



Welcome to the Hawker Hurricane IId “Tin Opener” package for Flight Simulator 2004: A Century of Flight.

Before you start, **[PLEASE READ THE AIRPLANE OPERATING TIPS](#)** found immediately below. While the Hurricane is a simple airplane, there are still some aspects related to operating it that are crucial to ensuring a safe, efficient flight. There will be a few highlights of critical areas that we'll begin with, and a more thorough coverage of technical data will follow that.

But before we get into that, a word about the IId model. This plane was considered by many to be the most deadly and accurate ground attack weapons platform the RAF had in WW2. It was particularly effective against tanks and other armored vehicles, hence the “tin opener” or “tank buster” label. But, it's a very heavy, high drag Hurricane variant; since it has extra armor protecting it against ground fire, and the combined drag from two Vickers 40 mm cannon, a Vokes desert filter, and the tropical cooling mod make it the slowest of all the Hurricanes.

Specifically, the cannon are nearly 10 ft long and weigh about 300 lbs each; the additional armor weighs 386 lbs; the radiator exit flap has two additional open positions due to the tropical kit installed for extra cooling that creates more drag with the flap fully open, and the Vokes filter also creates considerable drag. The Vokes filter alone causes an 8% reduction in speed.

All these factors conspire to limit the IId to a maximum speed of about 290 mph at a rated altitude of 17000 ft using a power setting of +12 psi and 2850 rpm, and the speed obtained using long range cruise power settings of 0 psi and 2000 rpm is only 152 mph, fully 28 mph slower than the IIa. A further note about speed: due to the additional weight and drag, you will need to tack on some extra speed during the approach to landing to compensate, and the IId will also require more power with full wing flap extension to maintain that speed, especially with the radiator exit flap fully open.

Airplane Operating Tips

All of the following aircraft operating tips are based on two years of email correspondence from people who downloaded a Touch the Sky Simulations Hurricane, but were confused about some aspect of it.

To begin with: this plane is **designed to be flown from the virtual cockpit**, and flight using the 2d panel is going to impose some limitations. Also, **follow the checklist** when flying this plane, by doing that, you will be properly set up for all operational conditions from startup to shutdown.

Undercarriage Position Lamps:



The Green undercarriage lamps must be switched to the “ON” position before they will illuminate, while the red lamps are on a separate circuit and operate from the battery bus. They will illuminate whenever the undercarriage is in the up and locked position. Switching for the red lamps is accomplished by the undercarriage up-lock catches engaging the stirrups on the main wheels and closing two micro-switches as the gear reaches the end of it's travel during the retraction cycle, and no pilot selectable option is available, except to switch to backup lamps in case the primary pair (either lamp or both) burns out. The backup changeover lamp switch is located to the right of the primary one, and in FS2004 will function to change to a backup pair of lamps. Failure of the primary pair is not simulated however. There is no intermediate undercarriage position indication on the Hurricane, it is either down and locked with two green lamps illuminated, or up and locked, with two red burning.

Auto-boost Cutout Control:



With the cutout control in the “ON” position, boost is automatically limited to below +12 psi. In an emergency, by operating the cutout to the “OFF” position, a maximum of up to +16 psi may be obtained, providing maximum power output from the Merlin XX. Be advised that operating at such high boost pressures is limited to 5 minutes duration only; operation beyond that time interval will result in engine damage and failure.

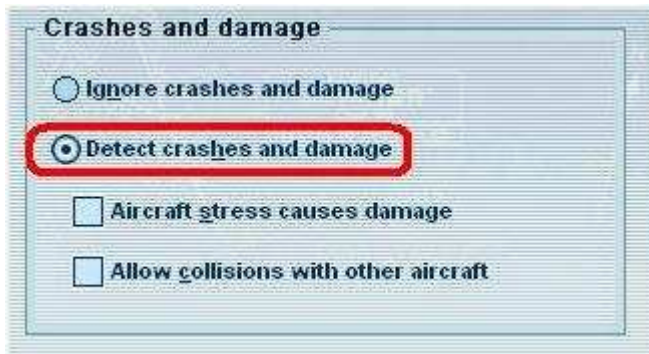
In RAF service, operating the cutout required a logbook entry noting the event, and a post-flight engine inspection to check for damage. It was not uncommon for damaged valves, pistons and rings to be found during the inspection; requiring replacement, and causing the airplane to be out of service until the damage was repaired. Operate this control with caution.

Should an engine failure occur, the engine and prop will stop completely and it will become dangerously quiet in the cockpit. Hydraulic power will **NOT** be available, since there is no hydraulic accumulator installed, and no emergency gear extension actuator either. On this airplane, a manual hand-pump acts as a backup device to provide pressure in an emergency. If sufficient altitude is available, you can unlock the gear using the emergency lever to the left of the rudder bar, then click on the hydraulic hand pump to the far right of the pilot's seat to lower the undercarriage. It will require about 50 "strokes" (mouse clicks) to bring up two green lights on the undercarriage indicator.

If the failure occurs at low altitude, then a wheels-up landing is your only safe option. Damage and custom effects for the aftermath of such an event are modeled, use spot plane view to have a look at the scene.



"Detect crashes and damage" must be selected in the FS2004 Realism menu for this feature to be enabled.

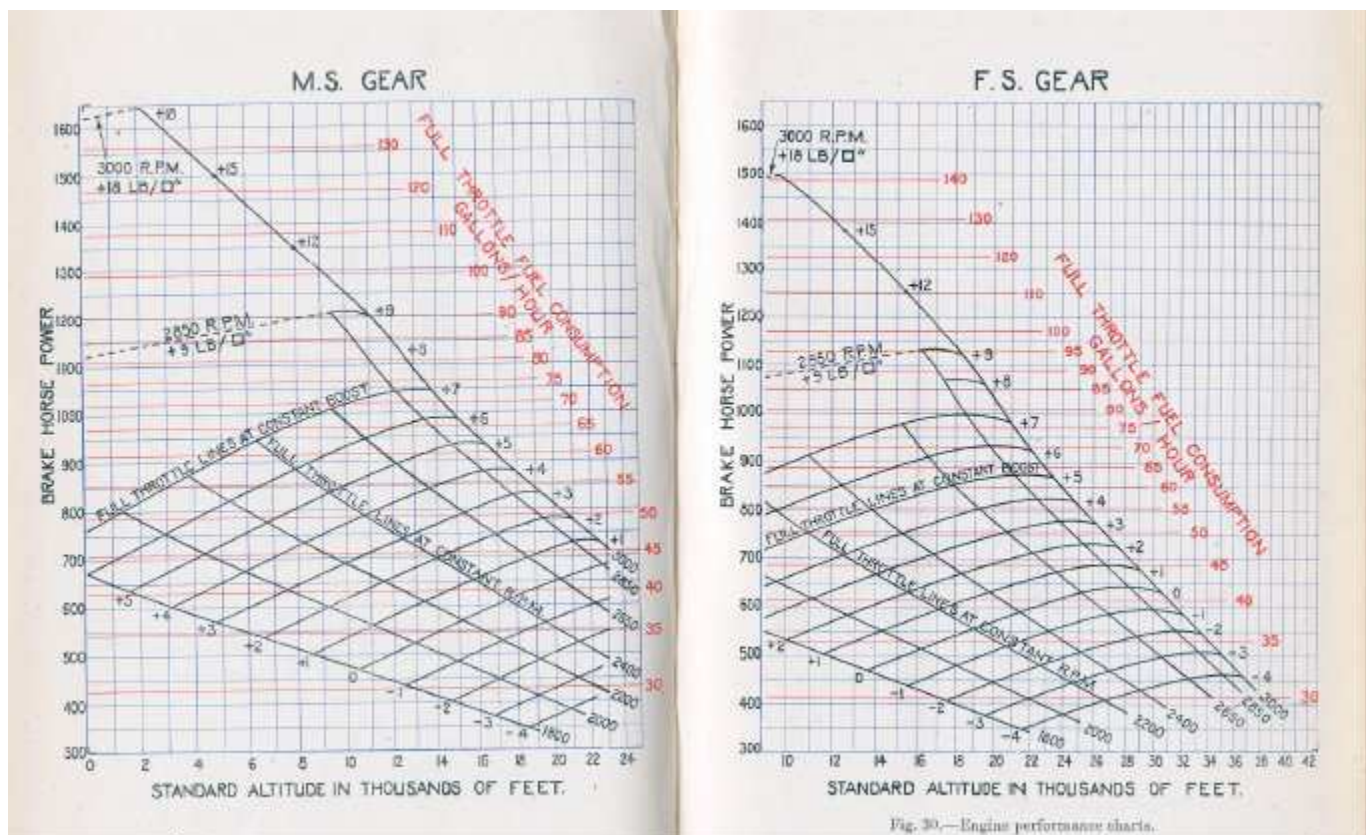


Supercharger:



The Rolls Royce Merlin Mk 20 features a manually operated two-speed single stage supercharger. The operating knob is located at the base of the main panel on the left hand side. The low altitude speed "M.S." for "moderate supercharging" provides full boost to around 10000 ft. Above 10000ft, boost will fall off progressively. Left in "M.S." mode, the aircraft will top out at about 24000 ft.

