever. This resulted in a condition known as “Spitfire knuckle”.

Eight Browning machine guns were fitted in the wings and aligned to converge on a single fixed point ahead of the aircraft. This created a murderous concentration of fire and little would survive a direct hit from a skilful Spitfire pilot. Some more experienced pilots had the guns of their machines trained to converge at less than 200 yards to be sure of a “kill”.

It was in this form that the Spitfire, along with the Hawker Hurricane, was to embark with the British Expeditionary Force to France to repel the German invasion of that country. The history of this period is well-documented and needs no coverage here except to say that together with the RAF ‘s other frontline fighter , the Hurricane, the Spitfires acquitted themselves with great honour and many future “Spitfire aces” cut their teeth in the skies above the French countryside. Some fell in battle too and several were to force land or crash on the beaches of Normandy and Dunkirk in the dark days leading up to the Battle of Britain.

In the months leading up to the fall of France, Supermarine designers and engineers were using the priceless pilots’ reports and experiences to further develop the Spitfire design and thankfully, in time for the Battle of Britain, the Spitfire had evolved considerably into a potent and sophisticated fighting machine.

The Spitfire Mk1A
After the evacuation of Dunkirk, a vast amount of energy was put into the improvement of the Spitfire. To battle the coming storm of enemy attacks would require competent machines not only capable of shooting down the bomber hordes but also their fighter escorts. Swarms of highly manoeuvrable Messerschmitt BF109s that could outpace the best frontline fighters of the RAF.

The Hawker Hurricane was to prove more than competent in destroying enemy bombers but lacked the performance and agility of the German fighters, especially at higher altitudes. That said, we must re-state that it was the Hurricane that was responsible for the lion’s share of “kills” in the Battle of Britain.

The Spitfire was able to match the Messerschmitt s at higher altitudes. The speed of the Spitfire meant that ground controllers could vector large numbers of aircraft to given rendezvous points in time to climb to altitude and therefore get the ‘drop’ on the enemy.

By now the airframe was fitted with thick-plate armour for the pilot, armour-plated glass windscreens and a new “bubble” canopy for increased visibility and headroom.

Up front, an improved Merlin engine developed 1030hp and turned a variable pitch, metal three-bladed Hamilton or Rotol propeller. Electric-powered, reflector gunsights replaced the antiquated “ring and bead” arrangements of the earlier models and other improvements like IFF and more powerful radios made flying the Spitfire a safer, more secure process. Airframes were rolling off the production lines daily and replacement aircraft were plentiful – it was the lack of trained, experienced pilots that represented the biggest challenge for Air Marshall Hugh Dowding in the coming summer months of 1940.

SUPERMARINE SPITFIRE PROTOTYPE	
Specifications:	
Wingspan:	37 ft 8 in
Wing Area:	242 sq ft
Length:	29 ft 11 in
Height:	8 ft 2 ½ in
Weight:	5332 lbs (*take-off)
Powerplant:	Rolls Royce Merlin II: 990 bhp @ 12,000 ft. Max. 1,050 @ 16,000ft and 3,000 RPM, 7 lb boost.
Propeller:	Watts wooden 2-blade fixed pitch
Armament:	None
Performance:	
Maximum speed:	349 mph @ 16,800 ft.
Cruise speed:	Maximum 311 mph @ 15,000 (160mph for economy)
Climb speed:	2,530ft./min.
Range:	395 miles
Service ceiling:	35,400 ft.
Time to 30,000 ft.:	17 minutes

SUPERMARINE SPITFIRE MK1 (EARLY)		SUPERMARINE SPITFIRE Mk1A	
Specifications:		Specifications:	
Wingspan:	37 ft 8 in	Wingspan:	37 ft 8 in
Wing Area:	242 sq ft	Wing Area:	242 sq ft
Length:	29 ft 11 in	Length:	29 ft 11 in
Height:	8 ft 2 ½ in	Height:	8 ft 2 ½ in
Weight:	5,875 lbs (*take-off)	Weight:	5,875 lbs (*take-off)
Powerplant:	Rolls Royce Merlin II: 990 bhp @ 12,000 ft. Max. 1,050 @ 16,000 ft and 3,000 RPM, 7 lb boost.	Powerplant:	Rolls Royce Merlin III: 1030 bhp @ 12,000 ft. Max. 1,060 @ 16,000 ft and 3,000 RPM, 7 lb boost.
Propeller:	Watts wooden 2-blade fixed pitch	Propeller:	de Havilland or Rotol 3-blade constant-speed
Armament:	8 x Browning .303 calibre machine guns, 4 per wing.	Armament:	8 x Browning .303 calibre machine guns, 4 per wing.
Performance:		Performance:	
Maximum speed:	362 mph @ 18,500 ft.	Maximum speed:	363 mph @ 18,500 ft.
Cruise speed:	Maximum 318 mph @ 15,000 (160mph for economy)	Cruise speed:	Maximum 210 mph @ 15,000 (160mph for economy)
Climb speed:	2,530ft./min.	Climb speed:	2,530ft./min.
Range:	395 miles	Range:	575 miles (combat- 395 miles)
Service ceiling:	31,900 ft.	Service ceiling:	31,900 ft.
Time to 30,000 ft.:	22 minutes 25secs	Time to 30,000 ft. :	22 minutes 25 secs

In this guide we will take you through all the necessary steps needed to fly a Spitfire, point out some of the design’s unique features and get you as close as possible to feeling what it would have been like to fly this incredible aeroplane.



K5054 was rolled out for its first flight with undercarriage locked down and no gear-leg fairings or spats.



