
GETTING TO KNOW YOUR
Stratoliner
A COCKPIT GUIDE AND FLYING NOTES FOR THE BOEING B307 STRATOLINER
Transcontinental Stratoliner
46A
Microsoft Flight Simulator

This guide has been produced to make getting acquainted with your new Stratoliner simpler and more fun. To this end, this is not an "official" pilot`s manual and should not be considered such.

The Boeing B307 Stratoliner is a tail-dragger. That is to say, it has a three-point landing gear with a castoring, lockable tail wheel at the back. Mastering a tail-dragger on the ground takes skill and practice. So, be patient at first and practice your ground-handling!

Boeing`s Stratoliner was the world`s first commercially-licensed, fully pressurized airliner. Designed to cruise at 20,000 feet at 220 m.p.h., it had a major competitive advantage over other designs of the day like the DC-3 as it could fly well above any adverse weather for the comfort of passengers and faster routes.

The all-metal design was based on Boeing`s highly successful B-17 bomber. Taking the wings, undercarriage and tail of the B-17, Boeing added a fully-pressurized wide-body fuselage that could accommodate 33 passengers and 5 crew.

Powered by Wright Cyclone radial engines, the new Stratoliner had a top speed of around 250 m.p.h. and a service ceiling of 23,000 feet.

A total of 10 Stratoliners were built. 3 went to Pan-American Airlines and 5 to TWA. The famous and wealthy aviator Howard Hughes ordered one for his personal use for a record attempt. World War 2 interfered with his plans so the airframe was converted into a sumptuous "flying penthouse".

The TWA examples were pressed into military service for WW2 and designated C-75. The PanAm ships were used in South America under the control of the US Army Air Force but flown by regular airline crews.

Boeing B307 Stratoliner

LEADING PARTICULARS

Principal dimensions

Length, overall	74ft.4in.
Width	11 ft.6 in.
Height (to top of fin)	20ft. 9 in.
Wing Span	107ft.3 in.
Gross wing area	1485 Sq. ft.

Tail plane

Span	44ft. 0 in.

Areas

Ailerons (total)	60.2 Sq ft.
Flaps (total)	213.4 Sq ft.
Tailplane (without elevators)	230 Sq ft.
Elevators (total)	98.30 Sq ft.
Fin	149.1 Sq ft.
Rudder	39.0 Sq ft.

Control surface movements

Ailerons

UP	12 deg.
DOWN	12 deg.

Flaps

DOWN	45 deg

Elevators

UP	23 deg.
DOWN	14 deg.
Rudder (each way)	30 deg.

Engine

Type Wright 1820 series Cyclone
Radial developing 1,100hp

Propeller

Type Hamilton Standard 3-blade metal, constant speed

Diameter	11ft. 6 in.

Tank capacities

Fuel tanks (Three tanks in each wing):

Outer (forward):
452 US gallons each

Outer (rear):
228 US gallons each

Inner:
226 US gallons each

TOTAL 1812 US gallons

Oil tanks (4) 25 US gal each.

Weights

Gross	45,000lb (20,412 kg)
Empty	30,310lb (13,748 kg)

When it entered service, the Stratoliner was the only four-engined land-based airliner in use by a U.S. airline. The wide girth of the fuselage provided for one of the roomiest cockpits and cabins of any airliner at the time. Up to 5 crew-members could be accommodated on the flight-deck and 33 passengers could be seated in the main cabin.

The new aircraft was the first commercial airliner to feature a dedicated flight engineer`s station. This significantly reduced the workload for the flight crew. The flight engineer could control all engine management and was
responsible for passenger comfort, being able to adjust the supercharged pressure heating and ventilation systems.

Engine-driven pumps pressurized the cabin to an equivalent of 8,000 feet and the regulator maintained pressure up to 20,000 feet.

A total of 3,655 lbs of luggage and cargo could be accommodated in holds below the cabin floor and accessed through doors in the belly of the aircraft.

A lavatory and a galley were installed at the rear with a ladies` powder- room included. The Stratoliner really was “all-luxury”.

Apart from the pressurized cabin systems, the Stratoliner had other advanced (for the day) features. The landing gear was electrically
operated as were the flaps.

Sadly, of the ten original airframes, only one survives. Beautifully restored to perfect flight condition, it now rests in retirement at the Smithsonian as part of the Air and Space collection.

