

AEROPLANE HEAVEN



You're virtually there.

HURRICANE Mk I E

A HIGH DEFINITION SIMULATION OF THE HAWKER HURRICANE MKI FOR MICROSOFT FLIGHT SIMULATOR 2020/2024



COCKPIT GUIDE & FLYING NOTES

In the mid 1930s, with clouds of war gathering, discussions between the Air Ministry and leading aircraft designers of the time, led to a new order being issued to replace the ageing biplane designs currently filling important front-line roles for the RAF.

Sir Sydney Camm and Hawker were already prominent in the design and production of many of the RAF’s front-line aircraft including the venerable Hawker Fury.

Camm set about designing a monoplane derivative of the Fury, retaining much of the traditional wood and fabric construction techniques, especially for the aft fuselage. This would prove to be an excellent direction as the airframes would be familiar to field crews and those responsible for maintenance and repair, resulting in faster servicing and repair times - a critical factor in the months to come.

The new design featured eight machine guns mounted in sturdy, extremely thick section wings. Early production machines were built with fabric covered wings but later (by the time of the Battle of Britain) these had changed to all-metal skinning.

A wide track retractable undercarriage was fitted with a castoring non-retractable tail wheel.

Power was delivered by Rolls Royce’s new Merlin II V12 engine - the same power plant that would power the Spitfire and Lancaster bomber, DH Mosquito and many other successful designs throughout the war. This again, would streamline servicing and maintenance of the RAF’s front-line fighting machines.

The new Hurricane first took the air in November 1935 and entered squadron service on Christmas Day, 1937. As already noted, these early machines had fabric-covered wings and sported two-blade fixed-pitch Watts wooden propellers. By the time of the Battle of Britain in 1940, there was a choice of Rotol or DeHavilland three-blade variable pitch, constant speed propellers, choice depending on available supply.

Largely unchanged in its entire career, the Hurricane was an effective day and night fighter, fighter-bomber and served at sea in carriers. It was even catapulted from merchant ships to protect vital shipping convoys. The hapless pilots of these machines faced a very cold and wet end to their flight as there was no way to retrieve the fighter once catapulted off the ramp and ditching in the icy Northern Atlantic was the only way to land if there was no nearby land available!

Often regarded as “the poor relation” to the Supermarine Spitfire, the Hawker Hurricane was in fact, a very capable fighting machine and again in fact, was responsible for 60% of Luftwaffe losses during the Battle of Britain. As a fighter, the Hurricane was no match for the manoeuvrability of the Messerschmitt BF109 but if a skilled pilot could bring those eight guns to bear, more often than not, the opposition was doomed amid a hail of concentrated fire. Those thick profile wings provided an extremely stable gun platform from which to shoot too. As the Battle developed, Hurricanes were assigned the primary role of destroying the waves of enemy bombers heading for British shores - Spitfires taking over the role of fighter interception and hence the more glamorous image.

During the Battle, the Hawker Hurricane made “aces” of many of the young pilots flying daily to defend the shores of Great Britain. It fought in all the theatres of WW2, inflicting a massive amount of damage not only to enemy forces in the air but on the ground and at sea.

Much of this success was owed to its incredibly durable construction, enabling the aircraft to sustain huge amounts of punishment and still keep going. Cannon rounds would pass harmlessly, straight through the fabric of the rear fuselage structure without exploding and substantial armour plating behind the seat would provide protection for the pilot from rear attack.

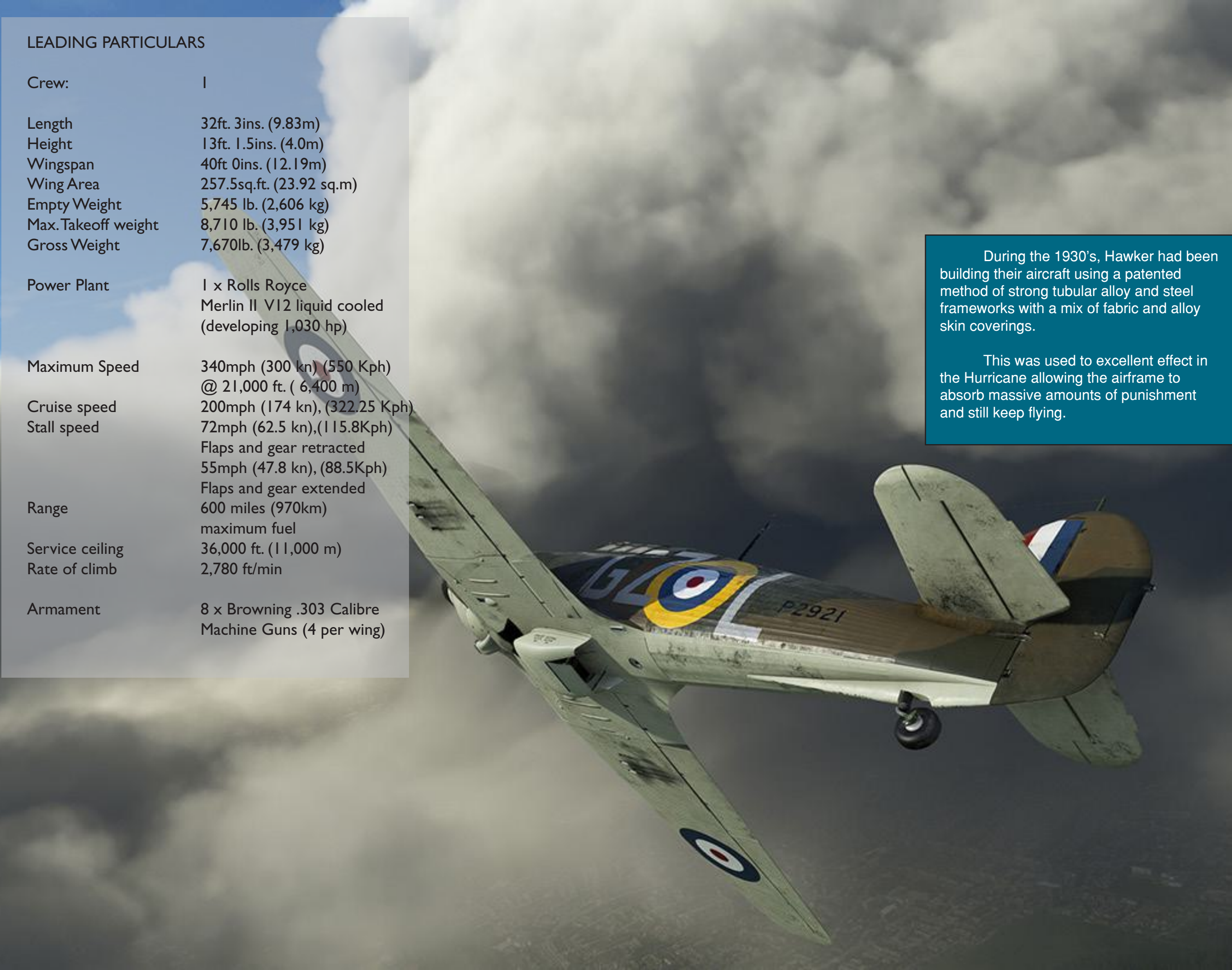
There is little doubt, that without this iconic aircraft’s rugged durability and the dogged determination of the RAF’s Hurricane pilots, Britain’s “Finest Hour” might have lasted a lot longer than it did.