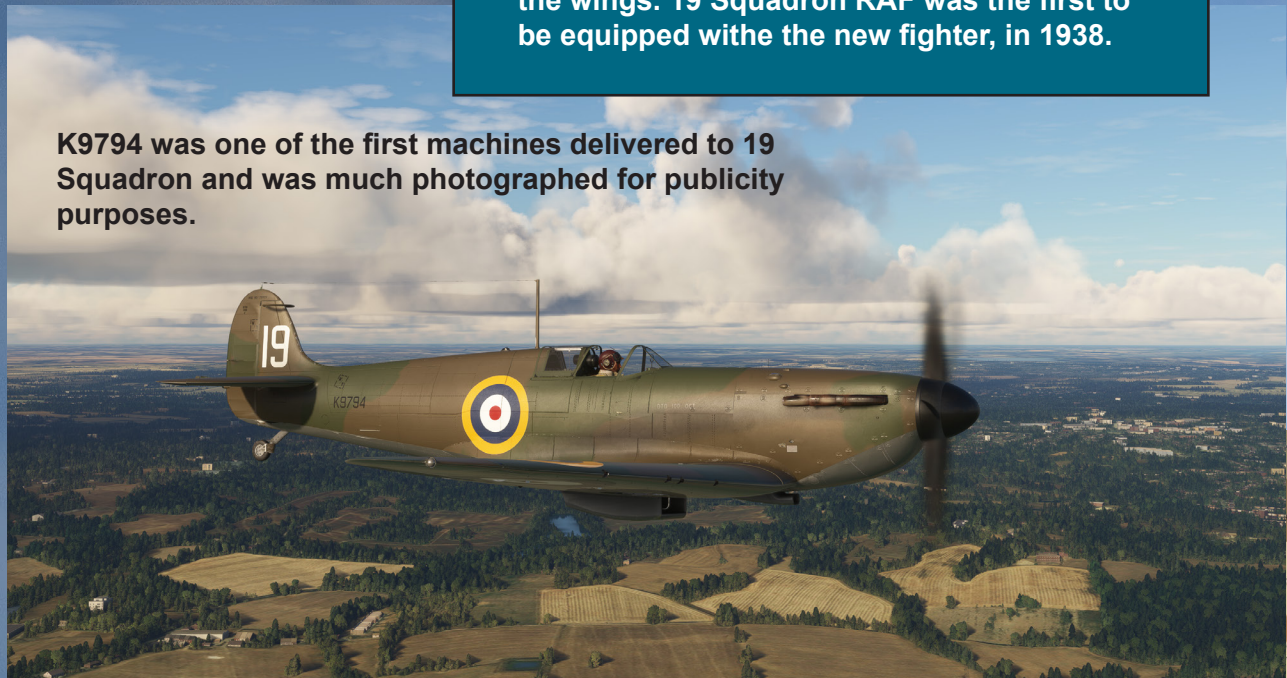
In this simulation you have a choice of flying the Prototype as she would have appeared at factory roll-out and first flight in March, 1936 or in overall grey/blue finish first seen at the Hendon Air Pageant in 1937.

Colour schemes for the Prototype are a matter of keen debate as no known colour photographs exist and only the memories of people involved at the time, remain.



Early on, there were no red/white/blue fin flashes and many machines carried no registration numbers. As the RAF camouflage schemes evolved, undersides went from all-over silver to the standard black/white or day/night pattern.

The Early Mk1 is recognised by a distinctive "parachute guard" attached to the fin and of course, the eight Browning machine guns in the wings. 19 Squadron RAF was the first to be equipped with the new fighter, in 1938.

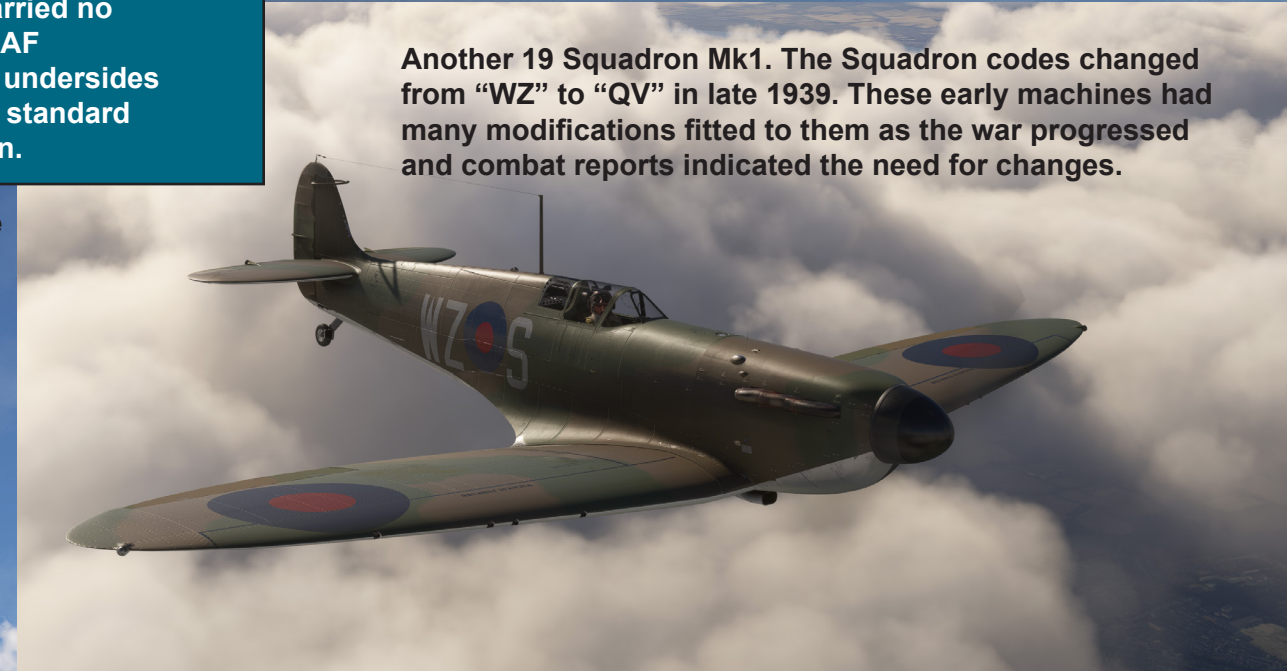


K9794 was one of the first machines delivered to 19 Squadron and was much photographed for publicity purposes.

K9938 was on charge with 72 Squadron in 1939. This Spitfire was later shot down during the Battle of Britain, crashing at Herne Bay. The pilot, Sgt. Norman Robert Norfolk bailed out, unharmed and went on to become a Battle of Britain ace.