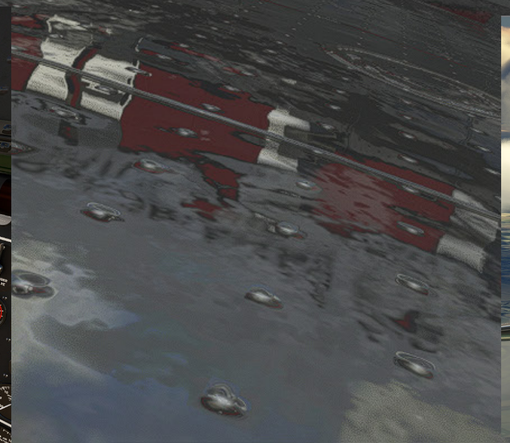
So this is now your chance to hop aboard, strap in and experience the thrill of takng command of a true aviation legend.

Only three examples of the were produced for Pan-American Airways.

These machines differed in many areas to the versions used by TWA.

New levels of luxury.

The Stratoliner offered levels of luxury and comfort never before experienced by air-travelers. The cabin had a unique layout with seats that could be converted into spacious sleeping bunks with their own windows.



IMPORTANT!!!

This panel has a switch (1) which when used allows you to toggle between the standard navigation instruments and a GNS suite.

To use the navigation systems, either traditional or GNS you MUST switch ON the Avionics Switch (2)

UPPER INSTRUMENT PANEL

1. GNS suite switcher
2. Avionics Master Switch
3. OMI Marker unit
4. Transponder
5. Autopilot
6. NAV1 Radial Indicator
7. ADF(NDB) Indicator
8. NAV1 RMI
9. NAV2 RMI
10. Fuel Truck (toggle)
11. Services (Toggle)
12. Windshield wiper switches
13. Ignition Magnetos
14. Propeller Feathering Buttons
15. Main U/C Warning lights
16. Tail Wheel Warning Lights
17. Landing Gear Switch
18. Flaps Position Indicator
19. Flaps Switch
20. Engine Starter Panel
21. Propeller De-Icing Controls
22. Landing Light Switches
23. Cabin Lighting Rheostats

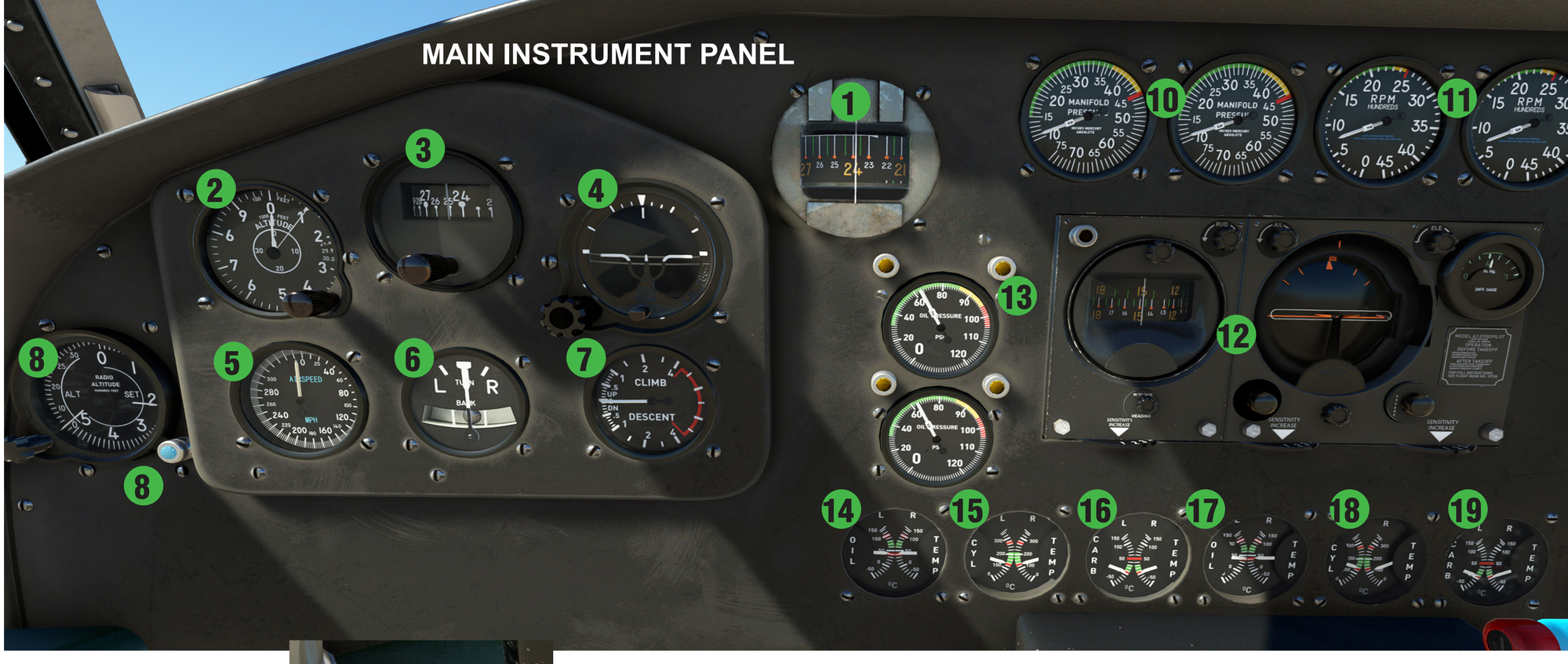
24. Pitot Heat Switch and light
25. Generator Ameters
26. Park Brake Warning light
27. Inverter Switch and light
28. NoSmoking Lights Switch
29. Seat Belt Lights Switch
30. Panel Lights Switch
31. Beacon Light Switch
32. Cabin Lights Switch
33. Compass Light Switch
34. Services (Toggle)
35. Eng.#1 Generator Switch
36. Eng.#2 Generator Switch
37. Fuel Pump Switches

