
Bristol
Mk2a
BULLDOG
The RAF's aerobatic fighter from the 1930's
AEROPLANE HEAVEN
You're virtually there.
Cockpit guide and Flying Notes

INTRODUCTION

In its original form, as Type 105 and designed to Ministry Specification for a day and night fighter, the Bristol Bulldog first flew on 17 May 1927.

Following a successful test programme, the design was further improved with a slightly longer fuselage and larger tail area to improve spin recovery. Designated the Bristol Bulldog MkII, deliveries of production airframes commenced in late 1929.

Stronger airframe components, a slightly swept back wing configuration and a more powerful engine resulted in the MkIIA, the subject of this simulation. Aviation was at the crossroads in innovation and technology at this time and the Bulldog was one of the last front-line biplane RAF fighters. By the time the dark clouds of war had spread across Europe the Bulldog had been retired from front-line service (1937) but remained as a trainer for several years.

It was for its aerobatic prowess that the Bulldog will be remembered. Pilots revelled in its high power and inherent strength. For the day, 490 hp up front in a lightweight aluminium and fabric airframe was a true "sports car" of aeroplanes.

The design also sported a number of quite sophisticated and advanced features such as gas-pressurised starting, wheel-brakes and a variable incidence tail-plane. The airframe itself was tubular steel with an all-alloy front section cowling – what gave the Bulldog its strength and very robust wing spars with metal ribs and formers provided extremely strong wings and tail surfaces.

Many RAF Squadrons formed official display teams and the Bulldog was to become a regular at air shows around the country, demonstrating the flying prowess of the RAF's top pilots. One such pilot, Douglas Bader, crashed his Bulldog whilst attempting a slow roll too close to the ground. His injuries led to the loss of both legs. Sir Douglas became a leading Battle of Britain ace in the years to come and his story is well-worth the read.

Other Battle aces trained on the Bulldog and the aeroplane did see active service overseas with other operators including the Finnish Air Force whose pilots were the first to score aerial victories in a Bulldog.

Today there are no flying examples but several are preserved in museums around the World.

So take the controls in your only chance to experience flight in an important milestone in British aviation history.

Enjoy the scenery!

All the shots in this manual were taken on location at ORBX "Damyns Hall". This truly masterful scenery is a must -have for all classic aviation enthusiasts!

You can find full details of this and their other fine sceneries at:

www.orbxdirect.com

Leading Particulars

Length	**25ft.**
Height	**9ft. 7 ins.**
Wingspan	**33ft. 10 ins.**
Wing Area	**Total 307 sq.ft.**
Empty weight	**2,205 lb.**
Max. Takeoff weight	**3,490 lb.**
Powerplant	**1 x Bristol Jupiter VII radial**
piston engine 490hp	

Performance

Maximum Speed	**178 mph (115 knots) IAS**
Service Ceiling	**29,300 ft.**

The Aerobat.

The Bristol Bulldog was an extremely capable aerobatics performer. The combination of a powerful Jupiter engine and a tough steel tube airframe made it possible to perform high "G" manoeuvres beyond the abilities of most of the bi-plane fighters of the day.

AIRCRAFT COVERED IN THIS SIMULATION

The Bristol Bulldog was operated mainly by the British RAF. However, other countries did use the machine, notably, Australia, Finland, Sweden, Denmark and Estonia. Japan, Latvia and Spain also operated the Bulldog.

A12-2 Royal Australian Air Force
The Royal Australian Air Force operated a total of 8 Bristol Bulldogs from 1929 to the outbreak of WW2.

Estonian Air Force
A total of 12 machines were operated by theEstonian Air Force during the 1930s.

Royal Danish Air Force
4 Bulldogs were operated up until the German occupation of Denmark in April of 1940

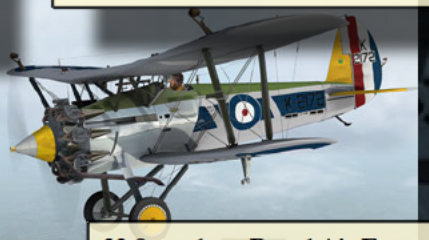
Swedish Air Force
Sweden took delivery of 8 aircraft in 1931. In December of 1939, 3 of these aeroplanes were given to Finland to aid in their fight against Russia in the 'Winter War'.

17 Squadron Royal Air Force
Together with 3 Squadron, 17 was the first squadron to take delivery of the Bulldog, in 1928.

