

AEROPLANE HEAVEN



You're virtually there.

COCKPIT GUIDE AND
FLYING NOTES

The CURTISS

SB2C "HELLDIVER"

FOR FSX/SE&P3D

INTRODUCTION

Designed to replace the Douglas SBD Dauntless dive-bomber, the new Curtiss SB2C had a difficult birth and a tough early career. Structural weakness, poor performance and significant handling issues all led to inevitable delays for the production model to enter service.

The challenging handling issues were never really resolved and the aircraft earned many nicknames including "The Beast". However, in the hands of experienced crews, the "Helldiver" became a formidable anti-shipping attack bomber and sub-hunter, contributing greatly to allied successes in the Pacific theatre.

Over 7,000 SB2Cs were built by war's end and the type continued to serve with the French Aeronavale until as late as 1958.

With the addition of the Wright R-2600 Twin Cyclone engine and Curtiss four-blade electric propeller, the SB2C was, at last, able to keep pace with the fighters of the day whilst delivering an extremely useful payload which included rockets, bombs, depth charges and torpedoes.

Handling remained a problem though, especially at the slow speeds required on approach to a carrier. This was mainly due to a lack of longitudinal stability produced by the short fuselage - required to fit on carrier elevators. The extra weight of ordnance didn't help either.

Despite all of the problems and the handling issues, the SB2C became one of the most effective weapons employed in the Pacific war and featured in just about every major battle. However, with the advent of the "ground-pounders" like the Vought Corsair and Republic P47 and their ability to carry rockets, the Helldiver was the last of the purpose-built dive-bombers to be used by the US Navy.

Britain says "No"

The British Royal Navy ordered 450 Helldivers but only 26 were actually delivered as tests returning "appalling handling" resulted in none being passed for combat roles.

The Royal Australian Air Force also showed initial interest but declined to order after similar handling tests showed poor results.



Leading Particulars

WINGSPAN	49ft. 9 ins. (15.17 m)
WING AREA	422 sq.ft. (39.2 sq.m)
LENGTH	36ft. 8 ins. (9.73m)
HEIGHT	13ft 2 ins. (4.66m)
EMPTY WEIGHT	10,547 lbs (4,794 kg.)
Max. TAKEOFF WEIGHT	16,616 lbs (7,553kg.)
POWERPLANT	Wright R-2600-20 Twin Cyclone radial, 1900hp
PROPELLER	Curtiss Electric 4-blade
Max SPEED	256 knots indicated @ 16,700 ft.
CLIMB RATE	1,800 ft. per min.
SERVICE CEILING	29,100 ft.
Max RANGE	1,165 miles
TANKAGE	110 US Gallons Fuselage 2 x 105 US Gallons Wing Tanks. 2 x optional Drop Tank of 58 US Gallons 1 x Bomb Bay tank of 130 US Gallons

ARMAMENT

2 x 20mm. M2 Cannon (wings), 2 x 30 cal Machine guns (rear cockpit) 2000lbs internal bombs or Mk 13 Torpedo, 2x 500lb bombs or 8 x 5 inch rockets



A special "OPTIONS" panel has been provided to enable the various loadout options and also a "COLD-DARK" switch which will shut down the engine, switch off all electrical systems and remove the pilot .

PRESS SHIFT+1 TO TOGGLE THE PANEL ON OR OFF

RECOMMENDED SPEEDS

All speeds in Indicated knots indicated.

Diving	350 KIAS (MAX)
Landing gear down	175 KIAS
Landing Flaps extended	130 KIAS
Diving Flaps extended	240 KIAS
Bomb Doors opening	240 KIAS

AIRCRAFT REPRESENTED IN THIS SIMULATION



**VB-80
USS Hancock
February 1945**



**VB-84
USS Bunker Hill
February 1945**



**Royal Navy
Evaluation**



**North Atlantic
Sub-killer
late 1945**



**N.A.M.U.
Johnsville P.A.
1945**



**VB-20
USS Lexington
February 1945**



**VB-3
USS Yorktown
1943**



**VMSB-244
"Bombing Banshees"
Mindanao 1945**

- 36. THROTTLE
- 37. SUPERCHARGER LEVER
- 38. MIXTURE CONTROL
- 39. PROPELLER CONTROL (ELECTRIC)
- 40. BOMB/DROPTANK SELECTOR
- 41. BOMB/DROPTANK RELEASE
- 42. BOMB DOOR CONTROL
- 43. FUEL TANK SELECTOR
- 44. PROPELLER CONTROL
- 45. RUDDER TRIM
- 46. AILERON TRIM
- 47. ELEVATOR TRIM
- 48. ARRESTOR HOOK CONTROL
- 49. TAIL WHEEL LOCK LEVER
- 50. RADIO CONTROLLER

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IMPORTANT!!!
ALWAYS SELECT THE MAIN TANK
BEFORE STARTING

**NEVER FORGET TO LOCK THE
TAIL WHEEL BEFORE STARTING
YOUR TAKEOFF ROLL!!**

1. ALTIMETER
2. CHRONOMETER 24HR.
3. ENGINE GAUGE
4. TACHOMETER
5. GUN SIGHT DIM CONTROL
6. GUN SIGHT RETICLE SWITCH
7. LANDING GEAR TEST LIGHTS
8. GYRO COMPASS
9. AIRSPEED INDICATOR
10. TURN SLIP INDICATOR
11. VERTICAL SPEED (VSI)
12. MANIFOLD PRESSURE
13. DIVING CHECKLIST

14. CARBURETTOR HEAT
15. DECISION HEIGHT CONTROL
16. MAGNETO IGNITION SWITCH
17. LANDING CHECKLIST
18. FREE AIR TEMP.
19. FUEL CONTENTS
20. RMI
21. SPERRY AUTOPILOT
22. SLIDE OUT CHART TABLE
23. HYDRAULIC PRESSURE
24. SUCTION
25. CYLINDER HEAD TEMP.
26. OXYGEN BLINKER

The AUTOPILOT has three function knobs which use the "BANK" **A** "PITCH" **B** and "RUDDER" **C** adjustment knobs.