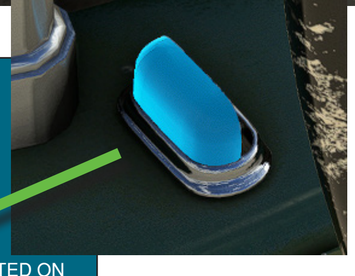
UPPER INSTRUMENT PANEL

INSTRUMENT PANELS

The main pilots' instrument panel contains all the necessary gauges required to fly the aeroplane including instruments for engine management from the pilots' seats. These instruments are repeated on the engineer's panel where, in real life, the engineer would be responsible for engine management during a flight.

1. Magnetic Compass
2. Altimeter
3. Gyro compass
4. Artificial Horizon Indicator
5. Airspeed Indicator
6. Turn/Slip Indicator
7. Vertical Speed Indicator
8. Radio Compass
9. Critical Height Warning Light
10. Manifold Pressure
11. Tachometers
12. Sperry Gyro-Pilot
13. Oil Pressure & Warning Lights
14. Oil Temp. (Engines 1 & 2)
15. Cylinder Temp.(Engines 1 & 2)
16. Carb. Temp.(Engines 1 & 2)
17. Oil Temp. (Engines 3 & 4)
18. Cylinder Temp.(Engines 3 & 4)
19. Carb. Temp.(Engines 3 & 4)
20. Fuel Press. & Warning Lights
21. Outside Air Temperature
22. Wing Fuel Tank Contents (6)
23. Chronometer





FOR A BETTER VIEW

THE LARGE CONTROL WHEELS AND COLUMN TEND TO MASK SOME OF THE CRITICAL INSTRUMENTS.

TO REMOVE THE YOKES FOR BETTER VISIBILITY, CLICK ON THE SMALL PILOTS' PANEL LIGHTS MOUNTED ON THE FORWARD PART OF EACH SIDE CONSOLE.

UPGRADES

This manual is part of an upgrade to the Stratoliner package. In this upgrade we have changed out the HEADING COMPASSES to MAGNETIC COMPASSES following community suggestions and requests.

The SPERRY GYROPILOT now works better than previously and is less troublesome when living with a modern Autopilot in the same cockpit! Please be sure to read the revised instructions on how to use the SPERRY.

Various systems have been upgraded and modified. As we learn more about this remarkable aeroplane, further development upgrades will follow.