19 Squadron Royal Air Force
19 Squadron operated the Bristol Bulldog from 1931 to 1935 at Duxford. This squadron that was the first to fly the all new Spitfire just a few years later.

23 Squadron Royal Air Force
Between the wars, there was no need for drab camouflage so bright insignia, flashes and stripes abounded to differentiate the various squadrons, flights and commanders in the air.

29 Squadron Royal Air Force
This squadron was home to the famous WW1 VC, James McCudden. 29 flew the Bulldog from 1932 to 1935.



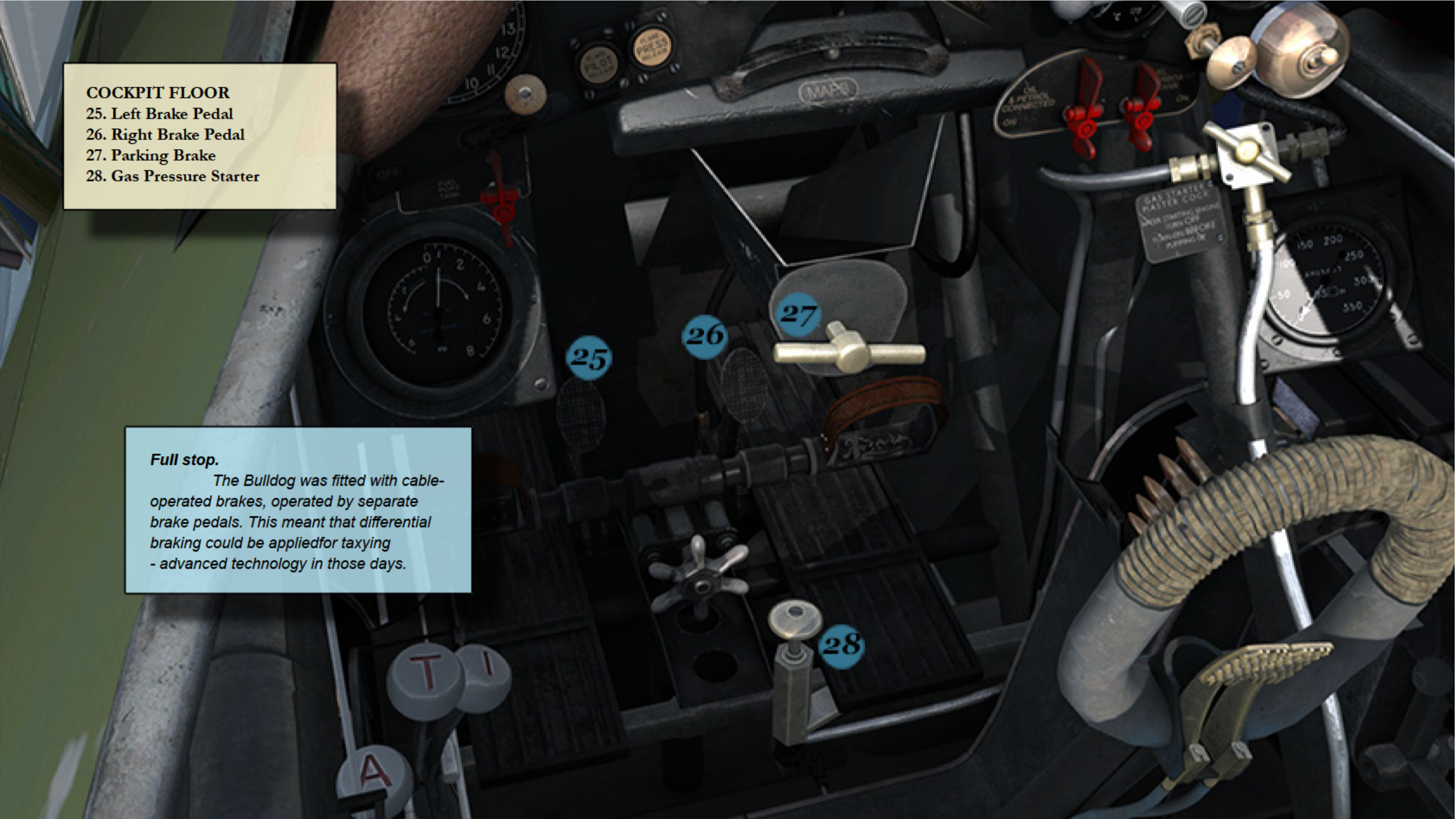
32 Squadron Royal Air Force
Based at Kenley. Coloured fin flashes were used to distinguish flight leaders and squadron commanders.