A is Heading Hold
B is Altitude Hold
C is NAV Hold

27. CARBURETTOR AIR FILTER
28. VOLT METER
29. COWL FLAP CONTROL
30. CANOPY HANDLE
31. GUN CHARGE CONTROLS
32. AUTOPILOT SWITCH
33. WING FOLD CONTROL
34. ARMAMENT CONTROL BOX
35. TAKEOFF CHECKLIST



FLAPS

The Helldiver is equipped with diving flaps and speed brakes. They are operated together. A special control box is fitted to enable diving or landing flaps to be selected and deployed. There is a separate note on correct operation of this unit, later in this manual.

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61.

51. LANDING GEAR LEVER
52. FLAP SELECTOR
53. FLAP CONTROL
54. HANDBRAKE/WHEEL LOCK
55. COMMS RADIO
56. NAV RADIO
57. FLAP POSITION INDICATOR
58. EMERGENCY GEAR LEVER
59. SWITCH BOX (SWITCHES AS MARKED)
60. VOLT/AMPS METER AND SELECTOR PUSHBUTTON
61. HYDRAULICS TAPS

124 85

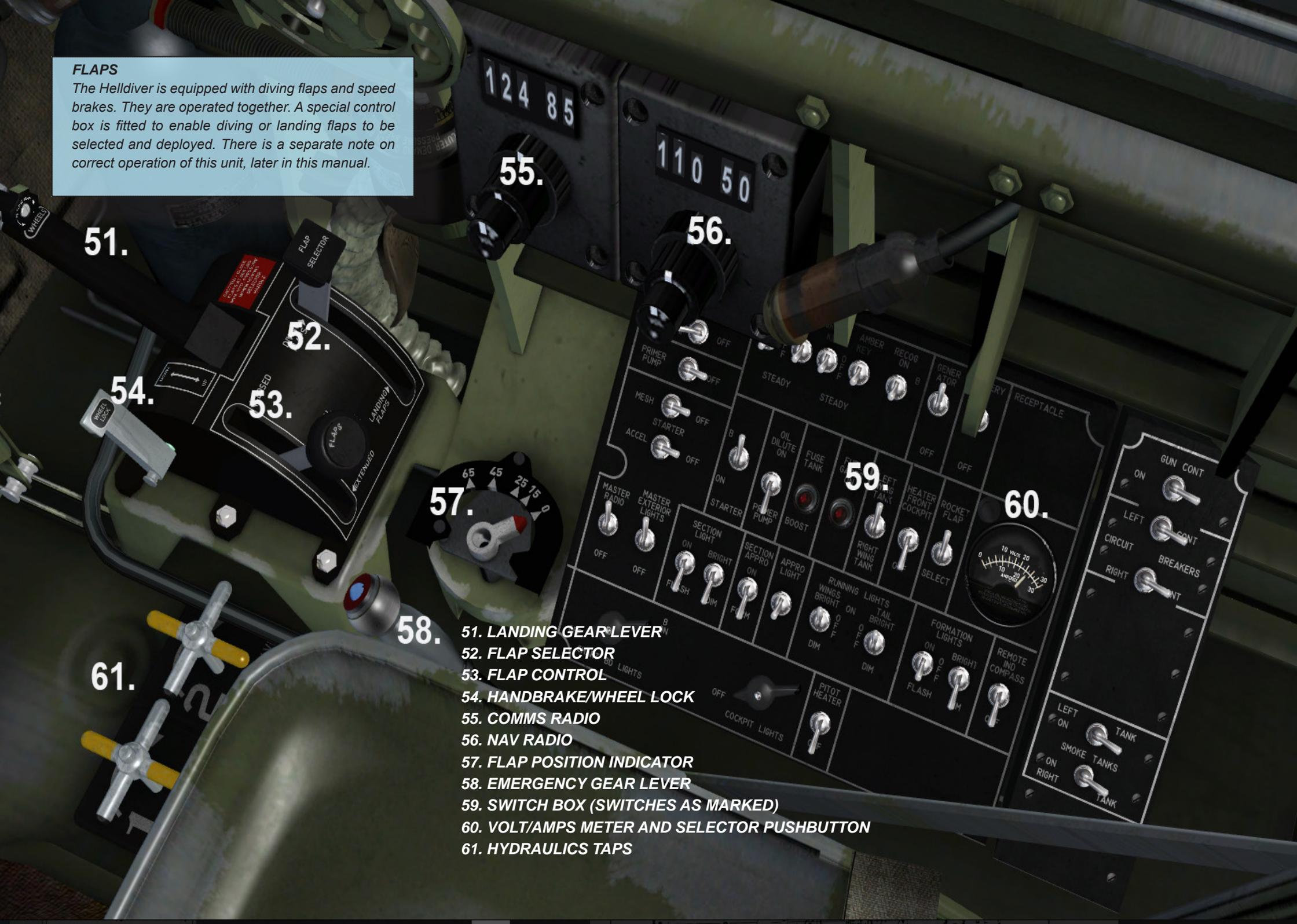
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REAR COCKPIT OPERATIONS



There are several options for the rear cockpit and its occupant.

Option 1. Canopy open. Use Shift/E+2 .

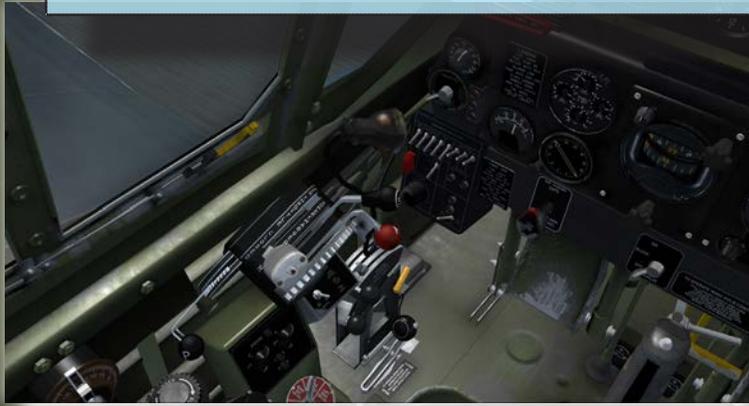
(Both canopies must be open and locked before any diving takes place.)