UNDER PRESSURE

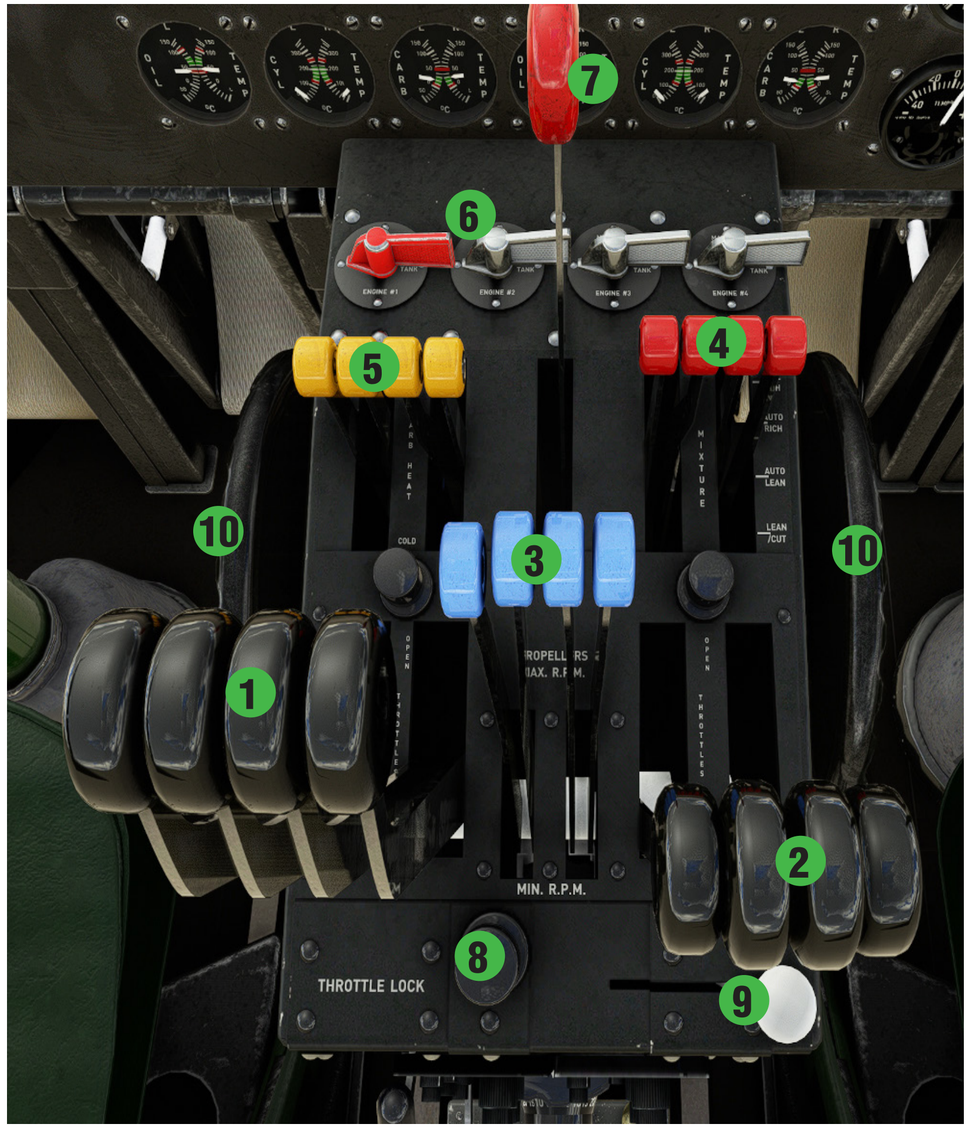
THESE CONTROLS ON THE FORWARD FACING PART OF THE ENGINEER'S STATION ARE THE CABIN PRESSURISATION SYSTEM.

FOR THE FIRST TIME IN A COMMERCIAL AIRLINER, THE ENGINEER COULD SET AND MONITOR CABIN PRESSURE AND TEMPERATURE FOR THE COMFORT OF PASSENGERS AND CREW.