Another 19 Squadron Mk1. The Squadron codes changed from "WZ" to "QV" in late 1939. These early machines had many modifications fitted to them as the war progressed and combat reports indicated the need for changes.



Although perhaps bewildering at first, you will find the cockpit of a Spitfire is actually laid out in a very logical manner with everything to hand.

It's a snug fit in here - as the saying goes, you don't sit in a Spitfire, you put one on.

There are three main areas of the cockpit which need to be studied in order for you to operate your aeroplane correctly and feel "at home"
These are: 1. Pilot Panel
2. Left Cockpit
3. Right Cockpit

All three cockpits in this simulation differ in detail. So we have provided detailed guides for each.

The Spitfire cockpit.

The Prototype.

RE-FUELLING SWITCH 32.

PUSHING THIS BUTTON WILL TOGGLE THE AEC BOWSER TRUCK AND RE-FUEL YOUR AIRCRAFT.

Pilot Panel

1. Airspeed Indicator

2. Flap Position Indicator

3. Vertical Speed (VSI)

4. Altimeter

5. Magnetic Compass

6. Turn/Slip

7. Nav lights

8. Flaps

9. .Battery Volts

10. Generator Amps

11. Generator Switch

12. Tachometer

13. Trim indicator

14. Landing Gear Indicator

15. Engine Magnetos

16. Clock with trip hands
17. Fuel Pressure

18. Oil Pressure

19. Oil Temperature

20. Coolant Radiator Temperature

21. Starting Magneto Switch

22. Fuel Gauges

23. Fuel Gauge Push-buttons

24. Engine Primer

25. Fuel Pressure cock

26. Fuel Tank cocks

27. Engine Starter

28. Cockpit torch switches

29. Oxygen Sub-panel

30. Boost Gauge

31. Pneumatics Gauge

32. Refuelling Switch

33. Outside Air Temperature

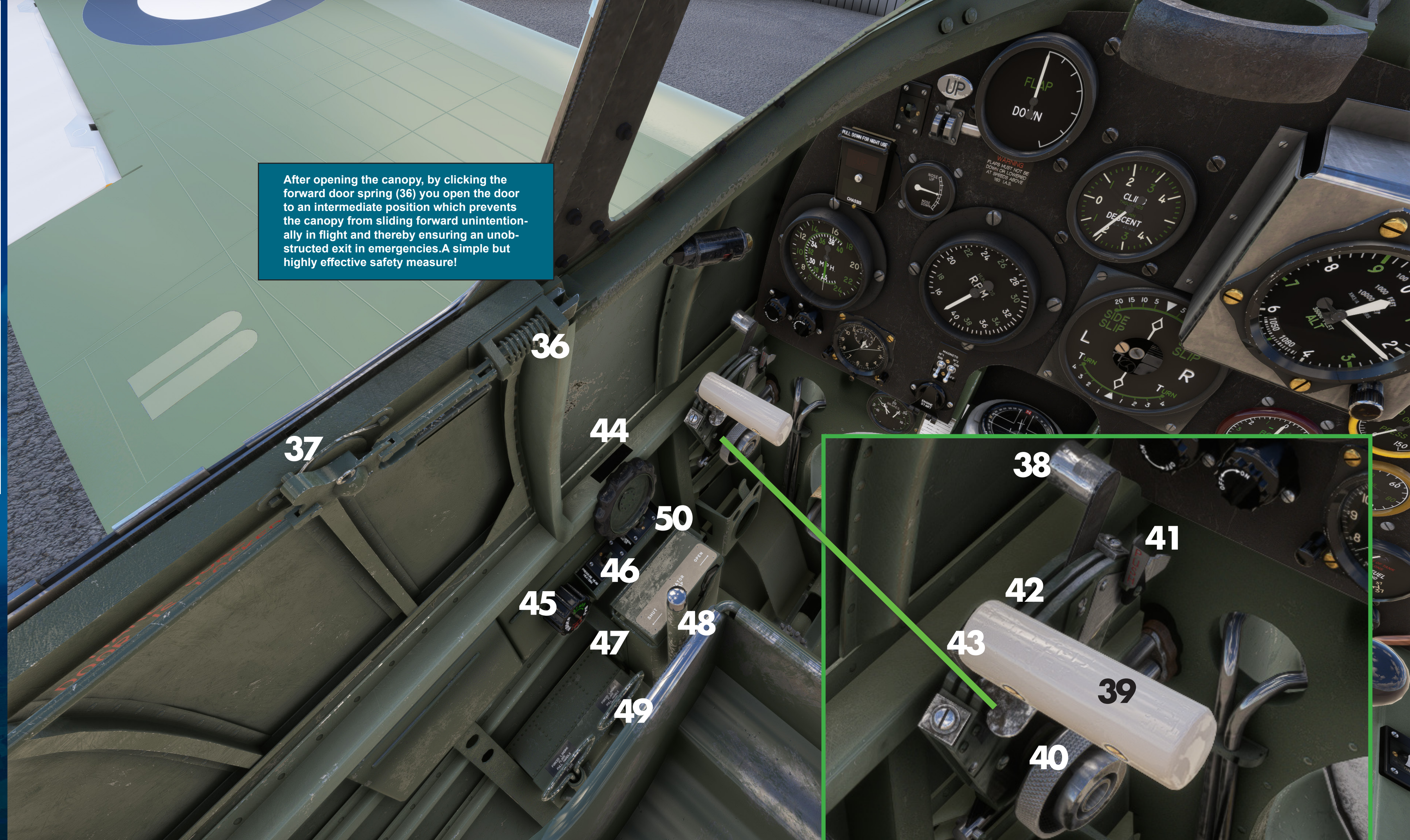
34. Slow-running Cut-out

In this simulation, we have provided a special "Refuelling Switch" (32) which will toggle on the period AEC Fuel Bowser truck and refill your tanks. You must be stationary and have the engine OFF.