Option 2. Lower the turtle deck and mount the twin machine guns on their rail. Use a keystroke for "Water-ballast"(use the OPTIONS/SETTINGS/CONTROLS drop-down menu in the sim to select one)

Option 3. Swing the gunner/radio operator around to man the guns. Use Shift/E+3

SPECIAL CAMERA VIEWS ALLOW YOU TO STUDY ENGINE CONTROLS, COCKPIT OVERVIEW AND REAR COCKPIT.

IN THE VIRTUAL COCKPIT VIEW, JUST CYCLE THROUGH USING THE "A" KEY

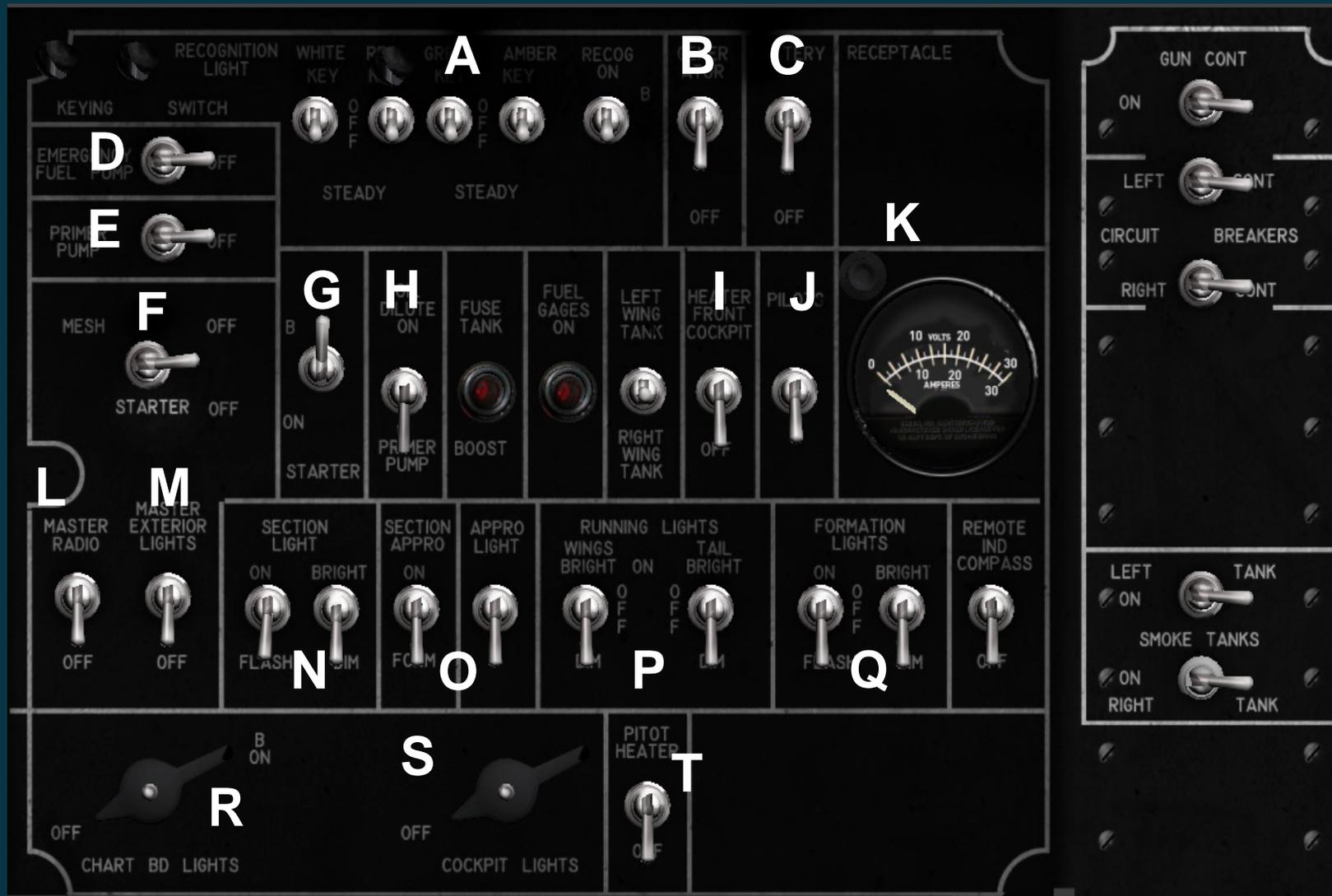


YOU CAN PAN AROUND IN THE REAR COCKPIT TO ACCESS DIFFERENT AREAS AND "SIGHT" THE MACHINE GUNS.



Use the lever A to lower the turtle deck and mount the twin machine guns After pressing Shift/E+1.





SWITCH PANEL

A. Recognition lights

Left to right-
Master white
Red
Green
Amber
Master ON

B. Generator

C. Master Battery

D. Fuel Pump

E. Engine Primer

F. Mesh/starter

G. Master engine starter

H. Oil dilution (cold weather)

I. Cockpit Heat

J. Toggle Pilots

K. Volts/Amps toggle

L. Avionics

M. Master lighting

N. Section light

O. Approach light

P. Running (Nav) Lights

Q. Formation lights

R. Chart light (when pulled out/open)

S. Cockpit lighting

T. Pitot Heat

NOTE: When the formation lights are switched to FLASH, the section light will also flash if the switch is in the FLASH position. To have a steady section light, just switch to "ON" position.

Switches on the right hand smaller panel are all INOP.