IN THE RIGHT SPOT

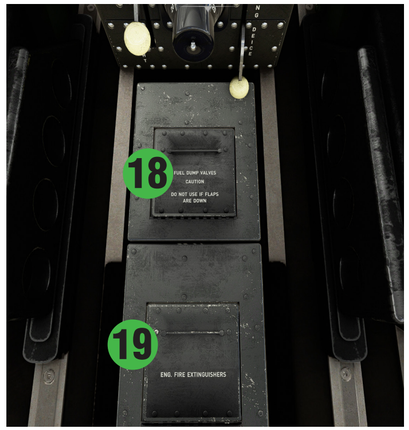
THERE ARE INDIVIDUAL CLICKSPOTS FOR CRITICAL AREAS LIKE THE PANELS. JUST HOVER OVER THE PANEL YOU WANT TO VIST AND CLICK. YOU'LL BE TAKEN IMMDEDIATELY TO THAT VIEW.

NO NEED FOR CAMERA MENUS!



PEDESTAL

1. Throttles
2. Throttles (co-pilot, slaved)
3. Propeller Controls
4. Mixture Controls
5. Carburettor Heat Controls
6. Manifold pressure selectors(INOP)
7. Tailwheel Lock
8. Throttle Lever Lock
9. Emergency Autopilot Switch
10. Elevator Trim Control
11. Parking Brake
12. Radio Suite
13. ADF Receiver
14. Rudder Trim Control
15. Aileron Trim Control
16. Ground/Flight Power Control
17. Wing De-Ice Control
18. Fuel Dump Valves
19. Engine Fire Control Panel



FUEL DUMP PROCEDURES

NEVER OPERATE THE FUEL DUMP VALVES IF THE FLAPS ARE DOWN!

LIFT THE COVER LID AND YOU WILL FIND TWO LEVERS. ONE FOR THE LEFT WING AND ONE FOR THE RIGHT. PULL UP TO JETTSION FUEL.

ENGINE FIRE CONTROL

LIFT THE COVER LID AND YOU WILL FIND A SELECTOR LEVER TO SELECT EACH ENGINE. AFT OF THIS IS A LARGE RED EXTINUGISHER LEVER WHCIH YOU PULL UP TO OPERATE THE EXTINGUISHER.

AT THE BACK OF THE CONTROL BOX ARE TWO SMALLER LEVERS. THESE ARE SUPPLY CUT-OFFS FOR FUEL AND OIL. YOU MUST TURN THESE OFF AND MAKE SURE THAT THE ENGINE IS CUT BEFORE USING THE EXTINGUISHER.

ENGINEER'S PANEL

1. Cabin Pressurisation Controls
2. Fuel Selectors (Tanks per Engine)
3. Volt Meter
4. Battery/Ground-Power Switch
5. Landing Lamp Test Switch
6. Light Switch
7. Fuel Tank Contents x 6
8. EGT
9. Cabin Pressure Control Panel
10. Carburettor Air Temperatures
11. Fuel Pressures
12. Fuel Flow
13. Oil Temperatures
14. Oil Pressures
15. Hydraulic Pressures
16. Pax Cabin Pressure Levers (INOP)

NOTE

QUITE A FEW OF THE INSTRUMENTS ON THE ENGINEER'S PANEL ARE DUPLICATES OF THOSE FOUND ON THE MAIN PILOTS' PANELS.

RADIOS

You have a choice of radio suites in the cockpit. For general IFR navigation work you may wish to stay with the conventional "old-school" receivers and instruments.
The upper panel has the following navigation instruments:
A NAV1 direction indicator **B** ADF direction indicator
C NAV1 RMI and **D** NAV2 RMI

At the rear of the pedestal are four radio head units and an ADF receiver for NDB radials. Two upper head units operate as comms receivers, COM1 and COM2. The lower head units are receivers for NAV1 and NAV2 frequencies.

Each head unit is equipped with two digital readouts one on the right for Standby frequency (the one you tune) and the other on the left for active (the actual frequency that drives the navigation instrument(s)).

Two large knobs tune the mHZ and kHz frequency. A small knob at the bottom left of each unit switches the display from Standby to Active.

Below these four head units as the ADF receiver with individual digit knobs. Once tuned to the correct NDB, the needle pointer of the ADF gauge will point toward the radial.

PLEASE NOTE

It is not the intention of this guide to teach navigation or how to use navigation instruments. There are many guides readily available on the web or tuition via the simulator.

THE SPERRY GYROPILOT

It should be remembered that this unit is not designed as a navigation aid and was never meant to be one. When you are flying long distances the Sperry is designed keep your airplane in straight and level flight.. It can adjusted using bank angle and rudder knobs to fly to a different heading but it is NOT an AutoPilot in the true, modern sense. Use the Sperry only in ordinary weather conditions and never in extremely turbulent air.