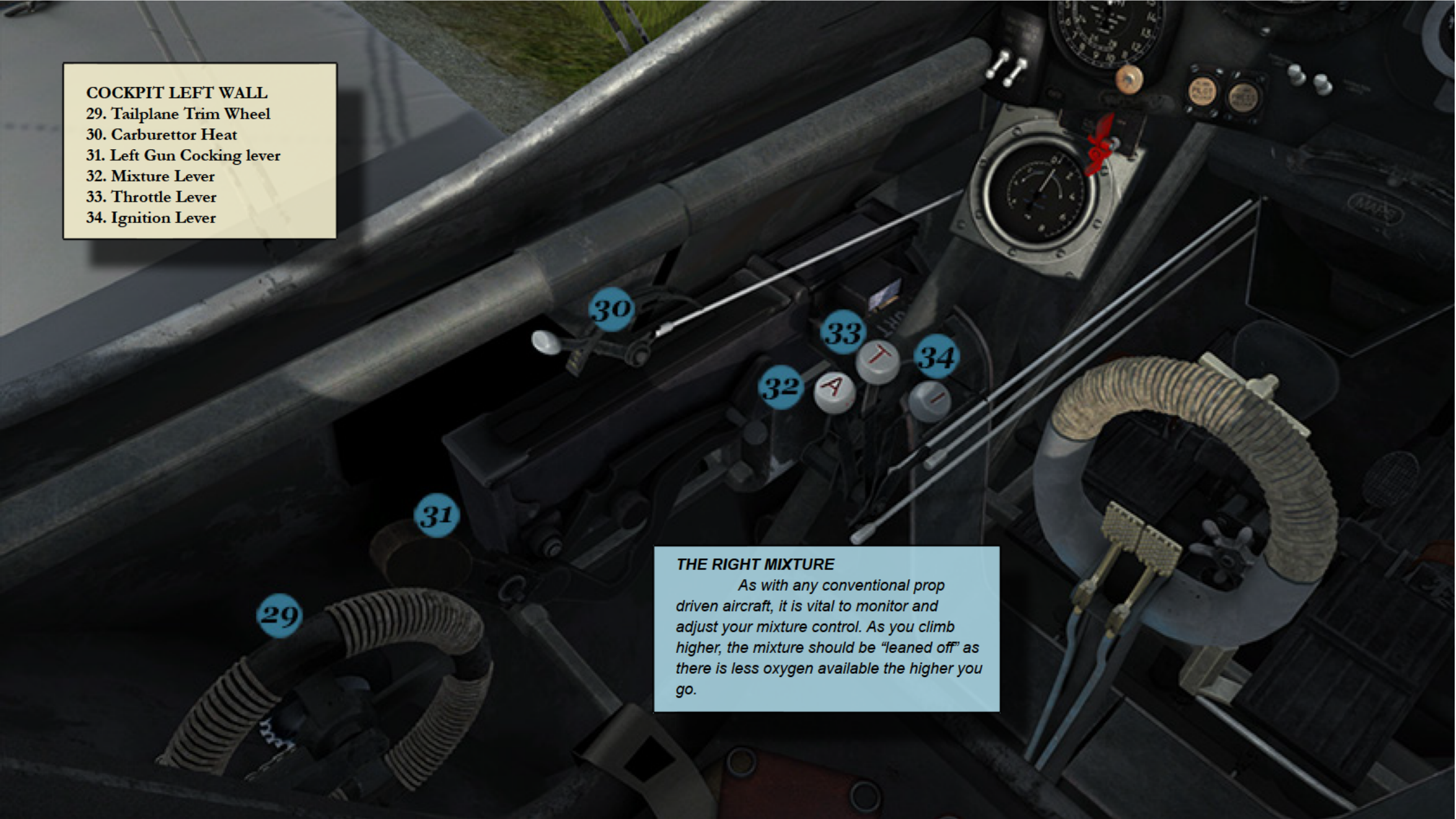
32 Squadron Royal Air Force
Another 32 Squadron aircraft from 1933 when based at Biggin Hill

54 Squadron Royal Air Force
This machine carries the Squadron Leader'spennant on the fin. As flown in 1932. Just 8 years later this squadron was in the thick ofthe Battle of Britain.