OPTIONS PANEL

Press Shift+1 to access the OPTIONS PANEL.

This panel has a number of switches, the functions of which are as follows:

COLD DARK START

Clicking this spot will shut down the engine if running, turn all switches off, fold the wings and remove the pilots. You are then in a position to start configuring the aircraft for flight. (to install the pilots, use the PILOTS switch on the cockpit switch panel.)

This is a “use-once” action. It cannot be reset without resetting the flight.

The other three switches will toggle the various payload options. The SB2C-3 is not equipped with rockets but can carry additional wing bombs. The SB2C-4 carries rockets but not bombs.



Cold dark cockpit. One use only you will need to reset the flight.



DIVE BOMBING

The secret to successful dive-bombing is planning.

Don't expect to go charging around the sky and then throw your machine into a vertical dive. She'll stall. Horribly.

There are several stages needed to set up for a dive-bomb run.

1. Attain sufficient height. Usually 6 -10,000 feet.

2. Once at altitude, reduce power to around 20 inches of mercury (Manifold Pressure)

3. Ensure both canopies are locked open and the rear turtle deck is down and guns mounted.

4. Extend the dive flaps (follow the procedure for that on the next page.)

5. OPEN the bomb doors!

6. Nose over into a steep angle dive and hold her there. She can dive at over 300 mph so don't worry about your speed, just your angle of attack and aim.

7. At around 2,000 ft., push the release lever 41. down to release the bombs.

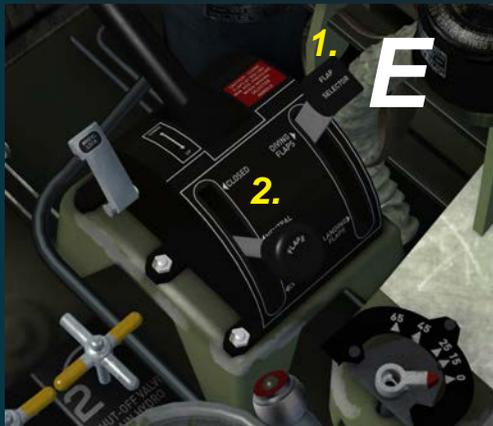
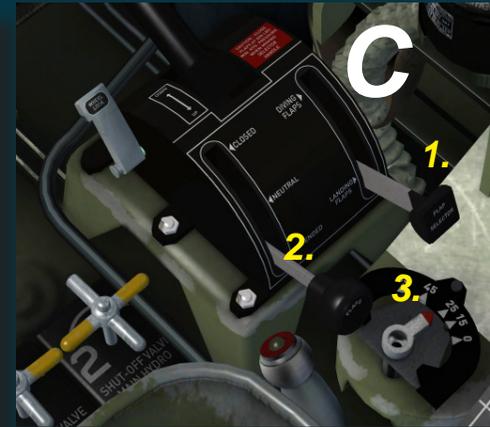
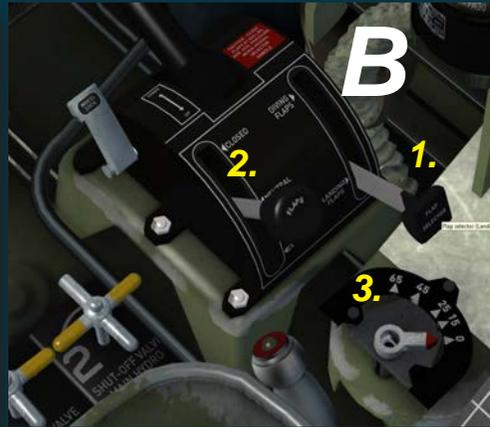
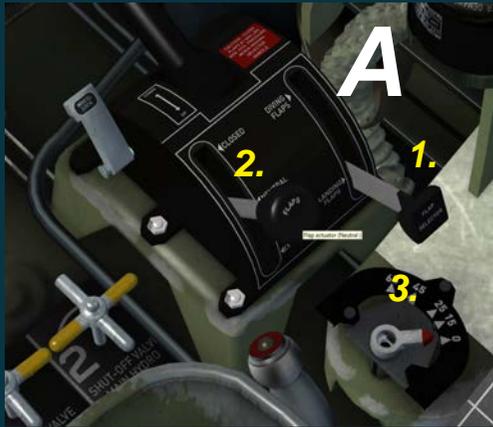
8. Once the bombs have left, pull out of the dive, close the dive flaps and the bomb doors.

9. Start climbing and feed in normal power.



YOU ARE AT YOUR MOST VULNERABLE, PULLING OUT FROM A DIVE. MAKE SURE YOUR REAR GUNS ARE MOUNTED AND MANNED. THEY ARE THERE FOR THE ENEMY FIGHTERS.





We have simulated the operation of dive and landing flaps exactly as in the real aeroplane. Please take some minutes to acquaint yourself with the procedures:

There are two levers to operate. The **FLAP SELECTOR 1** will select **DIVING OR LANDING FLAPS**. The **FLAP POSITION LEVER 2** will **OPEN** or **CLOSE** the flaps once out of **NEUTRAL** position.

The **FLAP POSITION INDICATOR 3** is the red tipped mechanical arrow on the marked quadrant, aft of the flap control unit.

To operate **LANDING FLAPS**, **A** place the **FLAP POSITION LEVER** in **NEUTRAL** and the **FLAP SELECTOR** in **LANDING** position. **B** Then move the **FLAP POSITION LEVER** out of **NEUTRAL** and **DOWN** to **EXTENDED** position. **C** Monitor the **FLAP POSITION INDICATOR** until the flaps are at the desired angle of deflection. **D** When they reach the desired angle, move the **FLAP POSITION LEVER** back up to **NEUTRAL** and the flaps will be left at the desired angle.

