AEROPLANE HEAVEN

You're virtually there.

NORTH AMERICAN B 25J MITCHELL

HIGH DEFINITION TRIBUTE TO AMERICA'S VERSATILE WORK-HORSE

For Microsoft Flight Simulator

COCKPIT GUIDE AND FLYING NOTES

NORTH AMERICAN B-25J MITCHELL

Introduction.

Named in honour of aviation pioneer, Brigadier General William “Billy” Mitchell, the B-25 series of medium bombers was amongst the most successful of WW2. Serving with distinction in every theatre of World War II, the B-25 was produced in a bewildering variety of versions, nearly 10,000 airframes were built.

The design first flew in August of 1941 but test flights recorded major aerodynamic issues, not the least of which was an alarming “Dutch roll”. By introducing the “gull-wing” configuration for the inner wing panels, the problem was cured and the new design displayed optimum flight characteristics under test conditions. The “gull-wing” also gave the B-25 it’s distinctive appearance when viewed head-on.

By the time of the attack on Pearl Harbour, 130 airframes had been delivered and the B-25 was ready for war. Perhaps the most famous B-25 mission was actually its first. In retaliation for the Pearl Harbour attacks, it was decided by the “top brass” to strike back at Japan in an immediate and convincing way. So a squadron of B-25B Mitchells were specially adapted (lightened by removing armament) to enable them to be launched off the aircraft carrier “USS Hornet” and flown to bomb Tokyo. The raid was led by Lt. Col. James Doolittle who planned the attack. Very few military targets were damaged but the psychological effect on the enemy-was very important and of course, morale back in the United States. All but one machine were destroyed in crashes but 14 of the 16 crews eventually made it safely back home.

The subject of our package is the B-25J. This was the most used version and over 4,000 were built. The version was available with either a fully-glazed nose which housed the bombardier/navigator (also acting as the nose-gunner) or a solid “Strafer” nose which housed 8 50cal. machine guns and together with the other gun packs could put up a phenomenal fire-power when attacking ground targets.

The design incorporated stations for side gunners, much like the Boeing B-17, an upper turret (again a very similar turret to the B-17 and a sting in the tail with twin 50 cals operated by a tail-gunner. Four remotely operated, detachable “cheek-pods” carried a 50 cal machine gun each which brought the total of offensive/defensive armament to at least 12 machine guns!

A wide variety of bomb-loads could be carried in the large bomb bay and some B-25s were adapted by the Navy to carry and deliver torpedoes which they did very effectively. Some “Strafer” models even incorporated a massive 75mm cannon, the largest ever carried by an American bomber.

Many B-25Js are still flying or being restored - such is the reliability and robustness of the airframe. We will continue to see examples of this incredible aeroplane well into the future.

B-25J MITCHELL GLAZED NOSE

SPECIFICATIONS

Length:	**52ft 11in (16.13m)**
Wingspan:	**67ft 7in (20.6m)**
Wing Area:	**618 sq.ft. (57.4m2)**
Height:	**16ft 4in (4.98m)**
Empty Weight:	**19,480lb (8,836 kg)**
Max T/O Weight:	**35,000lb(15,876kg)**
Maximum Speed:	**272mph (236kts)**
Cruising Speed:	**230mph (200kts)**
Ceiling:	**24,200ft (7,400m)**
Range:	**1,350 miles (2,170km)**
Powerplant:	**2x Wright R-2600-92 Twin-Cyclone 14 Cylinder 2-row air-cooled**
Payload:	**Up to 3,000lb bombs**
Armament	**12 to 18 50calibre Machine Guns**
	2 guns in the upper turret, 2 in the tail, 4 carried in side pods (optional) and up to 4 in the nose (glazed version) and 8 in the nose (“Strafer” version)
CREW	**6**

In this guide we will take you through all the necessary steps needed to fly a B-25J MITCHELL, point out some of the design’s unique features and get you as close as possible to feeling what it would have been like to fly and crew this incredible aeroplane.