LEADING PARTICULARS

Crew:	1
Length	32ft. 3ins. (9.83m)
Height	13ft. 1.5ins. (4.0m)
Wingspan	40ft 0ins. (12.19m)
Wing Area	257.5sq.ft. (23.92 sq.m)
Empty Weight	5,745 lb. (2,606 kg)
Max. Takeoff weight	8,710 lb. (3,951 kg)
Gross Weight	7,670lb. (3,479 kg)
Power Plant	1 x Rolls Royce Merlin II V12 liquid cooled (developing 1,030 hp)
Maximum Speed	340mph (300 kn) (550 Kph) @ 21,000 ft. (6,400 m)
Cruise speed	200mph (174 kn), (322.25 Kph)
Stall speed	72mph (62.5 kn),(115.8Kph)
Range	Flaps and gear retracted 55mph (47.8 kn), (88.5Kph) Flaps and gear extended 600 miles (970km) maximum fuel
Service ceiling	36,000 ft. (11,000 m)
Rate of climb	2,780 ft/min
Armament	8 x Browning .303 Calibre Machine Guns (4 per wing)

During the 1930's, Hawker had been building their aircraft using a patented method of strong tubular alloy and steel frameworks with a mix of fabric and alloy skin coverings.

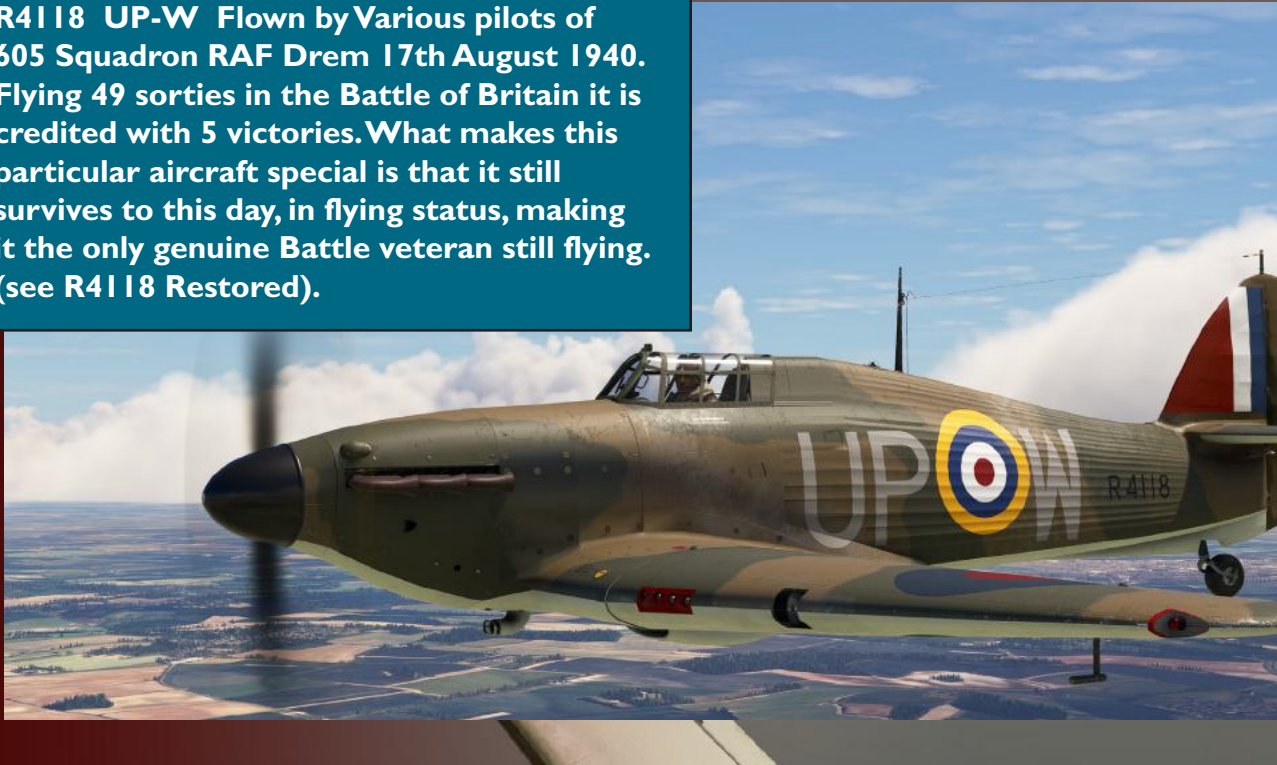
This was used to excellent effect in the Hurricane allowing the airframe to absorb massive amounts of punishment and still keep flying.



P2725 TM-B Flown by Flight Lieutenant Raymond T Holmes 504 Squadron RAF . It was in this aircraft that Holmes, out of ammunition, deliberately rammed a Dornier and the first enemy aircraft over London causing it to crash into Victoria Station. Holmes survived both the ramming and the war.



R4118 UP-W Flown by Various pilots of 605 Squadron RAF Drem 17th August 1940. Flying 49 sorties in the Battle of Britain it is credited with 5 victories. What makes this particular aircraft special is that it still survives to this day, in flying status, making it the only genuine Battle veteran still flying. (see R4118 Restored).



P3114 M A Sea Hurricane serving with 800 Squadron Fleet Air Arm out of RNAS Gosport in 1940.

This machine was part of a training squadron.

At this time the Royal Navy was still experimenting with camouflage/paint schemes for their aircraft.



V7478 The only Hurricane to be delivered directly to Australia. A tropicalised Mk I

This aircraft remained on Australian soil until it was scrapped in 1946



For use in tropical climates, the Hurricane could be modified with a tropical "Vokes" filter to increase cooling air to the Merlin.

Tropicalised Hurricanes were used in a variety of theatres including North Africa the Middle East and East Asia, extending the operational reach of the Hurricane.



284 "J" was flown by Lt. Bob Kershaw of 3 Squadron SAAF in East Africa March 1941.

Z7015 is a Sea Hurricane IB. Here it is depicted as it is displayed as part of the Shuttleworth Collection at Old Warden.

Meticulously restored this example is seen performing at airshows on a regular basis.