Left Cockpit

- 36. Canopy Lock door position
- 37. Door Handle
- 38. Mixture Control
- 39. Throttle
- 40. Friction Control (INOP)
- 41. Boost Cut-out
- 42. Gear Indicator Lights switch
- 43. Gear Horn Cancel Switch
- 44. Elevator Trim Wheel
- 45. Rudder Trim Wheel
- 46. Pitot Heat Switch
- 47. Clickspot for engine covers
- 48. Radiator Flap control
- 49. "Cold-Dark-Start" switch
- 50. Gear control selector switch ("Knuckle switch")

After opening the canopy, by clicking the forward door spring (36) you open the door to an intermediate position which prevents the canopy from sliding forward unintentionally in flight and thereby ensuring an unobstructed exit in emergencies. A simple but highly effective safety measure!



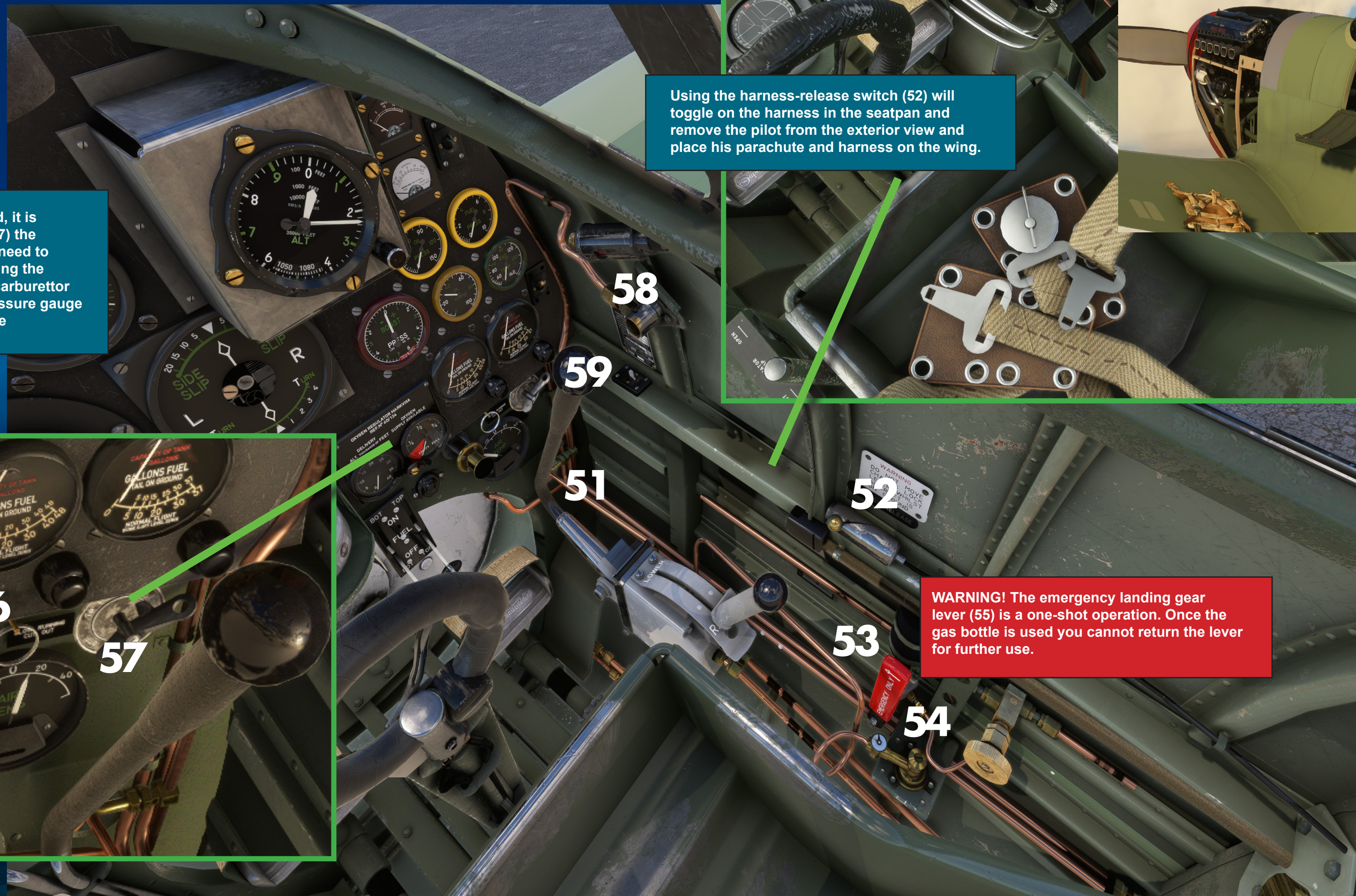
Right Cockpit

- 51. Landing Gear Control
- 52. Harness release
- 53. Emergency Landing Gear Lever
- 54. Oxygen Flow Control
- 55. Engine Primer
- 56. Slow Running Cutout
- 57. Fuel Pressure Cock
- 58. Pilot Oxygen Mask toggle
- 59. Battery cart switch

When starting the engine from cold, it is important to remember to prime (57) the cylinders. Before you do this, you need to pressurise the fuel system by turning the pressure cock (57) handle first to carburettor and then engine. Read the fuel pressure gauge to ensure you have pressure before continuing with the start.

Using the harness-release switch (52) will toggle on the harness in the seatpan and remove the pilot from the exterior view and place his parachute and harness on the wing.

WARNING! The emergency landing gear lever (55) is a one-shot operation. Once the gas bottle is used you cannot return the lever for further use.



The Spitfire receives its “Flying Six” panel, for the first time. Also, other instruments and controls had their positions standardised and this basic configuration stayed with the Spitfire through many generations.

With the addition of eight Browning machine guns in the wings, the Mk1 was fitted with a rudimentary ring-and-bead gun sight as used on pre-war RAF fighters. With the Mk1A, this changed to the all new reflector gun sight. Some Mk1s were retrofitted with this equipment as part of a programme to update Mk1s to Mk1A standards.