"Briefing Time" S/N 43-27638 340th Bomb Wing Italy 1944

"A-OA" KJ 683 No.342 Squadron RAF (FreeFrench) April 1945

"Hot Gen" S/N 45-8883 No.98 Squadron RAF 1944

"Angel of Mercy" S/N 43-35982 310th BG

"Heavenly Body" S/N 44-30748 390th BS/ 42nd BG Sansapor, New Guinea 1944

"Lady Lil" S/N 44-39577 398th BS/ 345th BG Pacific 1945

"My Buck" S/N 44-29590 17th TRS/71st TRG Lingayen 1945

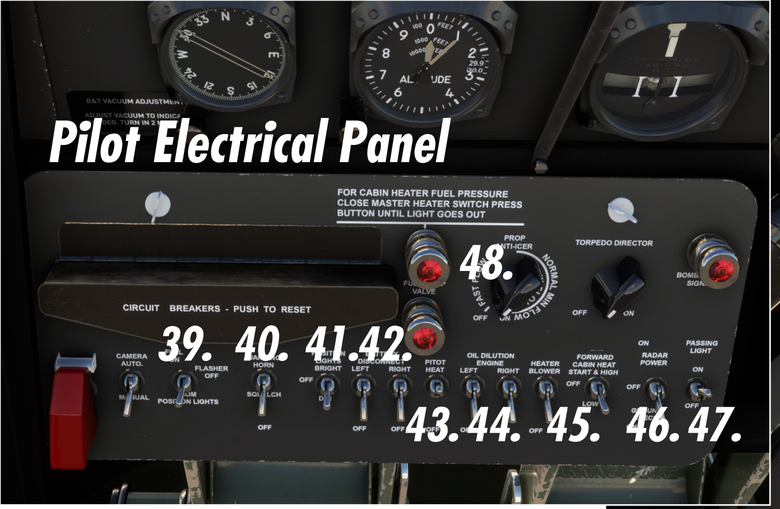
"Bugs Bunny" S/N 43-27957 823rd BS/ 38th BG Philippines 1945

Models,texturing and programme code — Aeroplane Heaven
Flight Model — Wells Sullivan
Sounds — Echo 19

AEROPLANE HEAVEN

You're virtually there.

Pilot Electrical Panel



The Mitchell's main instrument panel is laid out in a logical manner for a two-engined aircraft. The left half contains the instruments required to fly the aircraft, the right half has all the instruments necessary to monitor the engines and systems.

1. Airspeed indicator
2. RMI indicator
3. NAV1 indicator
4. Altimeter
5. Gyro compass
6. Turn/Slip indicator
7. A.H.I.
8. V.S.I.
9. Magnetic Compass
10. Manifold Pressures
11. Tachometers
12. Suction
13. Clock
14 Radio Compass (ADF)
15. Tachometers
16. Oil Temperatures
17. Cyl. Head Temperatures
18. Fuel Pressure
19. Carb. Air Temperature
20. Outside Air Temperature
21. Aux.Fuel Contents L/R
22. Front Tanks Contents L/R
23. Rear Tanks Contents L/R
24. Gear Transition Light
25. Nose Wheel Turn Lights
26. Gear and Flaps Position
27. Hydraulic System Pressure
28. Brake Pressure Indicator
29. Bomb Bay Doors Light
30. Bomb Release Light
31. Left Prop Feather Switch
32. Right Prop Feather Switch
33. Magnetos & Ignition Switch
34. Landing Light Switches
35. Boost Pump Switches
36. Starters
37. Left & Right Aux. Pumps
38. Recognition Lights Switches
39. Position Lights Switch
40. Flood Light Switch
41. Navigation Lights Switch
42. Battery Switches
43. Pitot Heater Switch
44. Oil Dilution Switches
45. Cabin Heater Switches
46. Panel Lights Switch
47. Passing Light Switch
48. Propeller De-Icing Control

Co-Pilot Sub-Panel

Pilot Wall

49. Pilot sliding window latch
50. ADF receiver
51. Comms Receiver (COM1)
52. Nav Receiver (NAV1)
53. Pilot Bomb Control Panel
54. Options Panel Switch
55. Gun Hatch Switch (Strafer Only)
56. Fuel Shutoff Cocks
57. Suit Heater

By using the Panel Options Switch (44) marked as “Bomb Salvo” in the real thing, you can toggle the special “OPTIONS” panel. This panel contains switches that can select the different crew members’ visibility.