We have included a model of the Sea Hurricane, a no-less important variant, used by the Royal Navy and Fleet Air Arm. These aircraft were deployed in aircraft carriers, land-based naval stations and were even catapulted from merchant ships, specially fitted with launching ramps.

In all, there were no less than 24 different variants of the Hawker Hurricane, produced in the lifetime of this amazing fighting machine.

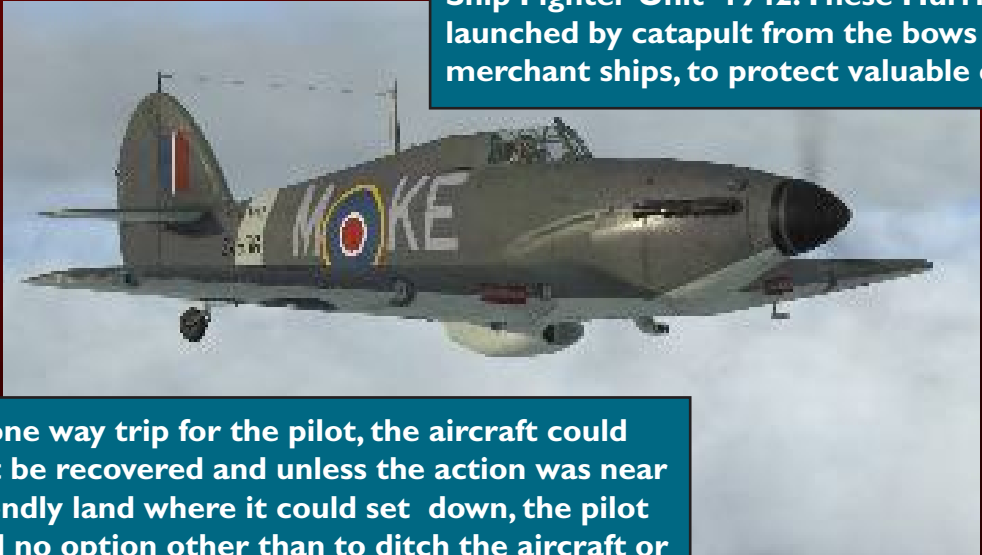
Z4615 was a Tropicalised Hurricane flown by Free French pilots in the Middle East. This aircraft began its flying career with No.80 squadron RAF in June of 1941. It was eventually struck off-charge in 1943



V7506 7-T A Sea Hurricane assigned to HMS Victorious during "Operation Pedestal" a supply convoy to Malta August 1942.



Z4936 KE-M A Sea Hurricane of the Merchant Ship Fighter Unit 1942. These Hurricanes were launched by catapult from the bows of merchant ships, to protect valuable convoys.



A one way trip for the pilot, the aircraft could not be recovered and unless the action was near friendly land where it could set down, the pilot had no option other than to ditch the aircraft or bail out. Either way, it was a cold, wet ending to his day out!

V7467 LE-D Flown by Squadron Leader Douglas Bader 242 Squadron RAF Coltishall 1940. Bader “the legless ace” scored most of his Battle of Britain victories in this machine before transferring to Spitfires. It carries his famous “booting Hitler” nose art. Bader was eventually shot down and taken prisoner for the rest of the war.



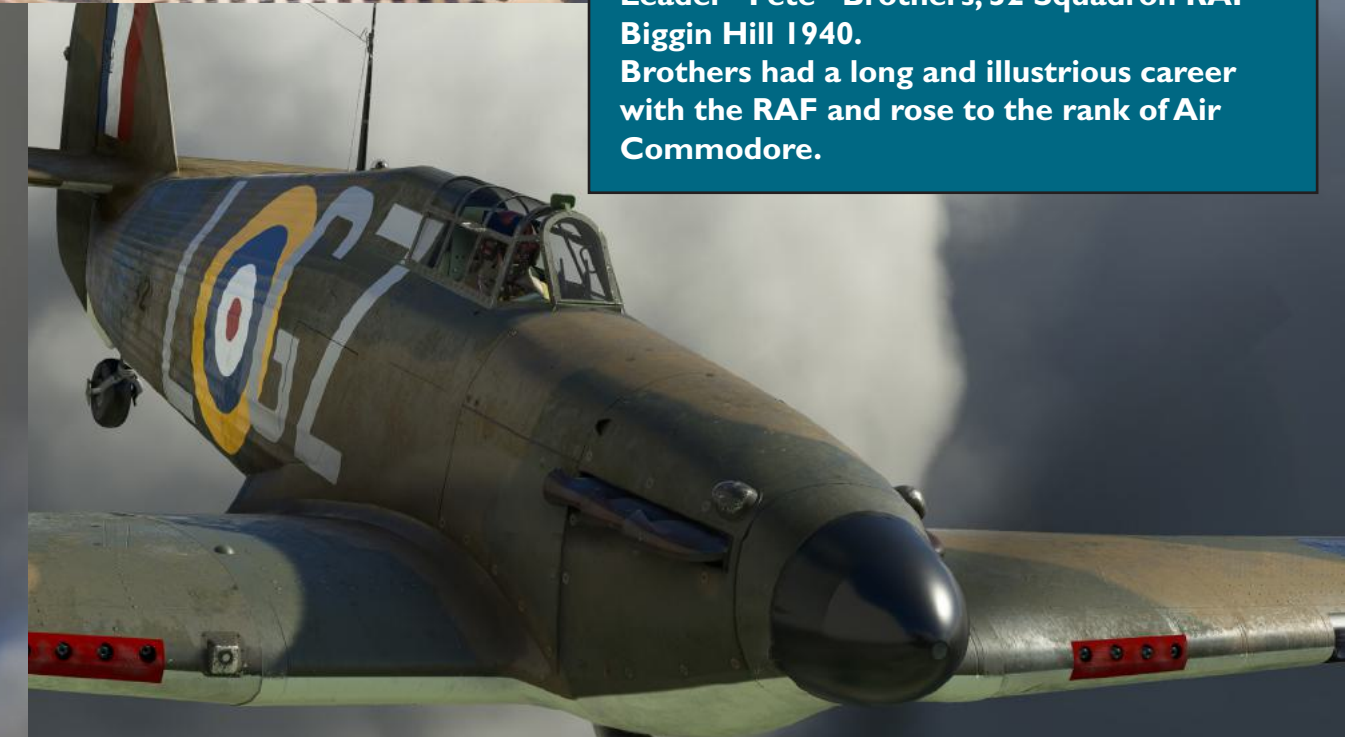
V7357 “SD-F”
Flown by FltSgt J.H. “Ginger” Lacy
501 Squadron RAF Gravesend
September 1940. “Ginger” Lacy was a pilot who became a famous top-scoring “ace” during the Battle of Britain.