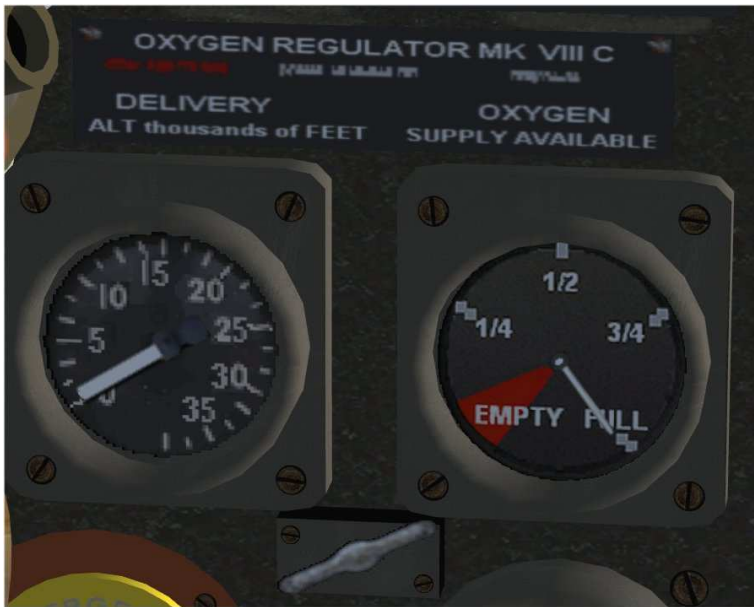
As you pass through 10000 -12000 ft you will observe the boost pressure begin to fall off. When it's dropped by about 5 psi (approximately 18,000') pull the knob to engage high gear "F.S" for "full supercharging". Boost will be restored and the aircraft will be able to climb to it's service ceiling of over 30000'. **For a maximum performance climb F.S. gear should be engaged as soon as the boost pressure begins to drop.**



Flaps:

Flaps are covered in detail below, but briefly stated, the Hurricane incorporates a relief valve that will open in response to excess dynamic air pressure and relieve hydraulic pressure to the hydraulic jacks (called flap actuators in the USA). This allows the flaps to retract to an intermediate position, or to retract fully if the dynamic pressure is high enough. This prevents damage from flap extension at airspeeds in excess of the limit of 120 mph. If you find yourself exceeding 120 mph (even briefly) on the landing approach, then the flaps will retract, and you will need to slow down to below 120 and lower them again.

Oxygen system:

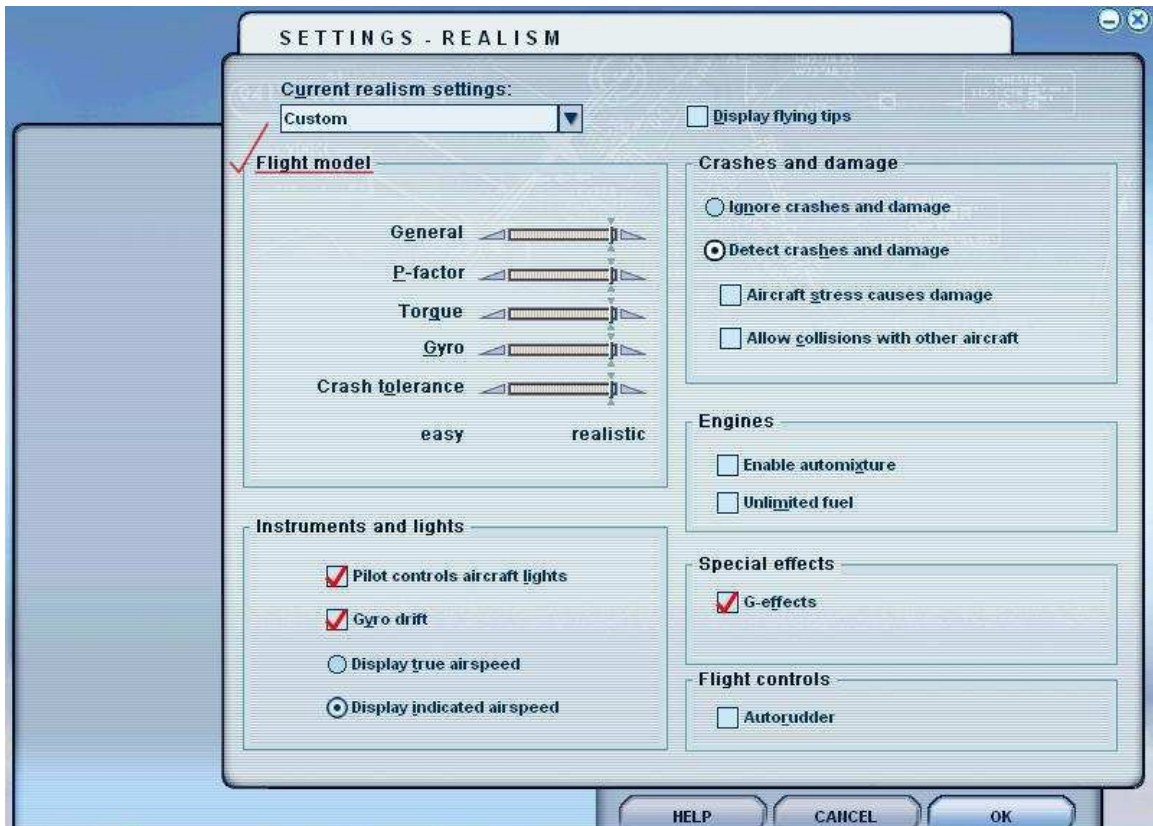


This airplane is configured for ground attack, but should you desire to fly at high altitude, then one O2 bottle is installed in the fuselage behind the pilot's seat. You'll need to turn the regulator to "ON" above 14000 ft to avoid "blackout". The pilot's mask will automatically appear at 14000 ft.

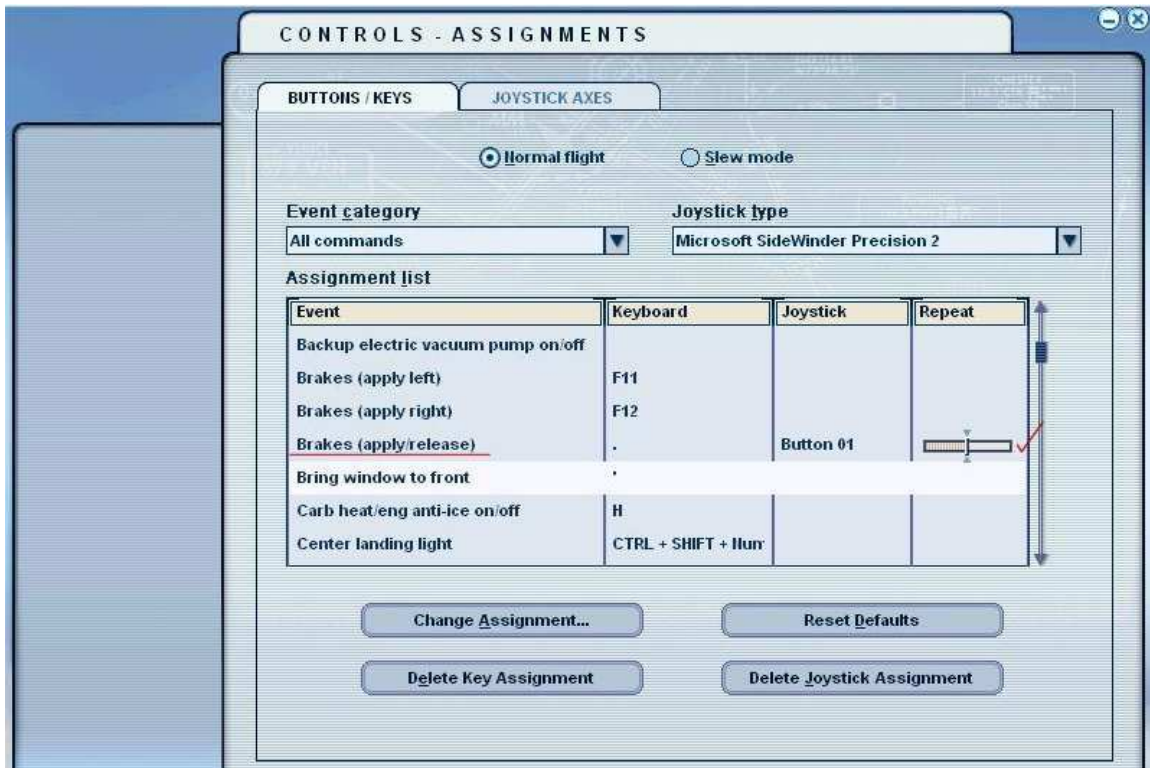
The information that follows applies to all Hurricane models, but remember — the IId model is heavier, and has much more drag than the others.