NOTE: The servo controls (speed valves) are INOP in this simulation.

The left hand Gyro Panel contains two rotating scales (1). The bottom one is a standard Gyro Compass Card, adjustable for drift. That is until you pull out the Caging Knob (2) which will cage the gyro and allow the scale to be used as a Desired-Heading scale by rotating the knob. The top scale is the Rudder Follow Up Card adjusted by the Rudder Knob (3). This also serves as a Heading Selector which, if providing the bank angle is set, will command the aircraft to turn to a new heading.

The right hand panel contains a modified artificial horizon indicator called The Bank and Climb Indicator. This instrument comprises a Horizon Scale or Bank Indicator (5) an Elevator Pitch Reference Index (6) an Elevator Pitch Indicator (7) and a Bank Angle Setting Bug (8). Also on this panel are an Aileron Knob (Bank Angle setting) (4) Elevator Knob (Pitch setting) (5), a Caging Knob for the Bank and Climb Indicator (10) , a Power Switch (9) and a Suction Gauge measuring Vacuum Supply to the unit (11).

Before use, configure the aircraft for a stabilized flight, correctly trimmed and wings leveled. Select the appropriate prop RPMs. Ensure that there is enough vacuum pressure at the gauge and the Bank and Climb unit (right hand panel) is free (uncaged).

With the Caging knob pulled out, set your desired heading on the lower card. Now match the heading with the Rudder Follow Up scale by turning the Rudder Knob (3) until both cards are aligned.

Now ensure that the Pitch Reference Index (6) and the Pitch Indicator (7) are aligned with the Pitch indicator sitting squarely in the middle of the Reference Index.

1. Rudder & Gyro cards 2. Heading Adjust (and cage)
3. Rudder Adjust 4. Bank Adjust 5.Pitch Adjust
6. Pitch Reference Index 7.Pitch indicator 8.Bank Angle Bug
9. ON/OFF 10. Cage Knob 11. Suction 12. Illumination.

Turn on the Sperry Gyropilot using the Power Switch (9) The aircraft will maintain current heading and in level pitch (or climb if you have set the Pitch Reference that way.

To commence a turn to the desired heading set on the Gyro card, just rotate the Aileron Knob (2) to give the required bank angle and the gyropilot will command the rudder for a shallow turn. If more or less bank angle is required for the turn- just adjust using the Aileron Knob. When the new heading is reached the bank bug will auto reset to 0 and the aircraft will level off. For further adjustements to heading, simply adjust the desired heading using the Rudder Knob and providing you have left sufficient bank angle on the Aileron knob, the aircraft will turn to the new heading and levle off.

For climbs or descents using the Sperry, rotate the Elevator Knob (5) to adjust the Pitch Refernce Index up or down and the Pitch indicator (and therefore the aircraft) will follow.

Caging the Bank and Climb gauge with the Caging knob (10) returns the aircraft to a wiings-level condition, ignoring the heading and bank bugs (that are not auto reset).

Uncaging the Attitude will make the gyropilot continue with the turn as it was commanded before.

Within turns, use the Bank Angle Bug (Aileron Knob) with caution. Best results are obtained with bank angles between 10-15 degrees. When using max or close (20-30 deg), they should be manually reduced as the desired heading nears, to avoid over-shooting the target (there might be oscillations during the cap-ture process).

When using the bank bug, direction of turn will depend on side of bank selected (left/right). An opposite bank bug will command an extended, uncoordinated turn, that might be use-ful in certain circumstances (for example, making a 360 degrees change).

NOTE

WE HAVE ATTEMPTED TO SIMULATE THIS SPERRY GYROPILOT AS CLOSELY AS POSSIBLE TO THE REAL THING WITHIN THE PARAMETERS OF THE HOST SIMULATOR. IT IS NOT FAULTLESS AND IS DESIGNED TO GIVE THE PILOT A REASONABLE APPROXIMATION OF WHAT IT WAS LIKE TO FLY DISTANCES WITH SUCH AN INSTRUMENT.

THESE WERE THE DAYS WHEN AUTOPILOTS WERE A THING OF THE FUTURE OR AT BEST, IN THEIR INFANCY. USING SUCH A DEVICE TODAY IS BOTH EDUCATIONAL AND FUN!