V6864 DT-A Flown by Squadron Leader Robert “Bob” Stanford-Tuck, commanding 57 Squadron RAF Coltishall, 1940



P2921 GZ-L Flown by (then) acting Flight Leader “Pete” Brothers, 32 Squadron RAF Biggin Hill 1940. Brothers had a long and illustrious career with the RAF and rose to the rank of Air Commodore.



P3576 GN-A Flown by Flight Lieutenant James Brindley Nicolson, 249 Squadron RAF Leconfield, Yorkshire August 1940. Nicolson was the only Battle of Britain pilot to be awarded the Victoria Cross, following action on the 16th of August in which he was shot down, suffering horrendous burns. Despite his horrific injuries, Nicolson pressed home his attack and destroyed an ME110 before bailing out.



P3675 UF-S Flown by Flight Lieutenant Michael “Mike” Robinson 601 Squadron RAF Exeter 1940. Whilst flying this machine, Robinson destroyed 4 aircraft with another claimed damaged.

This aircraft carries unconventional striped markings and a red, white and blue spinner. None of which was officially sanctioned by the RAF.



Many overseas pilots fled their countries as they were occupied by the German offensive in the early part of WW2 and joined the RAF to fight again. During the Battle of Britain, these “recruits” were an invaluable addition to depleted RAF ranks. The Polish squadrons in particular, gained a reputation as the most aggressive and successful units with many becoming “aces” quickly .

R4175 RF-R Flown by Polish pilot Josef Frantisek RAFVR 303 Squadron (Warsaw) RAF September 1940. Frantisek successfully crash-landed this aeroplane having been battle-damaged in a skirmish with a Bf109



The Hurricane cockpit.

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

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

In particular, please take note of the combined flap and landing gear control, unique to the Hurricane.

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. Control Column toggle
9. Gunsight Sunshade
10. Gunsight Reticle Switch
11. Modern panel toggle
12. Morse Lights
13. Panel Lights
14. Landing Light switch
15. Tachometer
16. Boost Gauge
17. Fuel Pressure
18. Oil Pressure
19. Oil Temperature
20. Coolant Radiator Temperature
21. Starting Magneto Switch
22. Fuel Gauges
23. Fuel Gauge Selector
24. Engine Primer
25. Emergency Boost Cutout
26. Pitot Heat
27. Engine Starters
28. Cockpit torch switches
29. Oxygen Sub-panel
30. Clock with trip hands
31. Landing Gear Indicator
32. Landing Gear Lights
33. Engine Magnetos

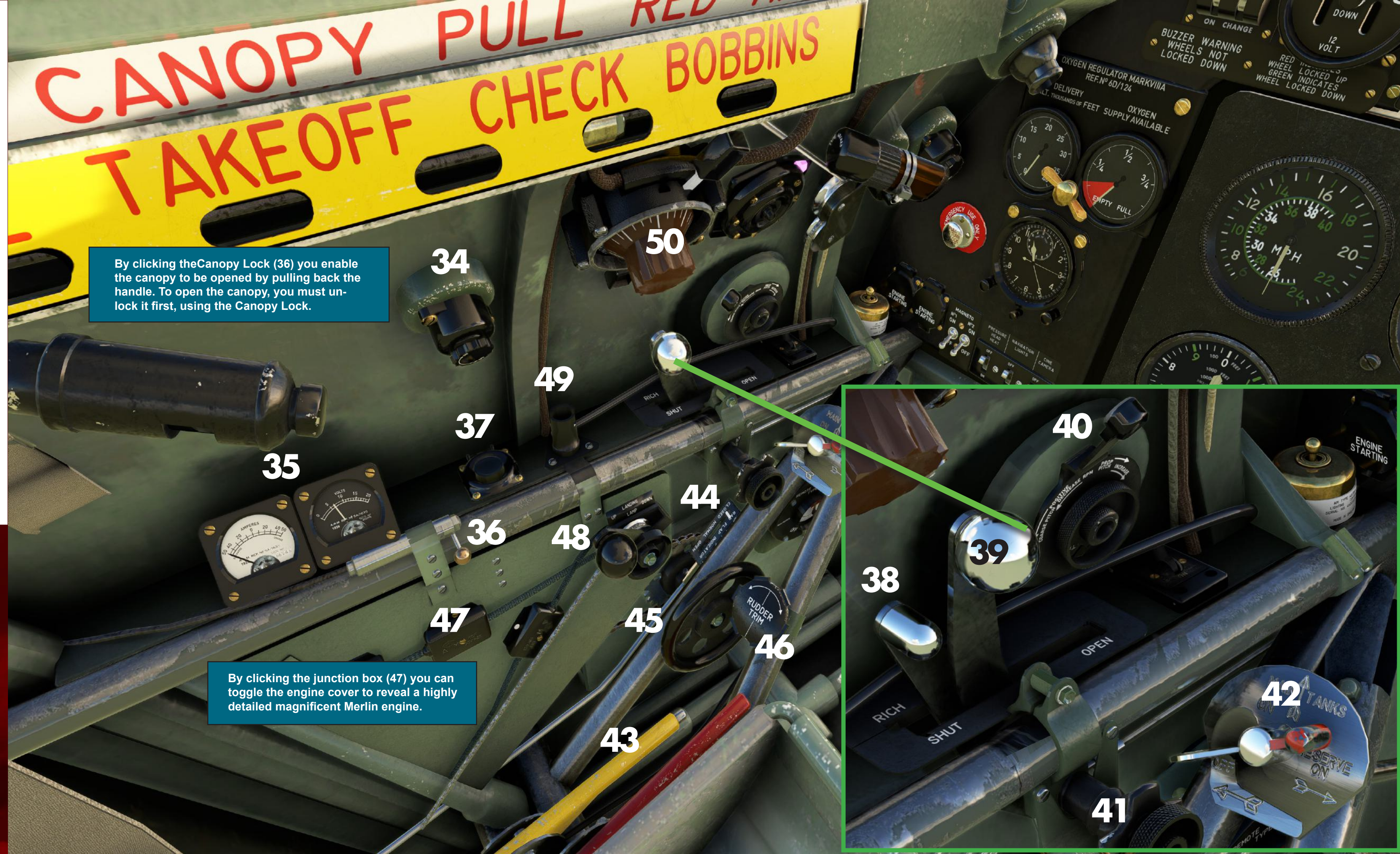
All wartime RAF aircraft including bombers used "The Flying Six" group panel for primary flight instruments. This was introduced so that pilots could transition across different aircraft types without having to learn where the primary gauges were located. The panel was used in many civilian types too, long after war's end.

When you turn on the communications radio, a small frequency indicator window will open in the compass card frame.