To operate **DIVING FLAPS**, **E** place the **FLAP POSITION LEVER** in **NEUTRAL** and move the **FLAP SELECTOR** lever **UP** to **DIVING** position. **F** Then move the **FLAP POSITION LEVER** **DOWN** to **EXTENDED** position. Now, the flaps are all in the correct diving configuration. Practice the routine a few times on the ground to get used to the operation before flying.



Flying the SB2C Helldiver

The thing to remember about the Helldiver when taking your first flights is that it is a very big, somewhat cumbersome aeroplane. It is certainly not a nimble, fast fighter like the Corsair or P51. It is, however, a very powerful, capable machine that is purpose-built to attack ground/sea targets by delivering a variety of ordnance with a high degree of accuracy. It does this by dive-bombing in a near vertical attitude at 300 mph.

So from that you can deduce that it has a very strong airframe, capable of withstanding a lot of stress.

The Helldiver has its vices, some of which we will discuss here, others you will discover for yourself as you get to know the aeroplane.

Let's begin with cockpit checks which should be done after you have selected a cold-dark, start from the options panel. Just press Shift+1 to bring up the Options/configuration panel and click the cold/dark option button.

Now you have a cockpit where nothing is ON and all levers, controls etc. are in their OFF/MINIMUM states.

The following checklists are taken from genuine original Pilot Flight Manuals. Let's begin with pre-start preparation and go from there.

IGNITION SWITCH	"OFF."
BATTERY SWITCH.-	"OFF."
MASTER ARMAMENT SWITCH.-	"OFF"
GUN CHARGERS.-	"SAFE"
AUTOMATIC PILOT.-	"OFF"
TIME CLOCK.-	Check the clock.
WINGFOLD LEVER.-	Wings folded
HYDRAULIC VALVES.-	Valves closed
WING FLAPS.	Closed
COWL FLAPS.-	Open

OIL COOLER FLAPS.-

Open.

LANDING GEAR.-

See that main landing gear locking flags are visible above the upper surface of the wings and that landing gear control lever is secured "DOWN"

TAIL WHEEL LOCK.-

plane take-offs shots are made locked;

"UNLOCK" position if aero- is to be taxied. Land and catapult with tailwheel carrier fly-offs and landings with tailwheel unlocked.

CYLINDER HEAD & OIL TEMPERATURES. -Note the cylinder head and oil temperatures in order to know which starting procedure to use. Head temperature is indicated by a dial on the instrument panel and oil temperature by a gauge in the same panel.

OXYGEN SYSTEM.

OFF

FLIGHT CONTROLS.-After the wings are spread, move the rudder pedals and control stick so that every control surface passes through its entire range of movement, to make certain nothing is impeding movement of the controls.

TRIM TABS.-

plane,
0°,
8° right

Tab settings depend upon' wind velocity, weight of the aero- whether cata-pult or running take-off, etc. Until the pilot becomes familiar with the aeroplane, settings of aileron elevator 0° and rudder are recommended. .

ENCLOSURES.-

LOCKED OPEN

RADIO

Set

ARMAMENT

Selected ON OPTIONS PANEL

INSTRUMENTS.-

Check settings.

FUEL.-Check readings of the fuel gauges.

ALTIMETER.-Set the altimeter (see figure 4 to field elevation.

BATTERY SWITCH.-"OFF."

FUEL AND OIL SYSTEM MANAGEMENT.

OPERATION OF FUEL SYSTEM.

Before starting a take-off, switch the fuel selector valve (43) to "FUSE," and turn "ON" the auxiliary fuel pump switch to insure the proper system pressure (16 to 18 psi). Trim tab adjustment will compensate for a full tank on one wing and an empty tank on the other. Since no gauge is provided for the droppable tanks, fuel consumption from these tanks must be determined from the elapsed time during which fuel is withdrawn. (5) The auxiliary fuel pump should always be on when: (a) Starting the engine. (b) Taking off. (c) Climbing to operational altitude. (d) Switching fuel tanks. (e) Engine driven pump fails. (f) At or above 5000 ft. altitude(q) Landing.

OPERATION OF OIL SYSTEM.

OPERATING PRESSURE.-The required system operating pressure is 80 to 95 psi, maximum pressure 95 psi, idling pressure 15 psi. The desired operating temperature is 70° to 85° C. (158° to 210° F).

STARTING ENGINE.

STARTING PROCEDURE.

MIXTURE CONTROL.-"AUTO-RICH". FULL FORWARD

SUPERCHARGER CONTROL.-"LOW" position. FULL FORWARD

PROPELLER GOVERNOR CONTROL. -Full "INCREASE RPM". in.

THROTTLE.-Set for 1200 rpm maximum-open approximately 3/4 inch).

COWL FLAPS.-"OPEN".

OIL COOLER FLAPS.-"OPEN".

FUEL SELECTOR VALVE.-"FUSE."

CARBURETOR ALTERNATE AIR. -Direct air position (pushed forward).

BATTERY SWITCH.-On.

GENERATOR SWITCH.-On.

IGNITION SWITCH.-"BOTH".

AUXILIARY FUEL PUMP.-On.

STARTER SWITCH.-Flip to "STARTER" for 15 seconds. This is the second STARTER SWITCH to the right of the primary starter switch.

IMPORTANT!!!!

In this simulation, we have programmed the starter to behave as close to real as possible. So, you have around 15 SECONDS from switching on the STARTER SWITCH before it returns to OFF.

In this time you MUST turn on the

PRIMER SWITCH.-On.

As soon as you see the **PRIMER SWITCH** return to its **OFF** state, press and **HOLD the (primary) STARTER SWITCH. to "MESH"**

The engine should fire. Be patient as the big radial will cough and splutter into life before settling to idle.

Release the **STARTER/MESH** switch and allow it to return to its **OFF** position

ENGINE WARM-UP AND GROUND TEST.