56 Squadron Royal Air Force
Perhaps the most famous example of the type, this is the machine in which P/O DouglasBader lost both legs and nearly his life when attempting a slow roll too close to the ground.


COCKPIT MAIN PANEL
1. Magnetos
2. Boost Pressure
3. Port Tank Cock
4. Altimeter
5. Fuel Contents Guide
6. Airspeed Indicator
7. Pilot ON/OFF toggle
8. Navigation equipment
9. Formation Light
10. Navigation Lights
11. Gyro Compass
12. Inclinometer
13. Cockpit torch
14. Tachometer
15. Magneto Hand Crank
16. Fuel/Oil Main Cock
17. Starboard Tank Cock
18. Oil Temperature
19. Chronometer
20. Oil Pressure
21. Accessories toggle ON/OFF
22. Starting Magneto
23. Gas Pressure Cock
24. Gas Pressure


COCKPIT FLOOR
25. Left Brake Pedal
26. Right Brake Pedal
27. Parking Brake
28. Gas Pressure Starter
25
26
27
28
Full stop.
The Bulldog was fitted with cable-operated brakes, operated by separate brake pedals. This meant that differential braking could be appliedfor taxying - advanced technology in those days.


COCKPIT LEFT WALL
29. Tailplane Trim Wheel
30. Carburettor Heat
31. Left Gun Cocking lever
32. Mixture Lever
33. Throttle Lever
34. Ignition Lever
30
33
34
32
31
29
THE RIGHT MIXTURE
As with any conventional prop driven aircraft, it is vital to monitor and adjust your mixture control. As you climb higher, the mixture should be "leaned off" as there is less oxygen available the higher you go.

Navigation

The real Bulldog had no sophisticated navigation aids. It had a compass and that was it. Pilots relied on map reading and dead-reckoning to get where they wanted to go.

Now, we understand that such a beautiful open-cockpit aeroplane would be a waste if you couldn't enjoy all the challenges that navigation in a modern simulator can bring.

So we have included a "secret" navigation suite in the form of an RMI (A) with NAV1 and ADF needles set against a Directional Gyro Card and a full radio suite consisting of Comms (B), Nav1 (C) and ADF (D).

It is not the job of this guide to teach navigation or discuss VFR and IFR flight rules. There are plenty of tutorials and other materials available on the web and the simulator has its own section on navigation.

Suffice to say that with the equipment provided you can carry out most navigation tasks successfully.

Use the right hand button (8) to toggle the navigation suite on and off.

Where's the fuel gauge?

Ok, so you're scanning the panel tryingto work out where the fuel gauge is?. Well, it's not there.

There are two gauges (one for each tank) but they are mounted at the top of the cabane strut for each upper wing. They are simple in design and rotate to show different colours as the fuel is used up.

The colour guide plate ***(5)*** *indicates the fuel state.*

Flying The Bristol Bulldog

Like most simulation add-ons, the Bulldog will start and run quite happily using Cntrl/E.

However for the full immersive experience we recommend that you begin your flight form a "cold,dark" state. That is all switches off controls at neutral.

The electrical system of a Bristol Bulldog is actually no more complex than a motorcar of the same period and in some ways is very similar. A wind-powered generator, mounted on the starboard lower wing supplies power for lighting and instrumentation etc.

Starting is mechanical and via a gas-pressurised system which uses fuel vaporised under air pressure.

Fuel is supplied from the upper wing tanks via two separate cocks and thence through a master cock which also turns on the oil supply.

Firstly, check fuel contents in each tank against the guide mounted on the instrument panel shroud. Then, switch the two tank cocks ON, followed by the master fuel/oil cock.

Before you go any further, check that the parking brake is applied. The wheel brakes are operated by wires run from the wheel brake drums up to two pedals adjacent to the rudder pedals and a centrally mounted brass lever acts as a parking brake by pulling on both pedal wires.

Check that wheel chocks are in position. A brass button on the right lower instrument board serves as a switch to toggle the chocks on and off together with other pre-flight accessories.

Open the carburettor air control to warm air position.

Check that the throttle is closed and the mag switches and starting magneto switch are OFF.

Pull the Mixture control (Marked A for altitude) all the way back to full rich position.

Make sure the Ignition lever is pushed fully forward. Advancing and retarding the ignition, exactly the same as in an old-school car engine, will allow you to adjust engine performance.

On the right side, at knee level is the brass cock lever for the pressure start system.