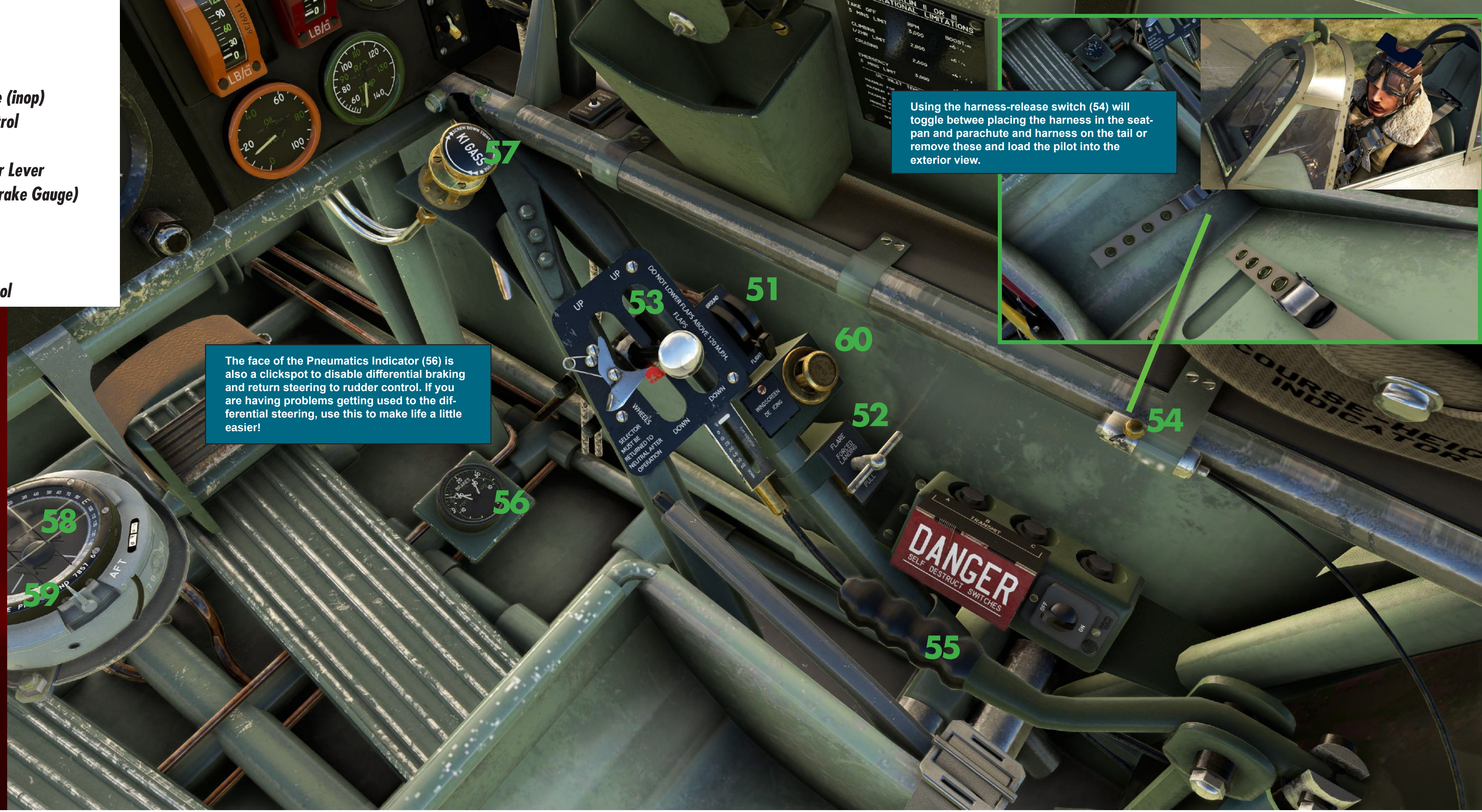
Left Cockpit

- 34. Cockpit Flood Light
- 35. Ameter & Volt meter
- 36. Canopy Lock
- 37. ReFuelling Switch
- 38. Mixture Control
- 39. Throttle
- 40. Propeller Control
- 41. Friction Control (INOP)
- 42. Fuel Tank Selector
- 43. Radiator Flap control
- 44. Radiator Flap position indicator
- 45. Elevator Trim Wheel
- 46. Rudder Trim Wheel
- 47. Clickspot for engine covers
- 48. Landing Lamp Dip control
- 49. Oxygen toggle (for pilot)
- 50. Comms Radio (VHF)



Right Cockpit

- 51. Battery cart switch
- 52. Emergency Flare release (inop)
- 53. Landing Gear/Flap Control
- 54. Harness release
- 55. Emergency Landing Gear Lever
- 56. Pneumatics Indicator (Brake Gauge)
- 57. Engine Primer
- 58. P11 Compass
- 59. Compass Lock
- 60. Windscreen de-ice control





In the restored version of R4118 “UP-W” you will find a ‘modern’ display pilot with a “bone-dome” hard leather helmet , late model goggles and oxygen mask



This is the early 1938 pattern goggles and oxygen mask. A swing-down sun-shade was provided for the goggles. This cumbersome outfit was soon replaced with lighter, smaller goggles although the side entry oxygen pipe remained for some time. Clicking the oxygen supply socket (49) toggles the mask and goggles for the pilot.



From 1941, Hurricanes and many other aircraft such as Spitfires and Lancasters were ferried between operational airfields, the factories and OTUs by the pilots of the Air Transport Auxiliary. Many of these pilots were women who amassed a huge number of flying hours on all types, throughout the war.

In honour of these amazing women, we have included a special “delivery” package with a female pilot.

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 cowl.