GENERAL.-The warm-up should be conducted at a maximum of 1200 rpm until oil pressure is 80 psi and the oil temperature is at least 30° C. (86.0° F.), cylinder head temperature 150° C. (302° F.), 232° C. (450° F.) maximum, then open the throttle to obtain 30 in. Hg. If the oil pressure drops, warm-up should be continued at 1200 maximum rpm. Check the fuel pressure. During warm-up, the cowl flaps should be fully open. The alternate carburetor air control should be locked in the direct (pushed in) position unless atmospheric icing conditions exist, in which case alternate air can be used. However, the control should be returned to direct air before take-off.

The position of the oil cooler flaps is optional, depending upon outside air temperature.

MAGNETO CHECK.-At about 2100 rpm, 30 in. Hg. maximum manifold pressure, turn the ignition switch from "BOTH" to "L" and "R" in turn, which should result in a drop of not more than 80 rpm.

THIS CHECK SHOULD NOT EXCEED 30 SECONDS.

PROPELLER CHECK.-With propeller lever in full "INC RPM" position, open the throttle until the engine turns about 2000 rpm. Pull the propeller lever up until about 1800 rpm or a manifold pressure of 30 in. maximum is reached. At this setting the propeller should hold the engine speed constant with no surges or irregularities. Return the governor control to full "INC RPM" position; if rpm reading is 2000, the propeller is operating properly and is ready for flight.

HYDRAULIC SYSTEM.-With engine running, check the hydraulic pressure gauge. This gauge should read between 850 and 1050 psi.

After the wings are spread, extend and retract the wing flaps in both the "LANDING" flaps and "DIVING" flaps conditions.

IMPORTANT!!!

In this simulation we have provided a landing flap and dive flap system that is very close to the real thing. Please follow the instructions on using the flap selector unit carefully for proper operation of flaps, especially in flight.

CAUTION Do not attempt to check flap operation with the wings folded.

IDLE MIXTURE CHECK.

Check the idle mixture adjustment as follows: With the throttle set to obtain about 600 rpm, move the mixture control lever with a slow, steady pull, toward or into "IDLE CUT-OFF" and observe the tachometer for any increase in rpm during the process of leaning. Return the mixture control to "AUTO RICH" before the rpm drops to a point where the engine cuts out, but do not return it before a definite drop in rpm is observed.

TAXIING.

FLAPS Since the flaps can very easily be damaged by flying debris, it is recommended that they be retracted during taxiing.

COWL FLAPS. - Open during all ground manoeuvres.

OIL COOLER FLAPS.-Open.

BRAKES.-The brakes provide adequate control for all ground manoeuvres. However, they are sensitive and must be used carefully.

TAIL WHEEL.-The tail wheel should be in "UNLOCK" position when the aeroplane is being taxied except during extended cross-wind taxiing, in which case the tail wheel should be locked to relieve excessive braking action.

TAKE-OFF.

CHECK-OFF LIST

FUEL SELECTOR VAL VE.-	"FUSE".
AUXILIARY FUEL PUMP.-	"ON".
MIXTURE CONTROL.-	"AUTO RICH".
SUPERCHARGER.-	"LOW".
PROPELLER GOVERNOR CONTROL. -	FULL "INC. RPM".
COWL FLAPS.-	"OPEN".
OIL COOLER FLAPS.-	"OPEN".

TRIM TABS.- Aileron 0°: rudder 8° R: elevator 0°.

FLAPS.- "LANDING".

CARBURETOR ALTERNATE AIR CONTROL.-Direct air position.

ENCLOSURES.- Locked open.

TAIL WHEEL.- Locked.

MANIFOLD PRESSURE.- 49 in. Hg @ 2800rpm.

CHECK-OFF LIST (CARRIER TAKE-OFF).

FLAPS.- "LANDING", 45° deflection.

FUEL SELECTOR VALVE.- "FUSE".

AUXILIARY FUEL PUMP.- On.

ENCLOSURES.- Locked open.

COWL FLAPS.- Open.

OIL COOLER FLAPS.- Open.

CARBURETOR ALTERNATE AIR CONTROL.-Direct air position.

MIXTURE CONTROL.- "AUTO RICH".

PROPELLER GOVERNOR CONTROL.-Full "INC RPM" position.

SUPERCHARGER.- "LOW".

CHART BOARD.- Locked closed.

THROTTLE FRICTION CONTROL.- "INCREASE."

ENGINE SPEED.- 2800 rpm: manifold pressure 49 in. Hg.

TAIL WHEEL.- Locked.

CAUTION

Do not exceed 263° C. (505° F.) Cylinder head temperature limit for take-off.

GENERAL.

FLAP SETTINGS.- For normal land-based operations, it is recommended that a landing flap setting of 20° be used for take-off. However, any setting from 0 to 60 may be used for SB2C-3 airplanes, 0° to 52° for SB2C-4, the higher settings giving shorter ground distance. Take-offs with flaps retracted are easily accomplished with a small increase in run, dispensing with the inconvenience of retracting the flaps after take-off.

The rate of climb immediately after take-off with flaps deflected is inferior to that with flaps retracted. Take-off with high flap setting should be made only when necessary to obtain the shortest possible deck run, and after more experience with the increased settings. The elevator trim tab should be set slightly tail heavy when the high flap setting is used.

TAB SETTINGS.-The tab settings vary with the individual aeroplane and the loading conditions. However, it is recommended that elevator 0° aileron 0°, and rudder 8° right be used until the pilot is familiar with the aeroplane.

MINIMUM RUN TAKE-OFF.

WING FLAPS.- "LANDING" (45°).

PROPELLER GOVERNOR CONTROL.-Full "INC RPM" position.

MANIFOLD PRESSURE.- 49 in. Hg.

Hold brakes slightly until 2800 rpm is reached. Release brakes, and allow tail to rise to near level flight attitude.

Note

The best carrier take-off results have been obtained by maintaining the aeroplane in flight attitude until near to becoming airborne. when a slightly nose-high attitude is attained. This procedure provides the minimum of "settling" after leaving the deck.

Take off when minimum flying speed is reached. If take-off is made from an unpaved or muddy runway, the tail of the aeroplane should be slightly lower.