Pilot Panel

The “Flying Six” -

1. Airspeed Indicator
2. Artificial Horizon
3. Vertical Speed (VSI)
4. Altimeter
5. Gyro Compass
6. Turn/Slip
7. Nav lights
8. Flaps
9. Radio readout toggle
10. Battery Volts
11. Generator Amps
12. Generator Switch
13. Tachometer
14. Boost Gauge
15. Fuel Pressure
16. Oil Pressure
17. Oil Temperature

18. Coolant Radiator Temperature
19. Starting Magneto Switch
20. Fuel Gauges
21. Fuel Gauge Push-buttons
22. Engine Primer
23. Fuel Pressure cock
24. Slow-running Cut-out
25. Fuel Tank cocks
26. Refuelling switch
27. Engine Starter
28. Cockpit torch switches
29. Oxygen Sub-panel
30. Pneumatics Gauge
31. Gear Indicator
32. Trim Indicator
33. Clock
34. Magneto Switches
35. Landing Light Selector
36. Landing Light Dip Switch
37. Radio readout
(when switch 9 used)



The Early Mk1.

With production came the “standardised” cockpit for the Spitfire, that would remain unchanged right through to the 1960’s.

Most prominent is the “Flying Six” central instrument panel which was standard equipment on all wartime RAF aircraft and continued in use well into modern times. It was also employed in many British commercial aircraft of the period.

The idea made it possible for pilots to transition between aircraft types with relative ease because all the basic flying instruments were grouped in the same place, irrespective of type.

Left Cockpit

36. Canopy Lock door position

37. Door Handle

38. Mixture Control

39. Throttle

40. Radio Tuner

41. Friction Control (INOP)

42. Boost Cut-out

43. Gear Indicator Lights switch

44. Gear Horn Cancel Switch

45. Elevator Trim Wheel

46. Rudder Trim Wheel

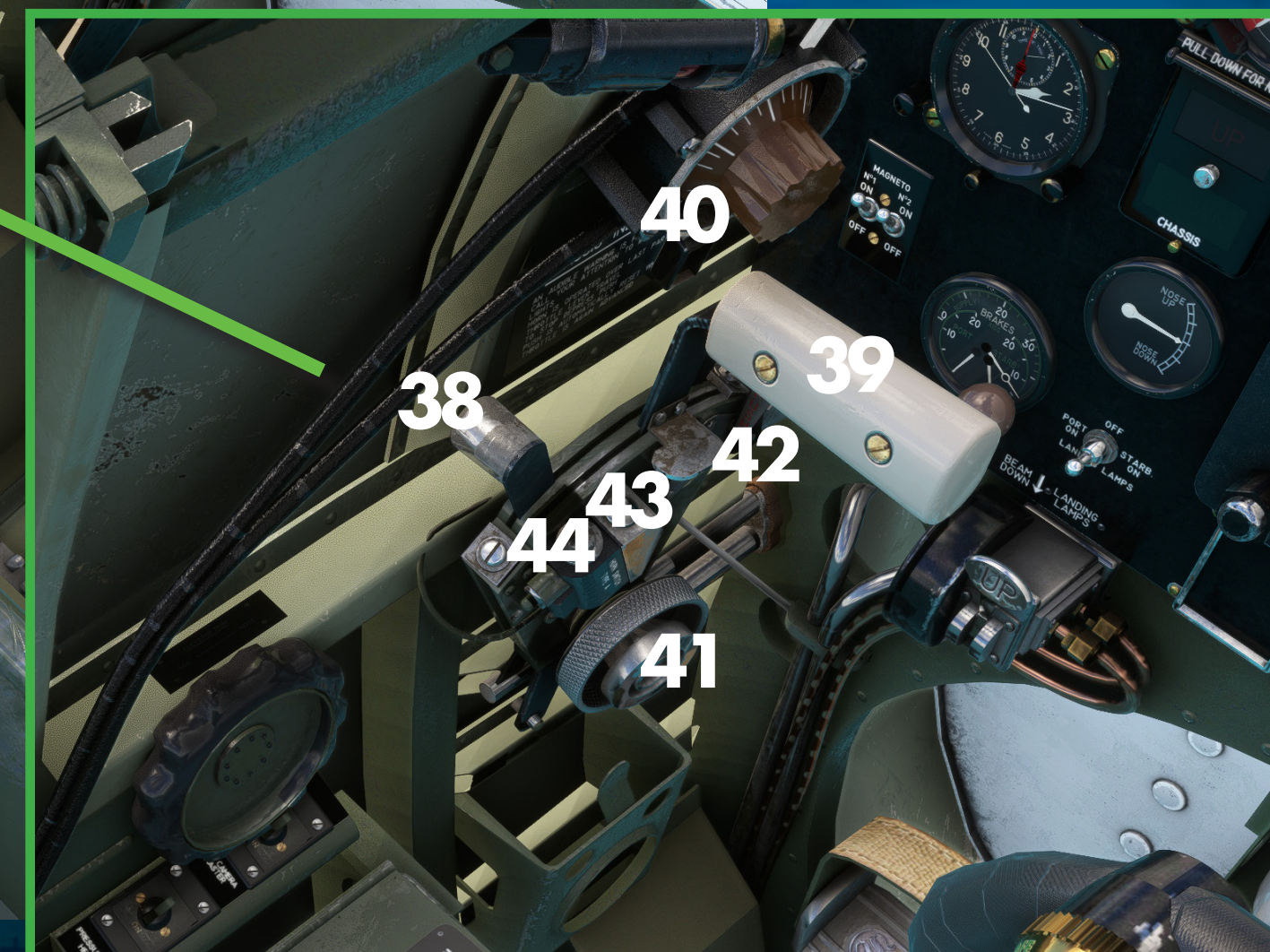
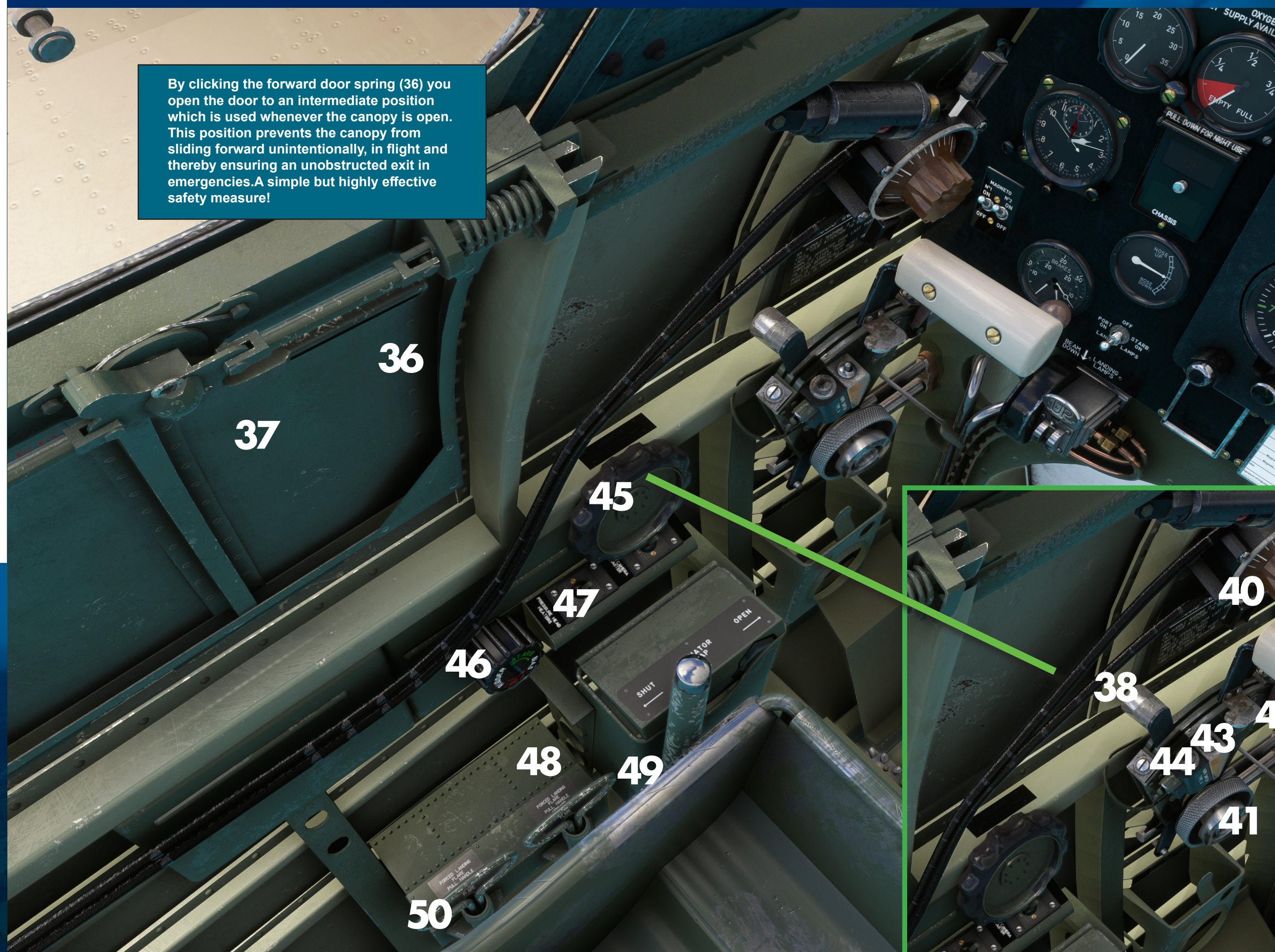
47. Pitot Heat Switch