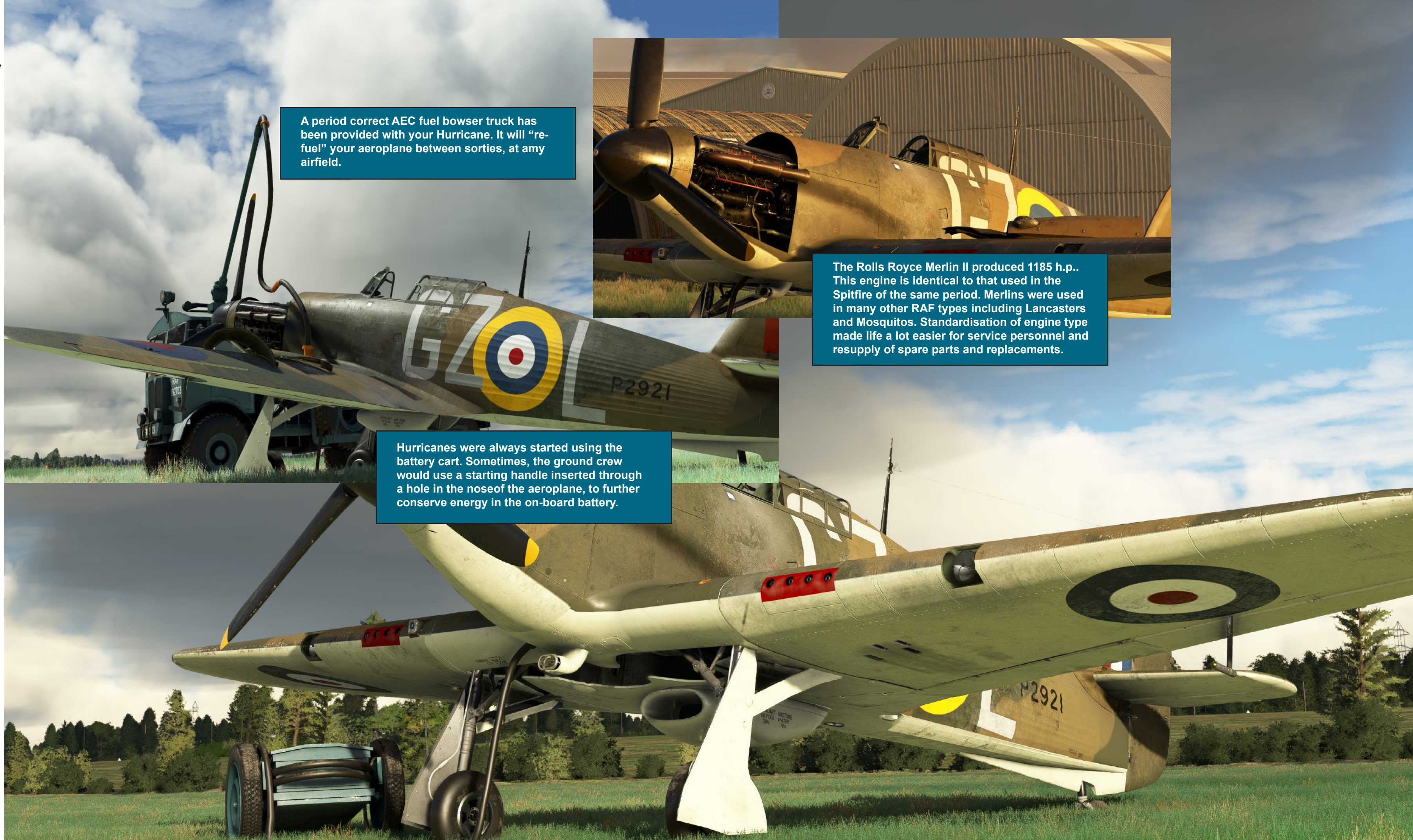
In this simulation, you use the switch **(51)** to toggle ON the cart and cable. ***Always remember to switch to FLIGHT after engine start.***

Inspecting the Merlin.

A clickspot has been provided **(47)** to allow you to remove the port-side engine panels and reveal that beautiful Rolls Royce Merlin engine.

Refuelling.

An authentic AEC fuel truck and hose has been provided. When the "refuelling button" **(37)** is clicked, you toggle the fuel bowser truck and your Hurricane's fuel tanks will be automatically replenished. Clicking the button again will remove the truck and hose.



A period correct AEC fuel bowser truck has been provided with your Hurricane. It will "re-fuel" your aeroplane between sorties, at any airfield.

The Rolls Royce Merlin II produced 1185 h.p.. This engine is identical to that used in the Spitfire of the same period. Merlins were used in many other RAF types including Lancasters and Mosquitos. Standardisation of engine type made life a lot easier for service personnel and resupply of spare parts and replacements.

Hurricanes were always started using the battery cart. Sometimes, the ground crew would use a starting handle inserted through a hole in the nose of the aeroplane, to further conserve energy in the on-board battery.

Using the flap and landing gear control.

The Hurricane is fitted with a multi-function lever that operates both flaps and landing gear. The lever selects the appropriate line to feed pressure to the relevant system.

We have simulated this using a combination of animations and clickspots. There are four of these clickspots on the surface of the baseplate.

LANDING GEAR

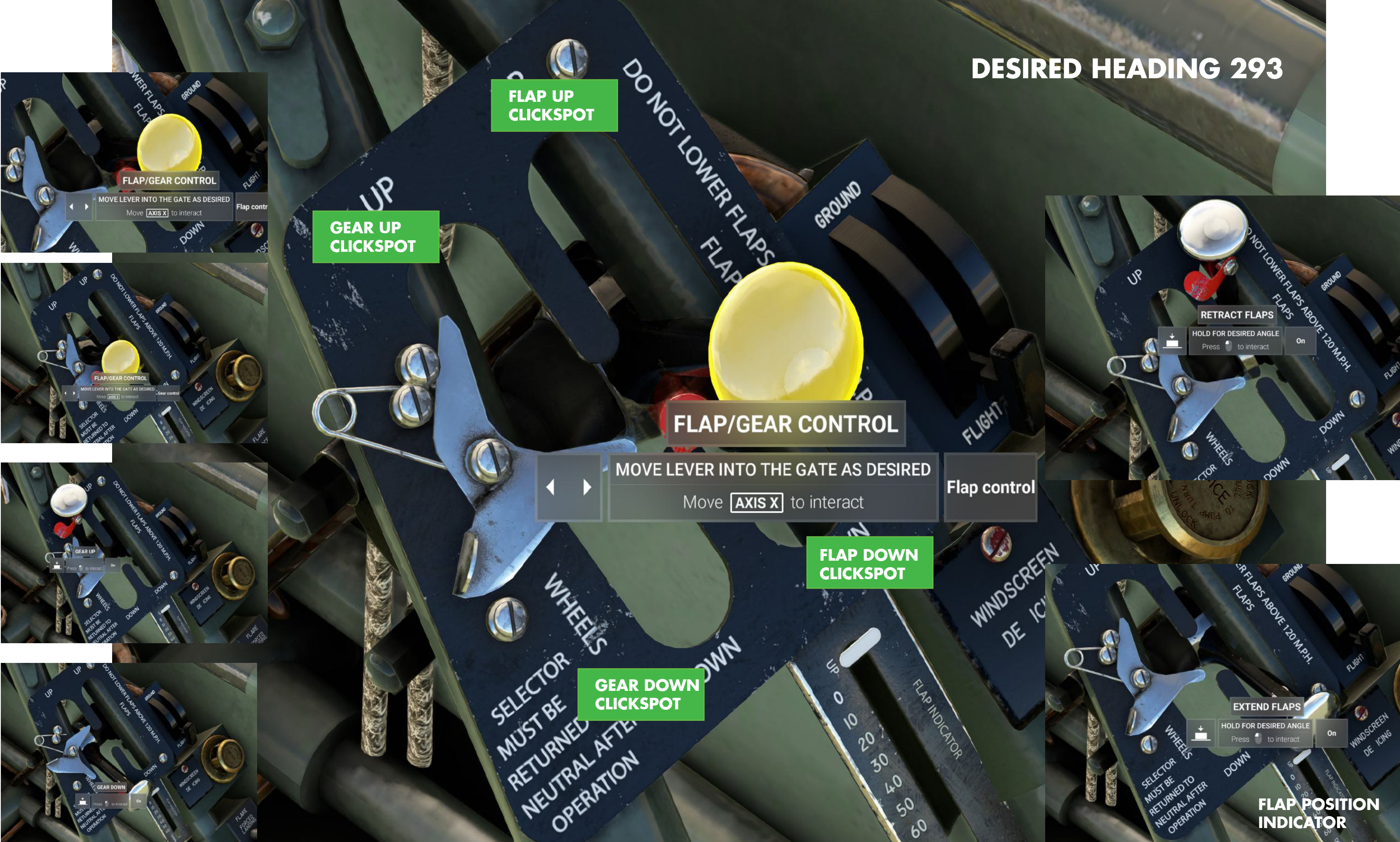
Click,hold and move the lever to the left side of the “gate”. The, hover over either the “UP” or “DOWN” labels and clcik. The Lever will move up or down the gate to operate the landing gear. Always click on the lever knob once finished, to return the lever to neutral position in the gate.