If the aeroplane is to be catapulted use full take-off power (2800 rpm. 49 in. Hg. manifold pressure).

A 45° flap setting is recommended with tab settings of aileron 0°. elevator 0°. and rudder 8°

CAUTION

Excessive and violent displacements of elevator surfaces should, as much as possible, be avoided immediately after becoming air-borne following catapult take-off.

All controls and locking devices (chartboard. propeller governor. throttle. Fuel selector, mixture control. etc.) must be in proper adjustment to overcome the force of inertia originated by the catapulting operation.

FLIGHT

Use 2600 rpm, 43.5 in. Hg. manifold pressure at sea level. Maximum 30 minutes

CAUTION Do not exceed 248° C. (478° F.) cylinder head temperature in military power.

NORMAL RATED (MAXIMUM CONTINUOUS) POWER CLIMB AND LEVEL FLIGHT. -2400 rpm. 41 in. Hg. manifold pressure at sea level.

CRUISING.-It is recommended that all cruising operations be conducted at powers below maximum cruise for best engine economy. A cylinder head temperature of 218°C. must not be exceeded. Aspeed of 140 -150 KIAS (Max) is recommended for best economic cruise.

GENERAL FLYING CHARACTERISTICS.

CHANGING POWER.

When increasing engine power. adjust first the propeller governor, then the throttle.

When decreasing engine power, adjust the throttle first and then the propeller governor. If necessary. readjust the throttle slightly.

AUTOMATIC PILOT OPERATION.

Engage by turning the automatic pilot valve "ON". After the automatic pilot is in operation. the course-setting knob and the elevator and aileron trim knobs may be adjusted slightly if necessary to put the aeroplane in straight and level flight. Any heading set on the gyro will then be followed by the Autopilot. Also, the Autopilot will follow any NAV course set by tuning the Nav radio to a VOR or ILS frequency.

CYLINDER HEAD TEMPERATURES AND COWL FLAP ADJUSTMENT.

The cylinder head temperatures may be controlled by the degree of opening of the cowl flaps. The following cowl flap settings are recommended:

All ground operation	-"OPEN"
Take-off	-" OPEN"
Climb	-As required
Cruising	-As required
Diving	-"CLOSED"
Landing	-"CLOSED" until landing completed

Operation of the engine shall be such as to maintain the cylinder head temperatures within the following limits:

"AUTO-LEAN" Operation:

- 218° C.** Maximum cruise or lower powers.
- 232° C.** Normal rated power to maximum cruise.
- 248° C.** Military power (30 minutes max.)

"AUTO-RICH" operation.

Use of "AUTO-RICH" mixture will increase the fuel consumption approximately 10 to 20 gallons per hour in the cruise range. and from 5 to 8 gallons per hour at higher powers.

Cylinder head temperature limits for "AUTO-RICH" operation are the same as for "AUTO-LEAN" with the following exceptions:

- 248° C.** Normal rated power (one hour max.)
- 263° C.** Take-off (5 minutes max.)

STALLS.

Stalls are indicated by an immediate dropping of a wing. Normal recovery methods -i.e. stick forward and gentle dive are effective. However, if an adverse spin does develop, use hard and immediate rudder input against the direction of spin followed by pushing the stick full forward and increase throttle.

SPINS.

Spins should be prevented by the proper use of the rudder, elevator, and throttle controls.

However, should a stall not be overcome before a spin develops, the following method of recovery is recommended:

Kick the rudder HARD and with a POSITIVE motion FULL against the spin and hold. After about one-quarter to one-half turn. move the elevator controls FULL forward with a POSITIVE motion. Keep ailerons in neutral. Hold controls in this arrangement positively and long enough for them to take effect. It is advisable to judge the lapse of time by the number of turns made. In the event of a vicious spin, applied controls for recovery should be held for at least five turns before attempting any other means for promoting recovery.

Slow and cautious movement of the controls during recovery is to be avoided. as in some cases. with such movement of the rudder and elevators, spinning will continue indefinitely; whereas brisk and positive operation of these controls will effect recovery.

In order to promote ease of recovery from a spin, the elevator trim tabs should be set so as to make the aeroplane nose-heavy for normal spinning. Use of the throttle in an attempt to recover from a bad spin, although effective at times. is very poor practice and generally should be considered as a measure to be tried only as a last resort.

Recovery technique for the spins entered from stalls in accelerated flight is the same as that for recovery from normal. intentional spins. However, it must be remembered that spins entered during accelerated flight will usually be much faster due to the greater speed at entry. Therefore, there is more need for rapid and positive application of recovery controls and the controls may need to be held in the recovery position for a longer period of time.

TO RECOVER FROM A SPIN ENTERED IN ACCELERATED FLIGHT

Employ prompt recovery controls, as outlined above, and hold these controls until rotation stops. Neutralize rudder after rotation ceases. Level wings. Pull out at such a rate as to avoid placing excessive "g" loading on the aeroplane, thus avoiding another stall.

TECHNIQUE FOR RECOVERY FROM INVERTED SPINS.

Cut the throttle. Kick hard opposite rudder against the direction of rotation. It is mandatory that a visual determination of the direction of rotation be made by reference to the nose of the aeroplane. The turn indicator will show the true direction of rotation in either normal or inverted spins.

Pull the stick back. neutralizing the ailerons. As soon as autorotation ceases, complete the recovery from the inverted position by either rolling out with the ailerons or completing the loop or a combination of the two. Ease the throttle on very gradually to prevent engine bearing damage as during the revolution, oil pressure will probably have been lost.

PERMISSIBLE ACROBATICS.

When carrying bombs, depth charges, and/or droppable fuel tanks. the following manoeuvres are permitted:

AILERON ROLL. (Only for entering dive).

WING OVER.

VERTICAL TURN.

INVERTED FLIGHT. (Only for entering dives, but not permitted when carrying filled droppable fuel tanks.)