48. Clickspot for engine covers

49. Radiator Flap control

50. "Cold-Dark-Start" switch

By clicking the forward door spring (36) you open the door to an intermediate position which is used whenever the canopy is open. This position prevents the canopy from sliding forward unintentionally, in flight and thereby ensuring an unobstructed exit in emergencies. A simple but highly effective safety measure!



Right Cockpit

- 51. Battery cart switch
- 52. Remote Contactor
- 53. Landing Gear Control
- 54. Harness release
- 55. Emergency Landing Gear Lever
- 56. Oxygen Flow Control
- 57. Engine Primer
- 58. Slow Running Cutout
- 59. Fuel Pressure Cock
- 60. Re-Fuelling Switch

When starting the engine from cold, it is important to remember to prime (57) the cylinders. Before you do this, you need to pressurise the fuel system by turning the pressure cock (59) handle first to carburettor and then engine. Read the fuel pressure gauge to ensure you have pressure before continuing with the start.

Using the harness-release switch (54) will toggle on the harness in the seatpan and remove the pilot from the exterior view and place his parachute and harness on the wing.

WARNING! The emergency landing gear lever (55) is a one-shot operation. Once the gas bottle is used you cannot return the lever for further use.

RE-FUELLING SWITCH 60.

PUSHING THIS BUTTON WILL TOGGLE THE AEC BOWSER TRUCK AND RE-FUEL YOUR AIRCRAFT.



Using the battery cart.

Spitfires are ALWAYS started using an exterior power source. Forerunner of the modern GPU (GroundPowerUnit), the battery cart consisted of a number of lead-cell batteries connected together, mounted in a box and carried on a sturdy wheeled chassis.

A heavy cable runs from the cart to plug into a special receptacle behind a small door in the Spitfire's nose cowling.

In this simulation, you use the switch **(51)** to toggle ON the cart and cable. ***Always remember to switch OFF the cart after engine start.***

Inspecting the Merlin.

A clickspot has been provided **(48)** to allow you to remove the port-side engine panels and reveal that beautiful Rolls Royce Merlin engine.

The Cold-Dark Start.

If you want a thoroughly authentic, immersive experience in your Spitfire, you need to begin your flights with a "Cold-Dark" start.

That is EVERYTHING OFF, in neutral or closed.

The door and canopy open, the pilot removed and the engine covers toggled OFF which will also open the radio and battery hatches on the exterior. The picture opposite is how she'd look. Now, how evocative is that?

To the left of the seatpan are two ring pull levers. In a real Spitfire these are flare release levers. We have used them to make things a little quicker when setting up.

For a Cold/Dark start you can either set things up manually or pull lever A.

For a "Quick-Start" pull lever B.



Flying the Spitfire.

The following guide covers the Mk1A specifically. However, the procedures are much the same for the other versions in this package.

At the end of this manual you will find a complete set of CHECKLISTS. However, it will be useful to run through a few things about handling and flying the Spitfire.