One final note, and a big difference from earlier Hurricane models: **there is no mixture control lever on the IId. The mixture is automatically controlled at all altitudes and requires no pilot input.**

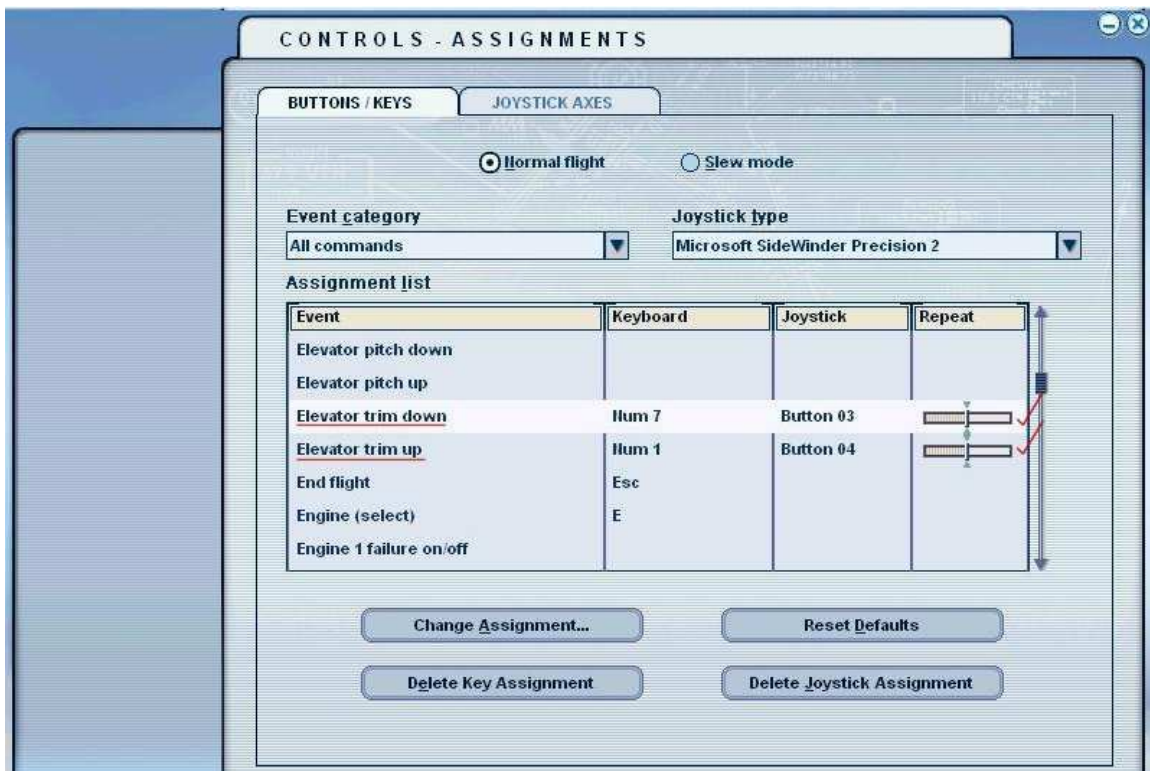
FS 2004 Settings:



In "Settings – Realism", set all the Flight Model sliders full right. This will enable spins.



In "Controls – Assignments", set the brakes repeat slider to the halfway position.



Next, scroll down and set the elevator trim repeat sliders to halfway also.

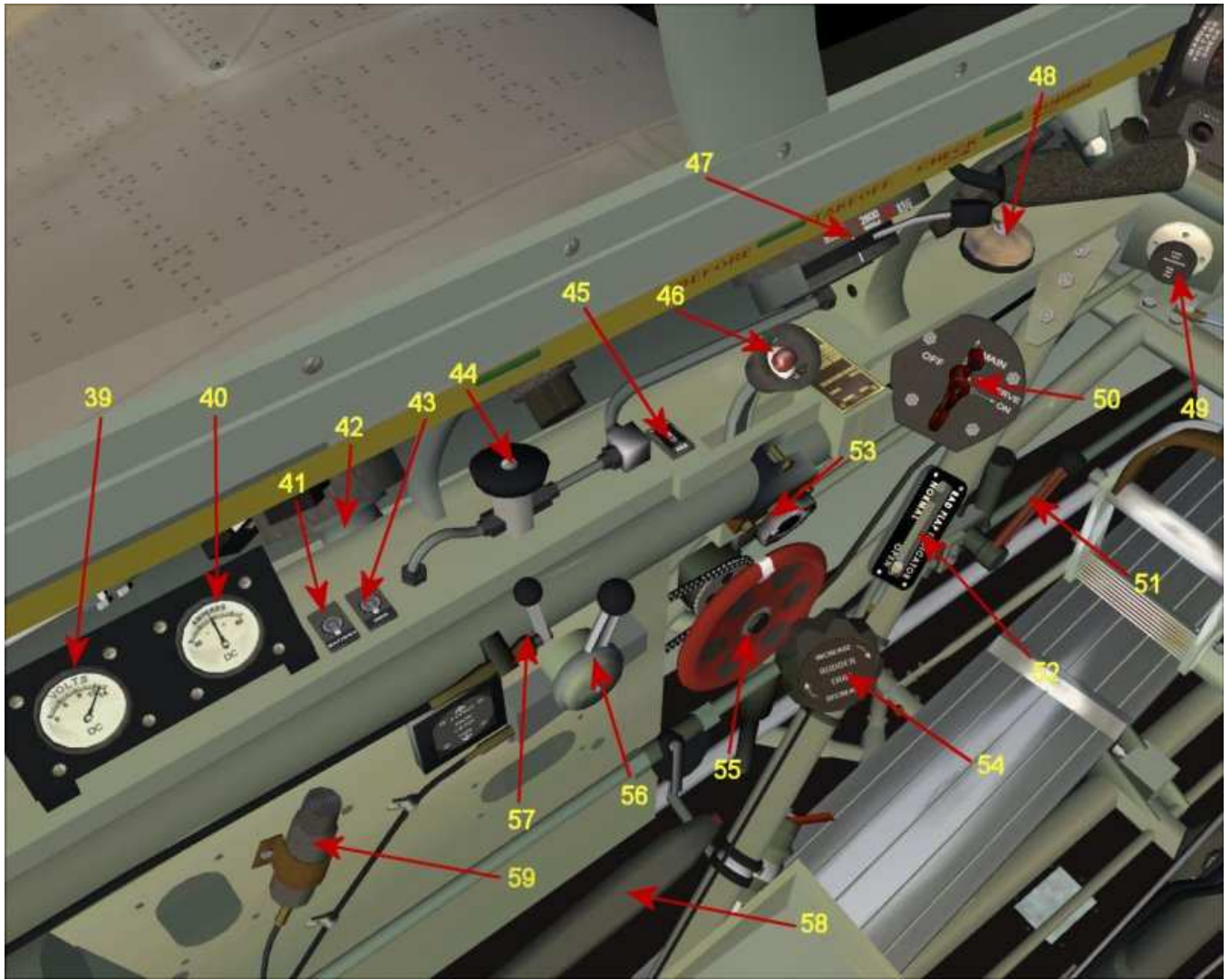
Setting the repeat sliders to halfway for the elevator trim events is recommended for all FS2004 planes that you want to fly without using the autopilot. It will allow you to trim with greater precision. For the Hurricane IId, setting the brakes repeat slider to the halfway position **is mandatory** if you want to have the proper braking power. When you're done flying the IId, you can easily return the slider to the full right position for use with other planes.