When not carrying such load items. the following acrobatics are permissible:

LOOP.

AILERON ROLL.

CHANDELLE.

IMMELMAN TURN.

WING OVER.

VERTICAL TURN.

INVERTED FLIGHT. (Only for entering dives).

NOTE

IT IS RECOMMENDED THAT ANY AEROBATICS ARE ENTERED AT SPEEDS ABOVE 210 KIAS AND AT ALTITUDES ABOVE 10,000 FT.

DIVING.

Caution should be observed in diving from high altitudes as the manifold pressure will build up rapidly at constant throttle setting. The throttle should be opened slowly at the completion of a dive so that the partly cooled engine will not cut out.

PROPELLER. - 2200 rpm (3100 rpm max. overspeed permissible for 30 seconds)-

COWL FLAPS.- "CLOSED".

BOMB DOORS.- " OPEN".

WING FLAPS.- "DIVING".

THROTTLE-- Adjust throttle to maintain a minimum of 15 in . manifold pressure.

COCKPIT HEATER.- ON.

COCKPIT ENCLOSUREs. -OPEN

It is recommended that the aeroplane be trimmed nose-heavy during dives, increasing the stick force necessary in the pull-out.

The "SNAP PULL-OUT" shall not be used in recovering from dives nor shall abrupt movements of the controls be employed in any manoeuvres at high speed.

APPROACH AND LANDING.

APPROACH.

During descend for landing at speeds near stall with the constant speed propeller control in the high rpm (low pitch) position and throttle almost closed.

GROUND LANDING.

RADIO.- Check for correct tower frequency.

GUN CHARGERS.- "SAFE".

FUEL SELECTOR VALVE.- Select tank with most fuel.

AUXILIARY FUEL PUMP.- "ON" .

SUPERCHARGER.- "LOW"

MIXTURE CONTROL.- "AUTO RICH".

CARBURETOR ALTERNATE AIR CONTROL- Direct (pushed in).

ENCLOSURES.- Locked open.

LANDING GEAR.-	LOCKED “DOWN”.
TAIL WHEEL.-	Locked.
WING FLAPS.-	”LANDING”- Setting 52°.
COWL FLAPS.-	”CLOSED”.
PROPELLER GOVERNOR. -	Full INCREASE

Note

After landing and before taxiing. Return wing flaps to “0 “ and cowl flaps to “OPEN”.

CARRIER LANDING.

GUN CHARGERS.-	”SAFE”.
FUEL SELECTOR VALVE.-	Select tank with most fuel.
AUXILIARY FUEL PUMP.-	“ON” .
SUPERCHARGER.-	”LOW”.
MIXTURE CONTROL.-	” AUTO RICH”.
CARBURETOR ALTERNATE AIR CONTROL- DIRECT (pushed in).	
ENCLOSURES.-	Locked open.
LANDING GEAR.-	LOCKED “ DOWN”.
TAIL WHEEL.-	”UNLOCK”.
WING FLAPS.-	”LANDING”-Setting 45 °.
COWL FLAPS.-	As required.
ARRESTING HOOK.-	”DOWN”.

CROSS WIND LANDING.-When it is found necessary to land cross wind, it is recommended that a power-on landing. slightly wheels first, be made.

MINIMUM RUN LANDING.-The recommended procedure for executing a minimum run landing is as follows:

During the last portion of the landing roll. the elevator will lose its effectiveness. Therefore. continue to apply the brakes hard, with full UP elevator. In event the aeroplane cannot be stopped by the time the end of the runway is reached. it is better to “ground loop” than to retract the landing gear. To ground loop. kick the rudder pedal hard one way or the other, keeping the aileron control neutral. This only applies when there are no obstructions or other airplanes with which collision is possible.

STOPPING OF ENGINE.

Before stopping the engine, idle it at about 1000 rpm until the cylinder heads have cooled. In extremely warm weather the engine may be stopped when the head temperatures have dropped to about 200°-210° C. (392°-410 ° F.). In cold weather allow the cylinder heads to cool to lower temperatures.

Note

If it is absolutely necessary to stop the engine before properly cooling off. Throttle down to at least 1000 to 1200 rpm BEFORE STOPPING.

CHECK LIST.

COWL FLAPS.-	”OPEN”.
PROPELLER.-	Full “INCREASE RPM”.
MIXTURE CONTROL.-	“IDLE CUT-OFF”.
The engine should stop in a few seconds.	
THROTTLE.-	Full open.
IGNITION SWITCH.-	”OFF”, once propeller stops
FUEL SELECTOR VALVE.-	”OFF”, when engine is not being operated.

BEFORE LEAVING COCKPIT.

Make sure that all electrical controls (battery switch, ignition switch, armament switches. Lights, etc. are in “OFF” position. (In this simulation you can use the “cold-dark” button on the “OPTIONS” panel (Shift+1)

INSTALLING JURY STRUTS.-If the aeroplane is to be parked with the wings folded, the jury struts must be installed. In this simulation, the struts are automatically installed at the end of the wing-fold routine.

PAINTING THE HELLDIVER

You can paint your own liveries for the Helldiver by using the special PAINTKIT available as a free download from the Helldiver product page on our site at:

www.aeroplaneheaven.com

AEROPLANE HEAVEN



You're virtually there.

KEYSTROKES

SHIFT/E PILOT CANOPY OPEN/CLOSE

SHIFT/E+2 REAR CANOPY OPEN/CLOSE

KEYSTROKE FOR TURTLEDECK AND GUNS = WATERBALLAST

SHIFT/E+3 GUNNER MANS GUNS

SHIFT/E+4 BOMB DOORS OPEN

SMOKE KEY (suggest "i") FIRE GUNS /SHELLCASINGS

SUGGESTED KEYSTROKES:

SHIFT"Q" LOWER/RAISE ARRESTOR HOOK

SHIFT"W" FOLD/UNFOLD WINGS

The CURTISS
SB2C "HELLDIVER"

FOR FSX/SE&P3D