FLAPS

Click,hold and move the lever to the right side of the “gate”. The, hover over either the “UP” or “DOWN” labels and click. The Lever will move up or down the gate to operate the flaps. **IMPORTANT** the flaps can be positioned anywhere in their travel by clicking the lever knob and returning the lever to neutral position when you are happy with the flap position indicated on the scale below the base plae.

Gear light indicator.

The landing gear indicator lights are separately controlled by a switch (32) This conserves battery power and light bulbs. To check position of the gear, turn on the switch and when the gear is in the desired position with correct lights, switch off again.



Using the P11 compass.

The Hurricane 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 235°. Later we wish to turn to a course of 293°. So, by turning the bezel of the compass so that the 293 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 Hurricane until the needle is nestling in between the course marks on the bezel glass. We will then be on a 293° heading.

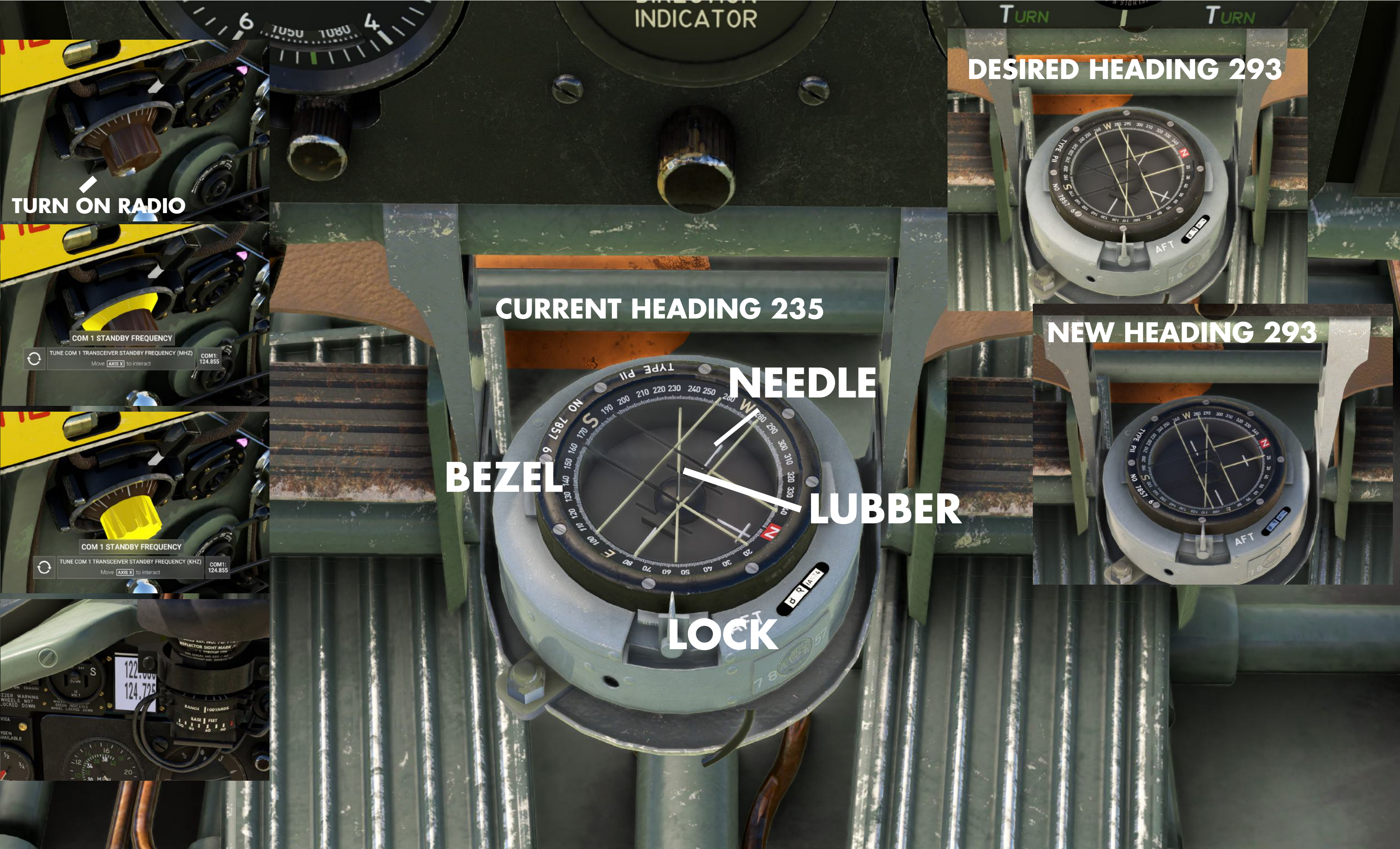
Just by turning the bezel and then turning the aircraft, the pilot can chage course with a high degree of accuracy and yet just glance at the compass. Simple but highly effective.

Radio.

The Hurricane Mk1 was fitted with a TR9 communications radio set. 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 compass card frame on the panel. 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 a Battle of Britain Hurricane. You used the compass, the clock and ground communication to get home.

However, you can if desired, toggle on a modern GNS suite if you prefer these modern conveniences. **PLEASE NOTE: THE MODERN RADIO IS ONLY AVAILABLE IN THE “RESTORED” HURRICANE, UP-W** The right hand switch next to the indicator light switch (11) will swap out the gunsight for the GNS suite.