Cockpit Features

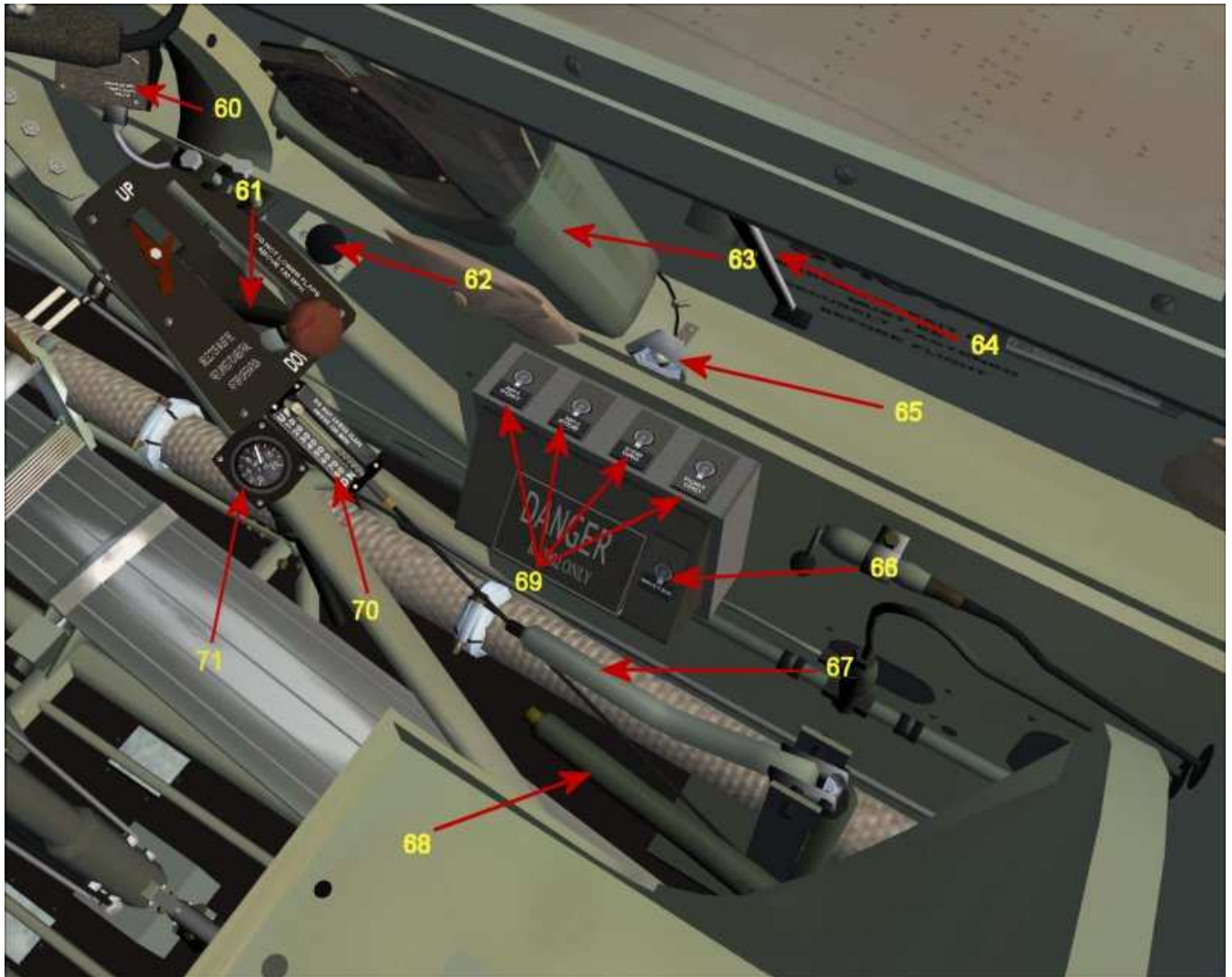
1. Gun Camera Footage Indicator
2. Ventilator
3. Generator Low Output Warning Light
4. Undercarriage Lamps switches (Normal and Changeover)
5. Undercarriage Position Indicator
6. Mk II Reflector Gun Sight

7. Bead Sight
8. Rocket Projectile Trajectory Adjuster (Click and **hold** to adjust graticule position for different ordnance types)
9. Dazzle/Sunscreen click spot (Click to raise/lower sunscreen)
10. Tachometer
11. Gun Sight On/Off Switch
12. Boost Gauge (Manifold pressure)
13. Fuel Tank Selector Switch (Click to display the contents of different tanks on the fuel contents indicator)
14. Ventilator
15. Low Fuel Pressure Warning Lamp (Illuminates below 6 psi)
16. Fuel Contents Indicator
17. Switch to Toggle Panel Icons Window
18. Coolant Temperature Gauge
19. Panel Light (Click to toggle panel lighting)
20. Primer
21. Oil Temperature Gauge
22. Oil Pressure Gauge
23. Turn and Slip Indicator
24. P8 Aperiodic Compass
25. Vertical Speed Indicator
26. Gyro Compass
27. Artificial Horizon
28. Altimeter
29. Airspeed Indicator (MPH)
30. Main Switch Panel (switches work in reverse, up is "OFF", down is "ON")
31. Eight Day Clock (click knob once to start/stop stopwatch timer)
32. Oxygen Contents and Delivery Altitude Gauges
33. Oxygen Supply On/Off Switch
34. Magneto Switches
35. Supercharger Control
36. Auto-Boost Control Cutout
37. Starter and Booster Coil Push Button Switches
38. Panel Light (Click to toggle panel lighting)



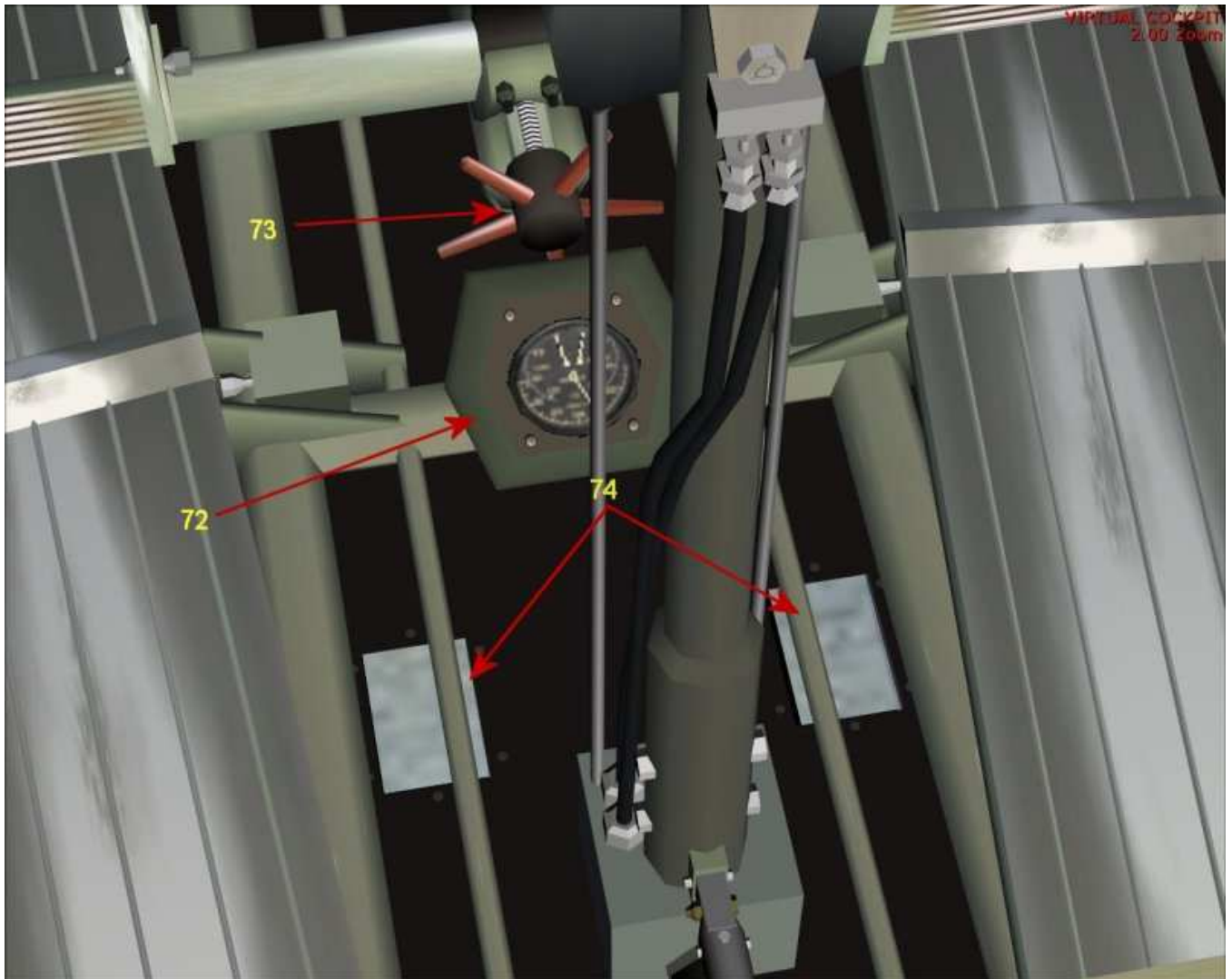
- 39. Voltmeter
- 40. Ammeter
- 41. Battery Master Switch
- 42. TR9 Radio Controller
- 43. Generator Master Switch
- 44. Oxygen Supply Valve
- 45. Cannon Arming Master Switch
- 46. Throttle with Cannon Firing Pushbutton
- 47. Propeller Control Lever
- 48. Landing Light Switch
- 49. Supercharger Control
- 50. Fuel Tank Selector Valve
- 51. Emergency Undercarriage Release Lever
- 52. Radiator Exit Flap Position Indicator
- 53. Throttle Friction Knob
- 54. Rudder Trim
- 55. Rudder Pedal
- 56. Rudder Trim Lever
- 57. Rudder Trim Knob
- 58. Rudder Trim Switch
- 59. Rudder Trim Indicator