Just a short note on ground-handling. The Spitfire is what we call a “tail-dragger” that is it has a tailwheel sits on the ground in a three-point stance, using the tail to steer, unlike modern aircraft that have nosewheels. There is a known issue with the new Microsoft Flight Simulator where tail-draggers are notoriously difficult to handle properly on the ground, especially in takeoff and landing rolls.

We have spent a lot of time taming the behaviour of the Spitfire on the ground to try to overcome some of these shortfalls of the simulator. We believe we now have the handling somewhere close to what a real Spitfire has. However, you will still need a lot of care and attention when operating the Spitfire on the ground. Mind you, that can be said for the real thing too!

So, let’s get started. We are going to assume you are using the “Cold-Dark” start method.

Use the HARNESS SWITCH to load the pilot. Close the engine covers.

Flight Simulator has a drop down menu for fuel. Make sure you have the fuel tanks full and most IMPORTANT, set the EMPTY COG on the slider at the right of the fuel window to 35.5%.



Now you need some power. **Make sure you have the battery cart connected and switch ON the STARTING MAGNETO. This provides energy to the basic systems and power to the ENGINE MAGNETOS for starting. Turn on the landing gear indicator lights using the switch on the throttle quadrant. Push the throttle lever forward to reveal the switch. (43)**

The Spitfire does not have pedal brakes. The brakes are applied by squeezing the bicycle style lever mounted in the spade-grip. Move this BRAKE LEVER to the right of the spade-grip to turn on PARK-BRAKE.

Fuel. Turn UP the FUEL TANK LEVERS for TOP and BOTTOM tank. An upper tank just ahead of the windscreen contains 48 (Imperial) gallons and a lower tank, beneath this holding 37 (Imperial) gallons. The upper tank always drains into the lower unless you isolate it by turning OFF the upper tank lever. For most situations leave both UP.

Check your fuel levels in the tanks by pressing the push buttons just below the gauges.

Now you pressurise the system by turning the FUEL PRESSURE COCK to CARB first. Do this by LEFT-CLICK to the right of the control. Check the pressure at the gauge (should be at least 2 psi) and then LEFT-CLICK again, on to ENGINE.

Hover over the PRIMER and roll the mousewheel to UNLOCK . Now pump the primer for FOUR STROKES. LOCK the primer. Check pressure at the gauge.

CHECK THAT THE RING-PULL SLOW-RUNNING CUTOFF IS FULLY IN.

Open the RADIATOR SHUTTER fully. This will assist with keeping the engine cooler on the ground. Merlin engines run very hot while idling and unless kept cooler, will overheat with drastic consequences.

The MIXTURE control on the Mk1A Spitfire operates differently to most aircraft you may know. FULL RICH is when the lever is FULLY BACK and CUT is FULLY FORWARD. The system is also automatic on a Mk1A, leaner setting on the lever allows a more economical setting but the engine looks after the mixture setting for correct air/fuel balance say, at altitude. So, pull the lever back and set it FULL RICH.

Pull the PROPELLER CONTROL lever back to about 2%.

Crack the THROTTLE 8%. Switch UP both MAGNETOS. Flip the cover down and push the STARTER BUTTON until the engine fires. Once running, close the fuel pressure cock (left click to the LEFT of the control). Warm the engine at a fast idle (about 1600 RPM or 1-2% throttle) and check fuel and oil pressure, oil temperature and radiator temperature.

FUEL PRESSURE: 21/2 to 3 psi
OIL PRESSURE : up to 50 psi (idle) 80 psi (full throttle)
RADIATOR TEMP. : at least 70⁰C
OIL TEMP. : at least 15⁰C (this will increase quickly!)

MAGNETO TEST

Open the throttle to give +61/4 boost and propeller lever to give 2500 RPM. Now, switch OFF the left magneto and observe the tachometer reading. You should see a drop in RPM of around 100 RPM, no more. Switch ON the left magneto again and repeat the procedure for the right magneto. Return the switch to ON.

Turn OFF the STARTING MAGNETO, return the throttle to idle and the prop to MAX PITCH 100%.

You are now ready to taxi to your takeoff position. The Spitfire has a very long nose which makes forward vision almost impossible for the pilot to see where he is going. So, we have provided a special “LANDING VIEW” in the view presets which will make taxiing a lot easier.

Open the throttle a small amount and release the brake. Normally the Spitfire should be taxied using slow, long ‘S’ turns in a weaving pattern so that the pilot can see the road ahead. With this camera view you should be able to just taxi to the takeoff point using rudder and differential braking in the usual way.

Before takeoff, apply the parking brake and double check your instruments. Feed in a small amount of NOSE DOWN trim using the elevator trim-wheel.

Check that your flaps are UP. “NEVER TAKE OFF IN A SPITFIRE WITH FLAPS DOWN!” You can, of course, but you must let the speed reach 120 MPH before raising them and at at least 150ft. Better to just leave them up- the “brass”don’t approve anyway!

Open up slowly and release the brakes. As you roll forward, gathering speed, open up to +61/4 boost and shortly the tail will rise. Hold the Spitfire there, using small rudder inputs to keep straight. DO NOT BE TEMPTED TO OVER-CORRECT!

At around 75-80 MPH, lift off and stay level at about 50ft., raise the gear as soon as you can. Let the speed build to 140 -150 MPH before attempting to climb.

BEST CLIMB SPEED TO 12,000 ft : 185 MPH

Lock the door shut and close the canopy. Close the RADIATOR SHUTTER. Keep an eye on the temperature gauge if it rises above 120⁰C, open the shutter.

You can cruise at +41/2 boost and 2,600RPM best range can be achieved at around 200 MPH.

The Mk1A Spitfire stalls at 69 MPH with flaps up and 63 MPH with them down. Stall is benign with maybe a wing drop under certain circumstances. Recovery is pretty standard by pushing the nose-down and rudder correction.



Using the P11 compass.

The Spitfire is fitted with a P11 Maritime Compass. You will find it mounted in its own tray immediately in front of the control column.