Modern radios

PLEASE NOTE: THE MODERN RADIO IS ONLY AVAILABLE IN THE “RESTORED” HURRICANE, UP-W

The GNS430 unit is easy to operate and is the same unit you will find in many aircraft in Microsoft Flight Simulator. We are therefore not providing a guide to this instrument or its companion AutoPilot.

To access the suite, use the switch (11) which will swap out the gunsight for the modern panel.

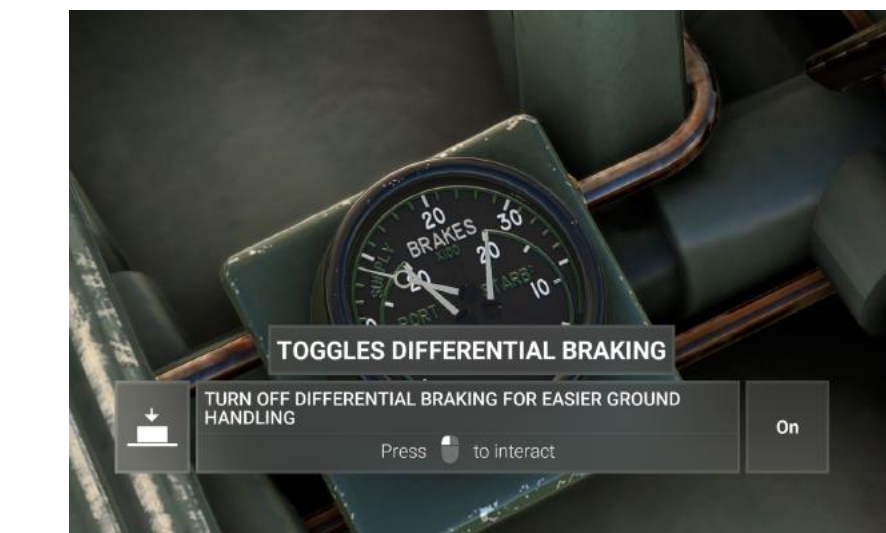
Steering with differential braking.

In a real Hurricane, steering on the ground is achieved using a combination of brakes and rudder. To turn left for example, you apply brake and rudder at the same time. The brake pressure is applied via rudder input to the left side brake only and the aircraft turns to the left.

In this virtual Hurricane we have simulated much the same system and procedure for steering. To commence a left turn keep the taxi speed up and apply the brake, immediately following with left rudder, keeping the brake applied.

It takes a little getting used to but once mastered it can become second nature.

However, if you are experiencing problems coming to grips with differential steering, we have installed a clickspot on the glass of the brake gauge (56) which when used, disables the differential system and returns you to simple (but inaccurate) rudder-based steering.



Flying the Hurricane.

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 Hurricane.

Just a short note on ground-handling. The Hurricane 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. 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 Hurricane on the ground. We believe we now have the handling somewhere close to what a real Hurricane 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 starting from a “Cold-Dark” state. That is a cockpit where everything is OFF or Neutral.

Use the HARNESS SWITCH to load the pilot. Close the engine covers if you have had them open to view the Merlin.

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%.



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 panel (32).**

The Hurricane 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. Always start the Hurricane using the RESERVE TANK. Turn the control **(42)** so that the handle **(hole end, NOT RED)** is over the reserve mark. The reserve tank feeds via gravity. The main tanks are below the level of the engine and require the engine pump when running, to deliver.

Check your fuel levels in the tanks by selecting the appropriate tank with the fuel gauge control knob **(23)**

Hover over the PRIMER **(57)** and click to UNLOCK . Now pump the primer for FOUR STROKES. LOCK the primer. Check pressure at the gauge.

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 Hurricane 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 Hurricane, 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.

Push the PROPELLER CONTROL lever fully forward. Crack the THROTTLE 8%. Switch UP both MAGNETOS. Flip the covers up and push the BOOST BUTTON first and while it is in, press the START BUTTON until the engine fires. Warm the engine at a fast idle (about 1600 RPM or 24% throttle and -2lbs of boost) 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 70°C
OIL TEMP. : at least 15°C (this will increase quickly!)

MAGNETO TEST

Open the throttle to give +5 boost and propeller lever to give 2100 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.

Return the throttle to idle and the prop to MAX PITCH 100%.

You are now ready to taxi to your takeoff position. The Hurricane 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 Hurricane 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 your flaps position. On short fields you can select 28° Otherwise, flaps should be UP.

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 Hurricane 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.

Close the canopy. Close the RADIATOR SHUTTER. Keep an eye on the temperature gauge if it rises above 120°C, open the shutter.

Best climb speed (to 10,000 feet) is 157 m.p.h.

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

The Hurricane stalls at 72 MPH with flaps up and 55 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.



Aerobatics.

We have included a copy of the original Pilot's Notes for the Hurricane. 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 Hurricane 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 Hurricane.

Under official test-flight conditions, the best landing speed recorded for the Mk1 Hurricane is 70 MPH or just on 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. (Hurricanes 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 magneto switches. We sincerely hope you get many enjoyable flying hours from your Spitfire Mk1A and get as much pleasure from her as we did from making her.

The Aeroplane Heaven Team

"Pulling the plug".

The Hurricane Mk1 is fitted with a **BOOST CUTOUT**. This device by-passes the automatic boost pressure system for the engine and allows for an immediate increase of boost (manifold) pressure to +12lbs.

This can place significant stress on the Merlin but the cut-out was installed with the intention of being used ONLY under combat conditions to provide increase in performance.

The control is mounted on the instrument panel over on the left side **(25)**.

Combat pilots in the Battle of Britain coined the phrase "pulling the plug" when referring to its operation. Unofficially, most used the control on a regular basis to get more performance from their machines. Ground crews complained of damage to the precious Merlins was increasing at an alarming rate and the top brass at the RAF eventually had to issue a directive to all pilots ONLY to use the control in emergency combat situations. So you have been warned!

We sincerely hope you get many enjoyable flying hours from your Hurricane Mk1 and get as much pleasure from her as we did from making her.

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AEROPLANE HEAVEN



**A SPECIAL CREDIT MUST GO TO
ECHO 19
WHO AUTHORED THE MAGNIFICENT
ROLLS ROYCE MERLIN SOUNDS
FOR THIS HURRICANE PACKAGE.**



CHECKLISTS

PRE-START

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

START

THROTTLE	CLOSED
FUEL TANK CONTROL	RESERVE
ENGINE PRIMER	UNLOCK THEN 4 STROKES THEN LOCK
MIXTURE	FULL RICH
PROPELLER	100% MAX REVS
MAGNETOS	ON (BOTH)
BOOST COIL	PUSH
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
LEFT MAG	ON
RIGHT MAG	OFF 100 RPM DROP
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)
CANOPY	AS DESIRED

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 175 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 70 MPH