- 55. Elevator Trim
- 56. Landing Light Dipping Lever
- 57. Hood (Canopy) Release
- 58. Radiator Exit Flap Control
- 59. Microphone



- 60. Signal Switchbox
- 61. Undercarriage Lever
- 62. Slow Running Cutout Control (Pull to Stop Engine)
- 63. Map Case
- 64. Emergency Exit Release Lever
- 65. Cockpit Light
- 66. Ordnance Release Arming Master Switch
- 67. Hydraulic Hand pump
- 68. Seat Height Adjuster
- 69. Port and Starboard Ordnance Arming Switches

- 70. Wing Flap Position Indicator
- 71. Hydraulic Pressure Indicator



- 72. Brakes Pneumatic Pressure Gauge
- 73. Rudder Bar Adjuster
- 74. Undercarriage Sight Windows

Warm-up/taxi

Follow the checklist. Heed the cautions and warnings regarding oil and coolant temps.

Check the brake pressures before taxi by opening the triple-pressure gauge window (Shift+6).

Check supply pressure (minimum 200) and left/right brake pressures (minimum 80). If you set the Brakes Apply/Release repeat slider to the halfway position as

recommended, then the differential brakes pressure needles will fluctuate as brake pressure is applied to each wheel in turn. This is normal.

For parking, the Hurricane can be swung around into a tight spot by locking one brake with differential braking, fully deflecting the rudder in the appropriate direction, and opening the throttle until the blast of air from the prop over the rudder swings the tail around.

Taxi

Taxiing: To taxi this plane, about 1500 rpm is needed to breakaway and roll. After that, power should be adjusted to maintain a slow pace. The recommended procedure is to taxi slowly and "S" turn to clear the way forward. Turns should be initiated at a slow speed, and full rudder deflection along with a little increased power will give the best turning response. Differential braking should be used only in tight spaces, or emergency situations. As soon as you begin a turn, you should be thinking about stopping it, and by using full rudder deflection initially until the plane begins to respond. Increased power along with full rudder deflection will increase the steering effect. Learn to use power and rudder in a coordinated manner for best results when taxiing.

Run-up

Follow the checklist, and do not exceed 0 lbs/sq/in boost or the aircraft **WILL GO UP ON ITS NOSE!!**



The real aircraft is exactly the same, for full power ground runs the maintenance manual requires two men on the tail, or that the tail be tied down to a properly set picket.

You can further confirm operation of the constant speed prop by observing the edge of the prop disk as you cycle the prop RPM from high to low. The edge of the disk in the Virtual Cockpit should move as the blades change pitch.

Before Takeoff

Follow the checklist, and confirm that the elevator trim is set to neutral (0 deg - white mark on trim wheel should be at the top), and the rudder trim is set FULL RIGHT (+10 deg).

The aircraft will be trimmed for about 150 MPH IAS with neutral elevator trim, very near the middle of the climb speed range.

While there is plenty of rudder authority for even a full power takeoff with neutral rudder trim (0 deg), takeoffs are much easier affairs using the FULL RIGHT setting recommended for the real aircraft. If you bring up the Rudder Trim window (Shift+6) before takeoff you can easily adjust the rudder trim after takeoff when power is reduced to climb power settings. +2 deg RIGHT RUDDER TRIM is a good starting place for most climb power settings.

If you are flying this aircraft with Flight model sliders set to 'Easy', the above should not apply.

Takeoff

Operations with the Hurricane are much easier from grass runways and into the wind. The real aircraft was designed to operate that way, and the same is true in FS 2004. Crosswind ops from hard surfaces are possible though, and only a little more challenging.

The throttle should be opened slowly to +9 lbs/sq/in boost for takeoff. Acceleration is rapid, and things will happen rather quickly once the boost pressure passes 0. The left wing will dip and the aircraft will gain speed rapidly. Use right rudder and stick to maintain compass heading and counter the torque. Watch the edges of the runway to your left and right to maintain position.

With rudder trim set FULL RIGHT, slight right rudder pressure will compensate for the swing to the left and back pressure on the stick at 80 MPH IAS will see you off. Watch for the left wing drop after lift-off due to torque. You can hold right aileron during the takeoff roll if you like, but it's just as easy to pick up the wing once airborne. Takeoff distances will vary according to aircraft weight and atmospheric conditions, but 300-350 yards is the norm.

Climb

Raise the undercarriage as soon as possible after a positive rate of climb is established, the landing gear speed limit of 120 MPH IAS is all too easy to exceed due to the acceleration of the aircraft and the lengthy retraction time. If necessary, pitch up to hold the airspeed below 120 MPH IAS until you see two red lamps illuminated on the undercarriage indicator, indicating gear up and locked.

For a maximum power climb +9 lbs/sq/in boost can be maintained and RPM reduced to 2850. In theory, this power setting can be maintained for 1 hour. In practice, it's best to limit all power settings over +4 lbs/sq/in boost to 15 minutes or less.

A more normal power setting for the climb is +6 lbs/sq/in and 2600 RPM, this will result in a climb rate of around 2000 FPM at 150 MPH IAS.

Since the Hurricane has a limited internal fuel capacity, you may want to use +4 lbs/sq/in and 2600 or 2300 RPM to save fuel and extend range.

At 14000' turn on oxygen.

At 15000' or when boost bleeds off about 5lbs, set supercharger to high gear.

Continue to climb to desired altitude.

The checklist has a chart with speeds for maximum rate of climb vs. altitude.

Cruise

Slightly before cruising altitude is reached, begin the level off with forward stick and allow the aircraft to accelerate while closing the radiator flap (shutter). Expect a slight pitch change as the radiator flap closes, and note that the airspeed increases more rapidly with the cooling drag reduced. Begin trimming nose down as the speed builds up and start reducing power and prop RPM to the cruising values. +4 lbs/sq/in and 2600 RPM is the maximum continuous cruise power setting. A good power setting to use for economy is 0 lbs/sq/in and 2000 RPM. That power setting will result in an airspeed of about 180 MPH IAS (152 in the IId model) and a fuel consumption rate of 36 gal/hr. For even better fuel economy, 1800 RPM can be used at boost pressures up to +4 lbs/sq/in.

During cruise, altitude and heading can easily be maintained by proper use of elevator and rudder trim.

For high altitude flight don't forget to turn the oxygen on.

Descent

Follow the checklist, and remember that the never exceed speed of the Hurricane is 390 MPH IAS.

Don't forget to open the radiator flap (shutter) for extended descents at low airspeeds.

Flap Operation

Notes on Hurricane flaps: Flap operation on the real aircraft is a little unusual. A single lever (gear and flap selector lever) controls both undercarriage operation and flap operation.

The lever operates in an 'H' pattern, much like the shift lever in an automobile. The left side of the 'H' controls the undercarriage, with the top of the 'H' being gear up and the bottom position gear down. The selector lever must be returned to the neutral position after the undercarriage has reach the up or down position, or it might jam.

The flaps are operated on the right side of the 'H', and the lever is placed at the top or bottom for flaps up or down. There are no detents for flap operation, the lever is simply moved to either up or down; the flap position indicator is then monitored, and when the flaps reach the desired position the selector lever is returned to neutral.

The real Hurricane has a pressure relief valve installed in the hydraulic supply pipe to the flap hydraulic jacks. If the load on the flap surfaces caused by the airflow exceeds a certain value (at greater than 120 MPH) the backpressure in the system from the airflow will open the relief valve and by-pass the hydraulic jacks. With pressure removed from the jacks and the selector lever in neutral the flaps will be 'blown up' to the retracted position or to some position in between.