FOR THE MODERN PILOT

For a more modern approach to your navigation needs, we have included an optional GNS suite running the very latest software. These units are standalone instruments and can operate as GPS -driven navigation systems, radi-os and much more. Using the toggle switch provided will change out the traditional instrument array to these GNS units. NAV1 is driven from the GNS530 and NAV2 from

Flying the Stratoliner.

The Boeing B307 Stratoliner is not a difficult aeroplane to fly. However, there are one or two unusual (for the day) features you should be aware of before your first flight.

Novel for the times, the Stratoliner used electrically operated systems for the landing gear and flaps. The switches and controls for these can be found on the upper instrument panel.

The landing gear itself was designed in such a way that the main wheels could still support the aircraft on the ground, when the gear is retracted. This allowed for a certain amount of maneuverability even after a wheels-up belly landing. This was a similar system employed by the DC-3.

The engine preparation and start procedures MUST be followed correctly for successful engine starts. There is a specific order in which various switches and controls must be used. Follow them and you will not have any problems starting the big radials.

The Stratoliner has a fully-castoring tail wheel which can and must be locked for takeoff and landing. The big airliner will have a tendency to
wander off the straight and narrow if you dont use the lock.

The flight deck was the first to feature an engineers station in a non-military aircraft. There are important controls such as fuel tank selectors located here. A lot of the instruments is repeated from the pilots main panels.

There are three fuel tanks in each wing. Fuel cannot be transferred from one wing to the other but each pump in each wing can supply fuel to either of that wings engines.

A full set of checklists is included in this manual and also a complete set of interactive checklists are available via the sim. It is often a good idea to set up auto-complete for the checklists for the first flight and watch each process as it runs and completes.

For a touch of realism, you can add a diorama to the external views which can include a period re-fueling truck and a set of period boarding steps and flight attendant. A luggage trolley and luggage is also added and the under-belly luggage compartment door is swung open. Use the switches (10 & 11) on the upper instrument panel.

By selecting the GROUND POWER position of the Ground/Flight switch, you can toggle on the GPU starting generator. This supplies enough power for the systems of the aircraft and also enough power to start the engines. Once running, you switch the lever to FLIGHT position and this brings the on-board batteries on-line, toggling off the GPU outside.

After passengers are aboard and freight is loaded, turn off the Services switch and the Fuel Truck Switch also.

Check that the Park-Brake is ON.

Now, with GROUND POWER selected, open the tank valves and select the appropriate tanks for each engine using the controls first on the engineers station (valves) and then the pedestal (selectors).

Check the flaps for operation and then switch OFF the flaps switch. Check that the gear switch is down and you have three green lights on.

Turn on the courtesy switches (NoSmoking and SeatBelts) and any cockpit/cabin lighting as desired.

Each engine has a Starter Switch, Boost Switch and Primer Switch. These are arranged so that you switch up or down for the desired engine. For example for Engine#1 you switch UP.

Engine starting procedure (per engine) is as follows:

1) Engine boost pump ON (Check Fuel Pressure)
2) Primer ON
3) Starter ON - this will start the prop spinning wait 5 seconds to allow prop to spin up.
4) Magnetos to BOTH (whilst prop is spinning)

The engine should fire and settle to an idle. Turn off the Engine Boost and Primer switches.

Select FLIGHT with the GROUND/FLIGHT switch and check removal of the GPU outside. Switch ON the generators and check for oil pressure, fuel pressure and temperature for all engines.

Tune your radios and set any navigation frequencies etc., call the tower for taxi clearance and UNLOCK the tail wheel. You have four powerful radial engines so it doesnt take much to get her moving. The Stratoliner has good manners

Before takeoff, place fuel selectors on MAIN, Mixtures to full-rich, propellers to maximum R.P.M., Fuel Booster pumps (37) ON, Carb. Heat -cold.

Now, check the magnetos. To do this, run each engine in turm up to 1,500 R.P.M. Turn the mag switch from BOTH to RIGHT and observe the Tachometer. You should see a rev drop of around 100 R.P.M. , no more. This should be the same for Right and Left Magnetos. Return the Magnetos to BOTH. Return engines to idle.