This type of compass is designed to give the pilot a rapid indication of the current heading and a desired course which can be set, using the bezel. The compass has a lubber line and has a lock lever which locks the bezel on the set course.

The compass needle has a white cross which is indicating the current course. In the illustration, this would appear to be 350°. Later we wish to turn to a course of 80°. So, by turning the bezel of the compass so that the 80 mark is opposite the lubber line, we can lock the bezel there. By using the lock, you can be sure your desired course will not move until you are ready to turn. Then, when the time comes for the course change we simply turn our Spitfire until the needle is nestling in between the course marks etched into the bezel glass. We will then be on an 80° course.

Just by turning the bezel and then turning the aircraft, the pilot can chage course with a high degree of accuracy and yet just glance at the compass.Simple but highly effective.

Radio.

The real Spitfire Mk1A was fitted with a TR9 communications radio set which lived in the small hatch behind the cockpit on the port side of the fuselage. The radio frequencies were selected by using an electro-mechanical control on the left cockpit wall, to tune into a number of pre-set frequencies.

In our simulation we have the control unit operational. By clicking on the lower lever beneath the unit housing, a small radio frequency window will open in the left hand compass card frame.Use the two controls (brown knobs) to tune the standby COM1 frequency. The upper lever will swap the standby frequency into the active channel. There is no navigation radio. Such things were non-existent in Battle of Britain Spitfires. You used the compass, the clock and ground communication to get home.



Aerobatics.

We have included a copy of the original Pilot's Notes for the Mk1 Spitfire. You will find it in the "documents" folder with this manual. This, apart from verifying what you have read so far, contains some interesting facts and figures with regard to aerobatics and general flying procedures. It is a fascinating document and well-worth reading. You will be reading the self-same passages that new RAF pilots would have studied as they prepared themselves for the battles to come.

The Spitfire revels in aerobatics and is a delight to fly. That said, if you do not follow the correct procedures, she will bite!

A full set of instructional procedures for all aerobatic manoeuvres is included in the Pilot's Notes.

Landing the Spitfire.

Under official test-flight conditions, the best landing speed recorded for the Mk1A Spitfire is 68 MPH or just above stall-speed. From this you can see that it is vital to get speed off the aeroplane before attempting a landing. So, start your approach by reducing throttle to give around 120 - 130 MPH.

Before turning onto final, idle the throttle and drop the landing gear. Just before turning onto final, drop the flaps. Be prepared to balance the drag induced by the flaps, with the throttle to keep the nose up. (Spitfires nose down under flaps).

You should aim to have around 80 -90 MPH (and falling) over the threshold. Flare out with the stick back to get a three point attitude and let her settle, starting at around 70 MPH, all three wheels on the ground. Landing on the mains is OK but DO NOT BRAKE until the tailwheel is planted. Once all three wheels are firmly on the ground, apply brakes GENTLY and intermittently to bring the speed off. Raise the flaps and taxi in.

There, that wasn't difficult was it?

To cut the engine, EITHER move the mixture control FULL FORWARD or turn off BOTH fuel tank cock levers. Before the engine has fully stopped, quickly pull the ring-pull SLOW-RUNNING CUT-OUT. This ensure sufficient fuel is left in the system for a fast restart.

We sincerely hope you get many enjoyable flying hours from your Spitfires and get as much pleasure from her as we did from making them.

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CHECKLISTS

PRE-START

PILOT	ABOARD
ENGINE COVERS	ON
CANOPY	OPEN
DOOR	CANOPY LOCK POSITION
PARKING BRAKE	ON
BATTERY CART	ATTACHED
START MAGNETO	ON
MAGNETOS	OFF
UNDERCARRIAGE	DOWN (GREEN LIGHT ON INDICATOR)
FLAPS	UP
LANDING LIGHTS	UP
FUEL	SUFFICIENT FOR FLIGHT (CHECK GAUGES)
GENERATOR SWITCH	ON
PITOT HEAT	ON

START

THROTTLE	CLOSED
FUEL TANK LEVERS	BOTH UP
FUEL PRESSURE COCK	TO ‘CARB’ THEN ‘ENGINE’ (CHECK PRESSURE)
ENGINE PRIMER	UNLOCK THEN 4 STROKES THEN LOCK
MIXTURE	FULL RICH
PROPELLER	100% MAX REVS
MAGNETOS	ON (BOTH)
STARTER	PUSH

ENGINE WARM AND RUN-UP

RADIATOR SHUTTER	FULL OPEN
FUEL PRESSURE	21/2 - 3 PSI
BRAKE PRESSURES	CHECK
ALTIMETER	SET
COMPASS	FREE AND BEZEL SET AS DESIRED
TEMPERATURES	CHECK

MAG TEST

THROTTLE	+61/4 BOOST
RPM	2500
LEFT MAG	OFF 100 RPM DROP ON
LEFT MAG	ON
RIGHT MAG	OFF 100 RPM DROP ON
RIGHT MAG	ON
THROTTLE	IDLE
PROPELLER	100% MAX REVS
NAV LIGHTS	ON

TAXY

PARKING BRAKE	RELEASE
INSTRUMENTS	CHECK
ALTIMETER	SET

PRE-TAKEOFF

ENGINE	CHECK INSTRUMENTS
THROTTLE	IDLE
FLAPS	UP
TRIM	NOSE DOWN SMALL AMOUNT (CHECK GAUGE)
DOOR	CANOPY LOCK POSITION

TAKEOFF

BRAKES	RELEASE
THROTTLE	SMOOTHLY TO MAX RPM
ROTATION	75 - 85 MPH
UNDERCARRIAGE	UP (RED LIGHT ON INDICATOR)
ATTITUDE	LEVEL UNTIL 150 MPH

CLIMB

THROTTLE	+61/4 BOOST
TRIM	MAINTAIN 1000 FPM AT 180 MPH

LANDING

THROTTLE	TO MAINTAIN 140 MPH
TRIM	AS REQUIRED
UNDERCARRIAGE	DOWN (GREEN LIGHT ON INDICATOR)
FLAPS	DOWN (ON FINAL)
THROTTLE	TO GIVE 80 MPH OVER THRESHOLD
THROTTLE	IDLE TO LAND AT 68 MPH