Should the flap lever be left in the down position (which would result in full flap extension of 80 deg +/- 5) and the airspeed limit then exceeded causing the flaps to retract, when the airspeed is once again below 120 MPH the flaps will fully extend.

This was difficult to model with 100% fidelity, so the FS2004 Hurricane will behave as if a thoughtful and careful pilot returned the selector lever to neutral after every flap operation. Exceeding 125 MPH IAS will cause the flaps to retract to the 1st or 2nd division on the flap indicator, and they will remain there until the speed is reduced below 120 MPH IAS, and flaps down is once again commanded by the methods described below.

As mention elsewhere in the Aircraft Documentation, the right (flap) side of the selector lever is not used in FS2004, and the flaps may be raised or lowered by clicking on the flap indicator or by joystick assignments or keyboard commands.

But mind your airspeed, or you will find yourself needing to slow down and lower them once again!

Approach

Follow the checklist, don't forget the radiator flap, and remember that the maximum speed for gear and flap extension is 120 MPH IAS.

Any type of approach may be used; I favour the fighter pilot's 'run and break' as the aircraft is very stable and may easily be flown at very low altitudes and high airspeeds over the runway or landing field before performing a chandelle onto the downwind leg.

Once established on the downwind leg gear and partial flaps can be extended once the airspeed allows (increasing prop RPM will add drag and help you slow down to gear and flap extension speed, throttle closed until the warning horn sounds will also help), and if you time it right this should occur abeam the numbers or sooner. Turning crosswind the flaps should be lowered fully, power and prop adjusted and if necessary a very steep approach can be made if you are too high. Should full flaps not provide a steep enough approach, the throttle can be fully closed (unlike a radial engine, back-loading is not a problem with a V-12) and a forward slip used to lose excess height.

A curving approach from the crosswind leg is recommended, rather than a long straight final. This is how the real aircraft is operated, and it works really well in FS 2004.

For those pilot's who lack experience with this type of approach, the more usual 'square' traffic pattern can be flown, but leave full flaps for late in the approach, until well established on final and at or under 350 ft AGL. A long straight 'airliner style' stabilized approach with full flaps is not recommended. 80 deg of flaps creates a lot of drag and the unwary can find themselves 'behind the power curve' rather quickly.

Bear in mind that reduced aileron response at low airspeeds is modelled with this aircraft. You will need to move the stick more at 95 MPH IAS than at 180 MPH IAS for the same roll response.

Note: The speed numbers are indicative only as approach speeds are dynamic according to the environment. The usual method to calculate approach speed in any light aircraft is 1.3 times the stall speed in the landing configuration (V_{so}), plus all of the steady wind speed and $1/2$ the gust speed.

Go-Around

Follow the checklist.

Landing

Three-point is preferred, but a wheel landing may be more easily accomplished. There is nothing especially difficult about either a three-point or wheel landing, provided it is made into the wind. Crosswind landings are a little more challenging, but may be satisfactorily accomplished using the sideslip method.

Do not use the crab method of crosswind correction until touchdown with this aircraft. Transition to a sideslip at the appropriate moment on short final.

A final caveat about approach and landing - the real Hurricane had a reputation for being a little hard to handle, and also unforgiving, certainly more so than the more docile and higher performance Spitfire. This has a lot to do with the lateral stability and spin characteristics, the Hurricane being only just stable longitudinally. Many real world Hurricane pilots lost their lives or were gravely injured from inadvertent spin entry, or from an accidental stall on landing that dropped a wing and the nose and resulted in the aircraft going straight into the ground. Most of those accidents occurred during the landing approach, although some occurred during hard manoeuvring in combat when recovery from an inadvertent spin that continued until it went flat proved impossible. While the FS 2004 version is much friendlier in that respect than the real aircraft, it is possible to get too slow on approach (especially with full flaps) and run into trouble. The FS 2004 Hurricane will drop a wing quite sharply when it stalls, almost as sharply

as the real aircraft which will drop a wing beyond the vertical in a full stall. Bear this in mind if you are going for a full stall three-point landing - your wheels had better be very close to the runway when this aircraft stalls. If you are too high and stall you will drop in hard wing low on one wheel. The Hurricane has a very soft springy undercarriage (wartime and contemporary footage shows Hurricanes bouncing quite a bit on takeoffs and landings from grass airfields) and at best the resulting landing is not going to be pretty, at worst you will depart the runway in a spectacular ground loop after rocking violently from wingtip to wingtip.

Use the brakes as little as possible after touchdown. It's best to apply them intermittently, or if the runway remaining allows, to let the aircraft slow to taxi speed without using the brakes at all. Watch the sides of the runway to maintain directional control on rollout after landing. It is much easier to maintain directional control rolling out on grass than on hard surfaces.

Crosswind landings

If possible, always land into the wind on a grass surface. If a crosswind landing must be made, use a crab and transition to a wing low sideslip before touchdown.

After Landing

Follow the checklist.

Engine Shutdown

Follow the checklist.

Stalls

At the stall one wing drops sharply - left or right wing - with flaps either up or down.

Depending on aircraft weight:

Stall Speed Gear and Flaps up – 70-90 MPH IAS

Stall Speed Gear and Flaps down – 65-75 MPH IAS

Spins

On the real aircraft, spins are not to be started below 10000 ft, and recovery is to be initiated before two turns are completed.

For the FS2004 Hurricane, it is good practice to climb to a minimum of 8000 ft before entering a spin as altitude loss in a fully developed spin can approach 1000 ft per revolution. A full rudder input at the stall in the spin direction desired will accomplish the spin entry. Hold the rudder input until the spin is established and then return the controls to neutral. The first two turns are slow, followed by very rapid auto-rotation. Recovery may be accomplished at any time by using full rudder opposite the spin direction and forward stick to break the stall. Ailerons should remain NEUTRAL at all times during spins. Once the spin is well developed, the airplane will auto-rotate with all controls neutral.

Spinning with the undercarriage and flaps down is not approved, as the 120 MPH limit speed will be exceeded in the spin recovery.

Aerobatics

Aerobatic Speeds:

Loop - at least 280 MPH IAS

Roll – 220-250 MPH IAS

Half Roll Off Loop – at least 300 MPH IAS

Upward Roll – 300 MPH IAS

Power Settings and Fuel Consumption

The approximate fuel consumption at high power settings is as follows:

RPM	BOOST lb/sq/in	GAL/HR
3000	+12	115
3000	+9	100
2850	+9	95
2650	+7	80

Leading Particulars

Main Dimensions - Complete Aircraft - (Datum line horizontal except where otherwise stated).

Length.....32ft. 3in.

Span.....40ft. 0in.

Ground angle tail down.....10°

Overall heights :-

1 blade vertically upwards.....12ft. 0.5in.

1 blade vertically downwards.....11ft. 10in.

1 blade vertically upwards, tail down....13ft. 3in.

1 blade vertically downwards, tail down..10ft. 5in.

Fuselage

Length (propeller-shaft to rear fin-post) 28ft. 10.5in.

Height, maximum..... 6ft. 7.5in.

Width, maximum..... 3ft. 3.25in.

Wings

Aerofoil section, at root.....Clark YH 19% modified

Aerofoil section, at tip.....Clark YH 12.2% modified

Chord at root..... 8ft. 0.25in.

Chord at tip, ignoring washout..... 3ft. 11.25in.

Incidence (aerofoil to fuselage d/l)..... 2°

Dihedral (outer plane d/l)..... 3.5°

Sweepback on front spar..... 3°

Sweepback on leading edge..... 5° 6'

Center Section

Span (joint pin centers)..... 9ft. 1.5in.

Chord..... 8ft. 0.25in.

Incidence (aerofoil to fuselage d/l)... 2°

Dihedral..... Nil

Sweepback..... Nil

Tail Plane

Span.....11ft. 0in.

Chord, (maximum), inc. elevator..... 4ft. 2.5in.