Call the tower for takeoff clearance and then release the parkbrake. With a smooth action slowly increase the throttles to give 2,500 R.P.M. and 35 inches of mercury (Manifold Pressure). The tail will rise at around 60 M.P.H. When this happens, keep a steady grip on the controls and correct any tendency to swing. At 90-100 M.P.H. pull gently back on the yoke and lift off. Keep level until the speed has risen to around 120 M.P.H. then slowly start a gentle climb.

Raise the landing gear. Throttle back to give around 30 inches and 2,250 R.P.M and continue to climb at around 175 M.P.H. at 1,200 feet per minute.Normal cruise speed is 222 M.P.H. (at 19,000 ft) and engines should be adjusted to give 1,850 - 2,000 R.P.M or 23 inches of mercury on the gauge.

Landing is quite straightforward using progressive flaps and balanced power settings. LOCK THE TAIL WHEEL BEFORE TOUCH-DOWN! With careful engine management and accurate flying, the Stratoliner has a range of up to 1,300 miles. Comfortable cruising in the Worlds first pressurized airliner!

Microsoft Flight Simulator

Checklists.

A fully interactive checklist is provided with the simulator package but we have also included a set of abbreviated checklists with this guide, for reference.

PRE-START

Parking Brake	ON
Services Switch	ON
Fuel Truck Switch	ON
Ground/Flight Switch	GROUND
Fuel Contents	CHECKED
Landing gear switch	DOWN 3 Greens
Navigation Lights	ON
Beacon Light	ON
Landing Lights	OFF
Flap Switch	OFF
Propeller Controls	Max R.P.M.
Fuel Tank Levers	MAINS
Mixtures	FULL RICH
Pitot Heat	ON
Trims	NEUTRAL
Altimeter	SET
Autopilot	OFF
Inverters	ON

START

#1 Boost Pump	ON (Check Pressure)
#1 Primer	ON
#1 Starter	ON wait 5 secs
Magnetos	BOTH
Boost Pump	OFF
Primer	OFF

Repeat for all engines

WARM -UP

Fuel Truck Switch	ON
Services Switch	OFF
Ground/Flight Switch	FLIGHT
Instruments	CHECKED
Throttle (per engine)	1,500 R.P.M.
Mag-check	100 RPM DROP
Services Switch	OFF
Door check	CLOSED
Radios	TUNED & SET

TAXY

Tail-wheel lock	OFF
Flaps	As required
Trimming	NEUTRAL
Brakes	RELEASED

TAKEOFF

Propeller Controls	Max R.P.M.
Tail-wheel lock	ON
Mixtures	FULL RICH
Throttles (smoothly)	MAXIMUM

CLIMB

Airspeed	130 - 170 M.P.H.
Landing Gear	UP No lights
Flaps	UP

CRUISE

Flaps	UP
Propeller Pitch Preset	CRUISE
Mixtures	AS REQUIRED
Throttles	AS REQUIRED
AutoPilot Ae145	AS REQUIRED

APPROACH

Airspeed	140 M.P.H.
Flaps	As required
Propeller Controls	Max R.P.M.
Landing Gear	DOWN 3 Greens
Tail-wheel lock	ON

LANDING

Airspeed	100 M.P.H.
Flaps	FULL
Throttles	AS REQUIRED
Touchdown	90 M.P.H.

Microsoft Flight Simulator

AN IMPORTANT NOTE ON PERFORMANCE

This model is designed to be as close to the original 1940 airplane, as it was built for Pan Am (Type Certificate number 719).

As such, it has a 45000 lbs max takeoff weight. The engines produce 1100 hp for takeoff with 43 inches of manifold pressure at 2350 RPM.

The supercharger is a single-speed type.

The recommended enroute climbing speed is 126.5 mph IAS. Maximum continuous power can be maintained up to about 5000 ft (38.5" Hg @ 2300 RPM), where the climb rate is about 1300 ft/min at gross weight.

Above that, manifold pressure and power will drop, along with the climb rate until the ceiling is reached (100 ft/min) just under 18000 ft.

The recommended cruising speed for maximum range is 160 mph indicated.

Depending on altitude, the following chart can be used.

Alt	MP	RPM	Fuel Flow	HP	MPH (TAS)
0	28.2	1800	170 GPH	525	164
6000 ft	27.4	1900	180 GPH	575	180
11000 ft	26.7	2000	197 GPH	625	194
15000 ft	F.T.	2200	214 GPH	675	206