This release air under pressure into a small fuel reservoir and pressurises the fuel, vapourising it to a gas. A gauge to the right of the cock will rise to 200 PSI to show the system is ready.

The engine's ignition system has a hand-cranked starting magneto in the cockpit and a "running" magneto set in the engine area.

Switch ON the starting magneto switch to open the magneto circuit, this is the big brass switch mounted on the right side of the instrument board.

Now click on the hand-operated starting magneto. As it is turning , you have approximately 15 seconds to push down the gas starter mounted on the floor and hold it until the engine starts.

With the engine running, turn off the gas starter pressure cock.

Switch UP/ON the two running magneto switches on the left of the instrument board and turn OFF the starting magneto switch.

Warm up the engine at 1,000RPM

MAG checks

Open up to 1,200 RPM and switch OFF each magneto in turn for a very brief moment. Observe the tachometer and you should see no more than a drop of a few RPM.

Throttle back to idle the engine.

Now throttle up to approximately 1,550 RPM and check that you have 0 lbs Boost.

Check the MAGS again and there should be no more than a 30RPM drop for each mag.

Slowly throttle back to idle.

You are now ready to taxy.

Press the brass button and toggle off the wheel chocks and accessories.

Release the parkbrake and hold the aircraft on the brakes.

Open the throttle slowly to get moving and then use judicious throttle to keep the aircraft rolling at a slow speed.

Steer with rudder and differential brake.

TAKEOFF

Align the aeroplane with the runway/strip and apply the brakes and parkbrake.

Using the hand-wheel to the left of the seat, feed in about 1.5 degrees of nose up trim.

Check that the mixture control "A" is full y back in full-rich position.

Push the carburettor air control full forward to cold-air position.

Release the brakes and push the throttle forward SLOWLY. If the throttle is opened too quickly, you will experience a marked torque swing to starboard.

Check any swing with rudder to keep straight as you open up to full throttle.

The aeroplane will unstick at around 65 – 70 mph so be ready to catch any swing or torque "dip" of a wing. As you increase airspeed the aeroplane will settle down and fly quite level and without fuss.

CLIMB

The optimum speed for climb is 82 MPH which should be achieved at around – 1 ½ lbs (minus 1.5 lbs) of boost. You can open up to 0 lbs boost but only for short periods.

As you climb above 5,000ft. begin weakening the mixture by slowly pushing the "A" lever forward. You will hear a rise in RPM and power will increase. Continue to do this as you climb.

In level flight, properly trimmed, the aeroplane will virtually fly itself.

When manouevring, however, ensure to use plenty of rudder input in turns as aileron drag is quite high with this type of aeroplane.

CRUISE

The speed for cruise is 140 MPH which should be achieved at around – 1 ½ lbs (minus 1.5 lbs) of boost. For maximum endurance and economy, a speed of 92 MPH is recommended.

STALL

The aeroplane will enter a stall condition at speeds from lower than 50 MPH. The stall will drop the nose and possibly a wing. Normal recovery method is used with aileron and rudder control with the stick pushed slightly forward, to recover flying speed.

The speed for cruise is 140 MPH which should be achieved at around – 1 ½ lbs (minus 1.5 lbs) of boost. For maximum endurance and economy, a speed of 92 MPH is recommended.

AEROBATICS

The aeroplane is fully aerobatic but the following speeds are recommended for safe manoeuvres:

SLOW ROLL	140 MPH
BARREL ROLL	140 MPH
STALL TURN	140 MPH
LOOP	180 MPH
HALF ROLL OFF LOOP	190 - 200 MPH

CIRCUIT AND LANDING

Check all gauges and controls, especially mixture 'A' which should be fully back. Ignition should be full forward and carburettor heat in "Cold" position.

Approach speed should be 85 MPH for the intitial leg, crossing the threshold at 65-70 MPH. This should be higher if gliding. The optimum speed for a gliding approach is 75 -80 MPH.

Landing is quite straight forward with throttle cut, you will have just sufficient speed for a three-point landing. If landing on mains, allow the tail to drop by itself. Do not use the stick, you may stall and ground loop.

To shut down the engine, close the throttle, turn off both tank cocks and then the master fuel/oil cock followed by both magnetos.

CONGRATULATIONS! You have just completed your first check-flight in the RAF's new fighter. Ain't she beautiful?

We hope you enjoy your Bristol Bulldog MkIIA as much as we did building her.

The Aeroplane Heaven Team