Incidence (aerofoil to fuselage d/l)... 1.5°

Dihedral..... Nil

Sweepback..... Nil

Areas

Main plane, with ailerons and flaps...257.60 sq ft.
 Ailerons, total..... 20.40 sq ft.
 Flaps, total..... 25.11 sq ft.
 Tail plane, with elevator and trim tabs... 33.26 sq ft.
 Elevator and trim tabs..... 13.46 sq ft.
 Trim tabs, (two), each..... 00.38 sq ft.
 Fin with rudder and tab..... 21.89 sq ft.
 Rudder, with tab..... 13.06 sq ft.
 Tab..... 00.36 sq ft.
 Control Surfaces - Settings and range of movement
 Tail plane.....Fixed
 Fin - leading edge offset to port..... 1.5°Aileron droop (at inner end).....Nil
 to 0.25in
 Aileron movement - up.....22.0°
 Aileron movement - down.....21.0°
 Elevator movement - up.....27.0°
 Elevator movement - down.....26.0°
 Trimming tabs, movable.....23.0°U and D
 Trimming tabs, fixed..... 5.0°Up
 Rudder, port and starboard.....28.0°
 Rudder tab - trimming movement-port only.15.0°
 Rudder tab - balance movement-P and S....20.0°
 Flaps, down +/- 5°.....80.0°
 Tolerances on ranges, except flaps +/-... 1.0°
 Undercarriage - Main Wheel Units
 Type.....Two separate shock-absorber struts, retracting inwards and
 backwards.
 Track.....7 ft 10 in
 Shock-absorber struts...Vickers oleo-pneumatic
 Wheels.....AHO 10019 or AH 8123
 Tyre....IVV 12 ivv 13 or IVV 17, 8 in x10 ¼ in
 Tube...IVV 8
 Brakes...Dunlop pneumatic
 Undercarriage - Tail Wheel Unit

Type...Non-retractable shock-absorber strut with fully castoring pneumatic wheel.

Shock-absorber strut....Dowty oleo-pneumatic C.6595 or C.7941

Wheel.....Dunlop AHO 5048

Tyre...("Ecta" W.M. 11 or W.M. 14, 4.95 in for 3.5 in wheel).

Engine

Name...Merlin XX

Type...12 cylinder 60 deg two-speed supercharged, geared, liquid cooled

Direction of rotation....Crankshaft - Left hand...Propeller shaft – Right hand

Fuel pumps...type – EP2 Mk. II-1

Coolant...70% distilled water + 30% ethylene-glycol DTD 344A

Propeller

Type.....Rotol variable-pitch external cylinder group

Diameter....11 ft 3 in

ENGINE LIMITATIONS MERLIN XX (20)

Max. take-off to 1,000 ft - R.P.M..... 3,000

Max. take-off to 1,000 ft - Boost..... +12 lb/sq in.

Max. take-off to 1,000 ft - Temp, Coolant.. -----

Max. take-off to 1,000 ft - Temp, Oil... -----

Max. climbing, 1 hr. limit - R.P.M..... 2,850

Max. climbing, 1 hr. limit - Boost..... + 9 lb/sq in.

Max. climbing, 1 hr. limit - Temp, Coolant 125° C **

Max. climbing, 1 hr. limit - Temp, Oil.. 90° C

Max. continuous - R.P.M..... 2,650

Max. continuous - Boost..... + 4 lb/sq in.

Max. continuous - Temp, Coolant..... 105° C **

Max. continuous - Temp, Oil..... 90° C

Max. combat 5 mins limit - R.P.M..... 3,000

Max. combat 5 mins limit - Boost..... +14 lb/sq in.*

Max. combat 5 mins limit - Boost..... +16 lb/sq in.*

Max. combat 5 mins limit - Temp, Coolant... 135° C **

Max. combat 5 mins limit - Temp, Oil.... 105° C

NOTES :

* Combat boost is obtained by operating the boost control cut-out

** 115° C coolant temperature is permitted for short periods at cruising rpm.

Oil pressure - normal..... 60-80 lb/sq in.

Oil pressure - minimum..... 45 lb/sq in.

Min. temp. for take-off - oil..... 15° C

Min. temp. for take-off - coolant..... 60° C

Fuel pressure..... 8-12 lb/sq in.

Vickers 40mm cannon

Length.....9.75 ft

Weight.....295 lbs

Rate of Fire.....100 rpm

Projectile Weight.....2.99 lbs

Muzzle Velocity.....1870 fps

Muzzle Energy.....163000 ft/lbs

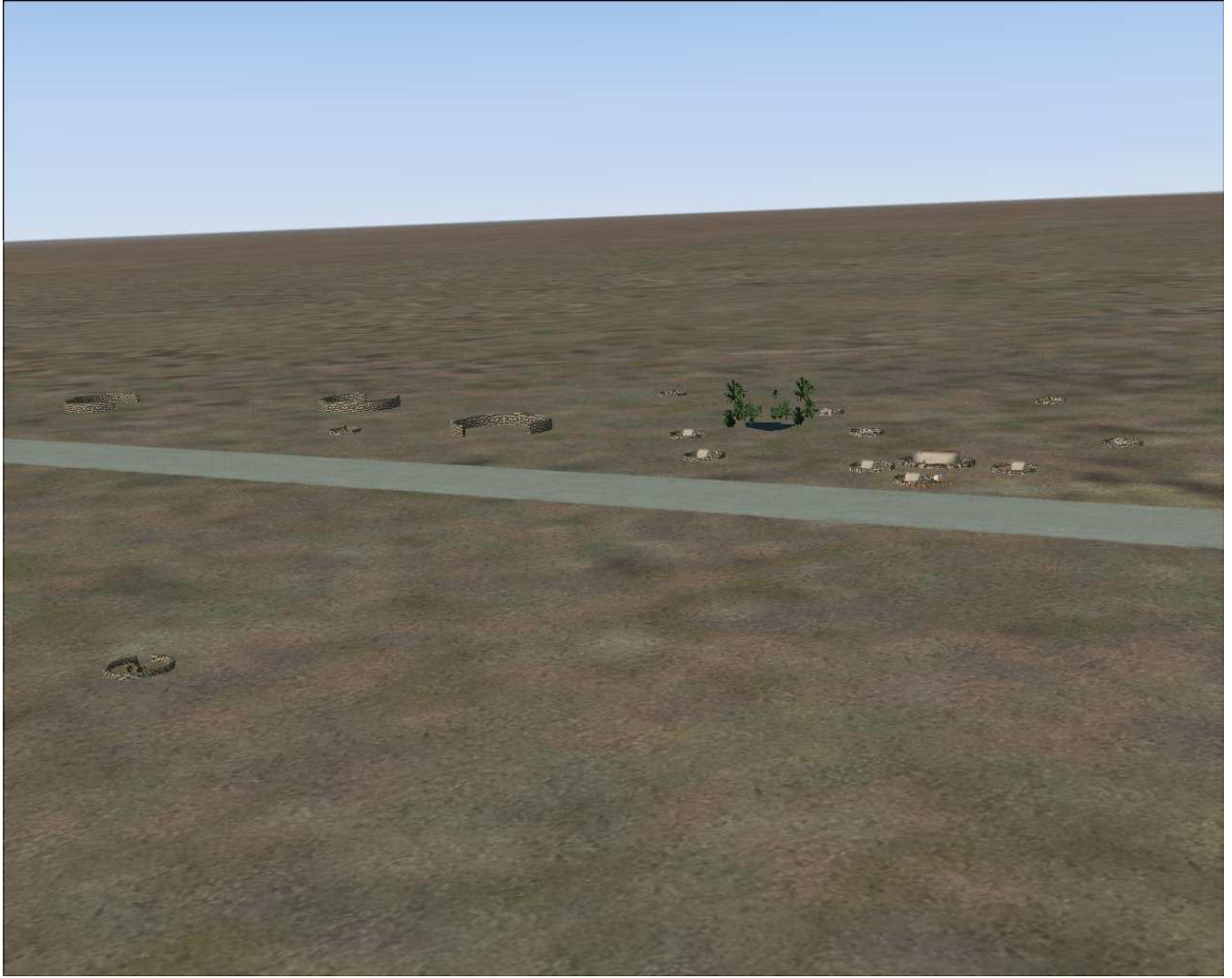
Magazine Capacity.....15 Rounds per weapon

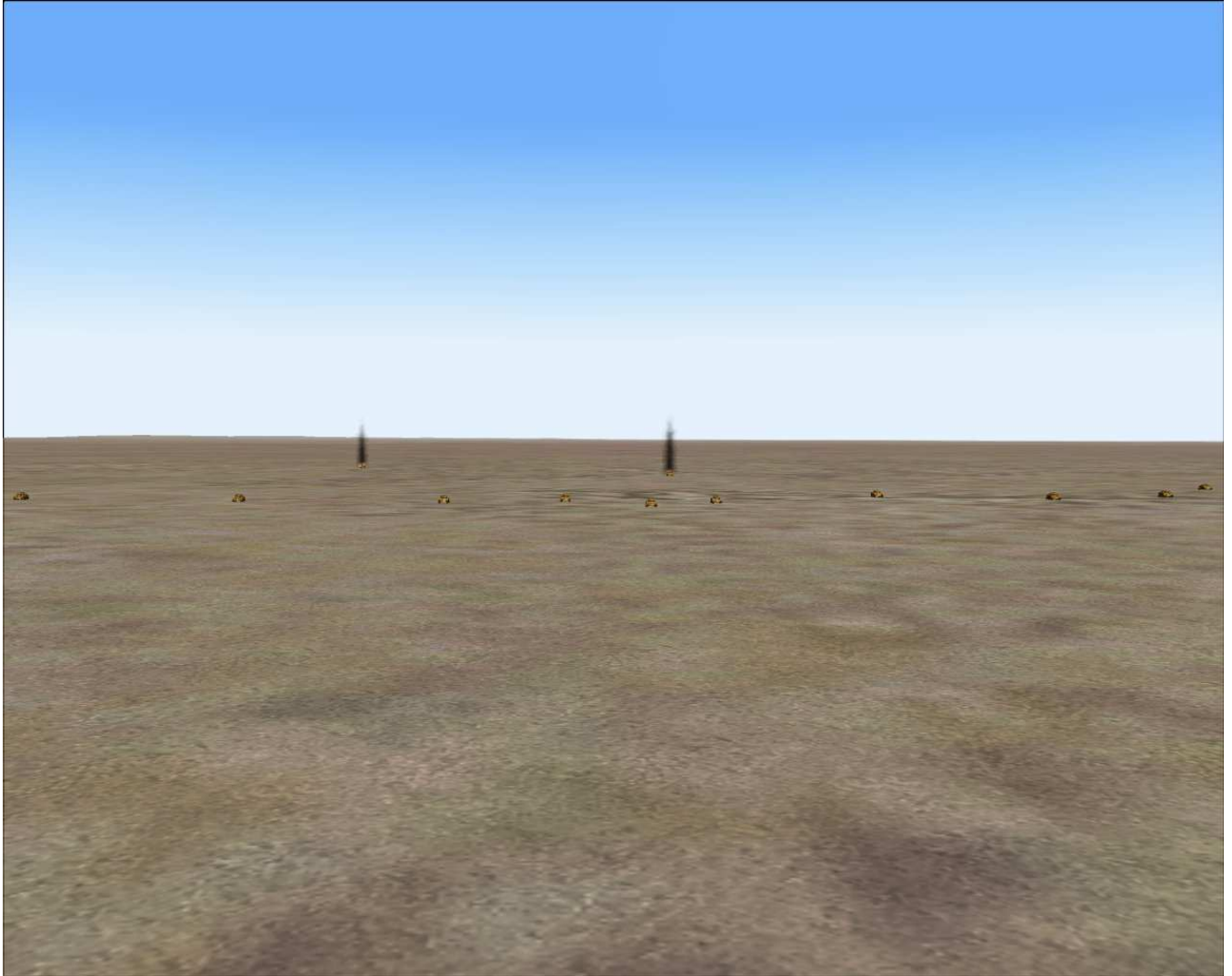
Cowlings and Fuselage Panels



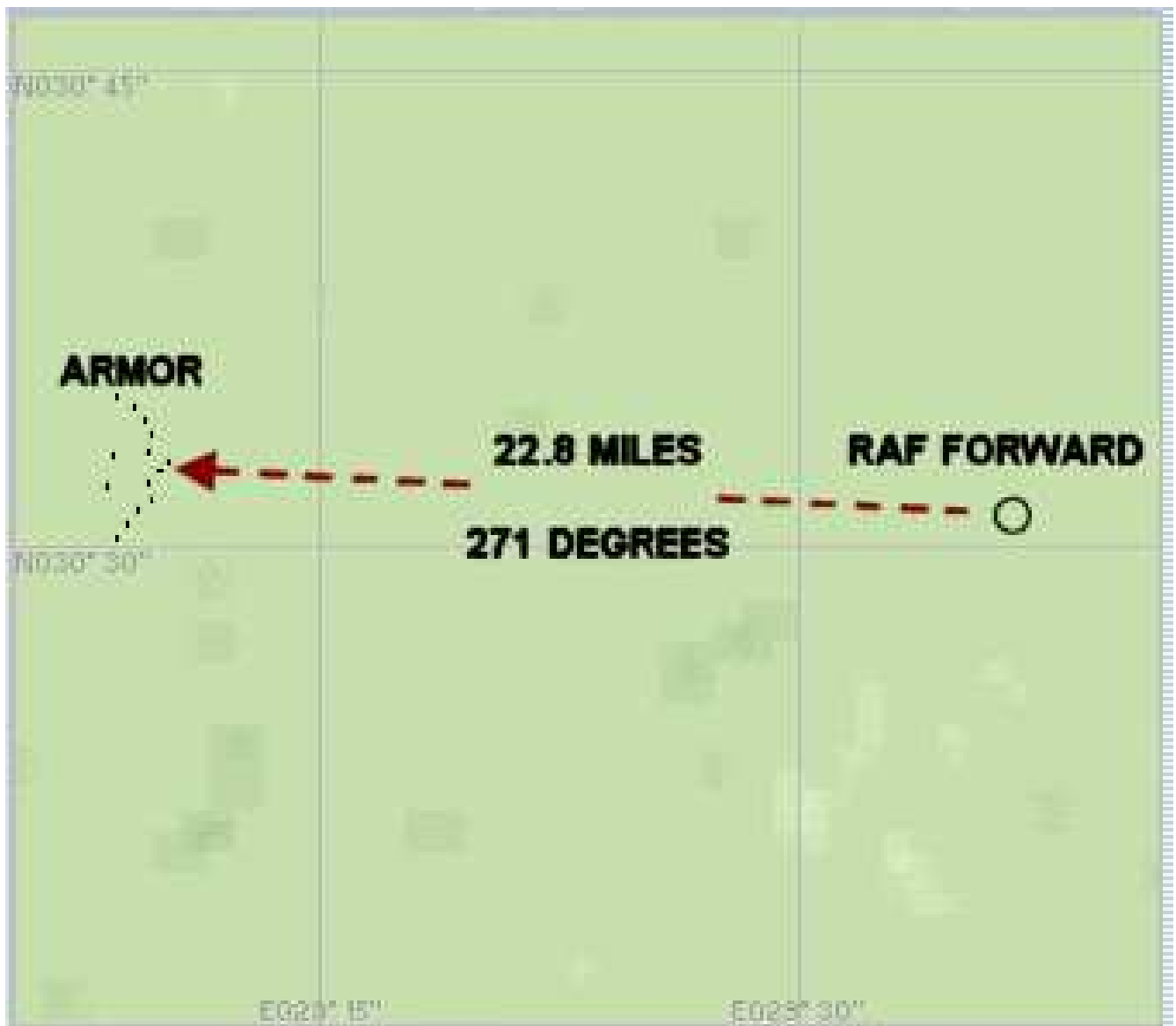
The cowlings over the engine, glycol header tank, and fuel tank; along with the fuselage access panels aft of the cockpit, can be opened by using the keyboard command Shift+E+2.

Scenery





The scenery included with this package consists of an RAF forward airbase, and a German Armoured column located approximately 23 miles west of the airbase position.



In the FS2004 Select a Flight menu, select "Hurricane IId Tin Opener" from the category list, then, in the Choose a Flight menu, click on either the "Hurricane IId at RAF Forward Cold and Dark" or the "Hurricane IId at RAF Forward Ready to Roll" flight. When the flight loads, you will be at the RAF forward airbase 44 miles southwest of Alexandria, Egypt. Takeoff and make an immediate left turn to a heading of 271 degrees, climb to about 700 ft agl, and adjust your power to a cruise setting of +4 psi and 2600 rpm. With the radiator exit flap closed, this will result in an indicated airspeed of just over 200 mph.

Maintain this speed, heading and altitude for approximately 6 minutes; at which time the smoke from two burning tanks destroyed in previous attacks will be visible. This is the I.P. (initial point, a point several miles from the target where

the attack begins), so switch on your reflector gun sight, arm your cannon and gun camera, then increase power to +12 psi and 3000 rpm for the attack run.

A slight climb should be initiated to an altitude of about 1200 ft agl, followed by a low angle descent to increase your airspeed, and timed to place your plane in the optimum position to attack the lead tank in the column. After the attack is made and you're off the target, you should exit the area at high speed and very low altitude, making evasive turns as required. Under no circumstances should a climb be initiated until you're clear of the target area. Once you're downrange by an appropriate distance, a return to target can be initiated, and the same procedure can be used for the second pass.

If you prefer, the flight "Hurricane IId Attack Run" can be selected to position your Hurricane at the I.P. (initial point) without navigating to the target area. When the flight loads, you will be properly positioned and ready to begin the attack on the lead Tiger tank.

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