A knob to the right of these switches selects special camera views so you can visit the Bombardier’s station in the nose , the Top Turret Gunner’s position or Pilot Station. Using the push-button marked “Go” will take you to the selected station.

The knob (45) at the base of the Pilot’s Bomb Control Panel, will open the gun hatch in the nose of the Strafer. An exterior view will show the configuration of the eight Browning 50.cal Machine guns and their ammunition feeds and boxes.

To open the side window, use the latch (39) by “pinching” the two halves of the latch together and sliding the latch toward the rear.

Co Pilot Wall

58. Co Pilot sliding window latch
59. Co Pilot NAV Radio
60. Intercom
61. Bombing Computer
62. Drift Meter
63. Fuel Transfer Controls
64. Map Case
65. Generator Panel

Control Console

66. Propeller Pitch Levers
67. Mixture Levers
68. Throttles
69. Friction Levers
70. Carb. Heat Levers
71. Supercharger Levers
72. Flaps lever
73. Cowl Flaps Control
74. Landing Gear Lever
75. Landing Gear Lever Latch
76. Aileron Trim
77. Rudder Trim
78. Emergency Brake Levers
79. Emergency Landing Gear Lever
80. Elevator Trim Control
81. Elevator Trim Indicator

FLYING COFFINS!

Later versions of the B-25J had these armour-plated seats fitted as an option to provide more protection for the crew.

They were quickly dubbed “coffin seats” by crews because of their shape. You can select this option over the standard seats by using the switch on the Pilot Bomb Control Panel.

The seats were split vertically so that one half could be folded back to allow access to the flight deck.

WARNING! The emergency landing gear lever (79) is a one-shot operation. Once the gas bottle is used you cannot return the lever for further use.

82. Window Wiper
83. Bombing Computer
84. Repeater Gauges
85. Bomb Control Unit
86. Window Wiper Switch
87. Norden Bomb Sight
88. Gimble-mounted Machine Gun
89. Ammunition Cases
90. Fixed Machine Gun
91. Bomb Bay Door Control

The Glazed Nose.

Depending on the intended mission, the B-25J Mitchell was available in two versions. For general bombing, the fully glazed nose variant accommodated a forward gunner/bombardier. The nose section was equipped with the all-important and highly secret (in the day) Norden Gunsight and up to four (in some cases) 50 cal. Browning Machine Guns. A centrally gimble-mounted gun protruded through the front of the glazed canopy for use by the bombardier/gunner. The other guns were in fixed positions and operated by the pilot, remotely. Ammunition for these weapons was contained in rows of metal boxes with automatic feed systems up to the breeches of the guns.

The remaining equipment in this station consisted of the bombing computer, bomb selection controls and bomb bay doors control.

Crew Stations

In addition to the Pilot and Co-Pilot, there are four other main crew stations in the B-25J fuselage - the Bombardier/Navigator, the Radio Operator/Turret Gunner Side or waist Gunner and the Tail Gunner.
In this simulation you can visit the Bombardier and Turret Gunner stations. using the "OPTIONS" panel.

Bombardier/Front gunner

The Bombardier doubles as a Front Turret Gunner when not on a bomb run.

The large glazed area provides exceptional visibility for the Bombardier who has a commanding view ahead and down.
A special optically flat glass is framed into the dome for the Norden bomb sight. This is fitted with a wiper controlled by switch on the bomb control panel

Above the bomb sight is the swivel-mounted 50 caliber Browning Machine Gun and to the right a second fixed 50 cal operated by the pilot.

To the left are the bombing controls and repeater instruments. The right side of the nose section is dominated by rows of ammunition boxes for the 50 cals.

An escape hatch is fitted to the port side of the nose section. Access to the nose is via a cramped “tunnel” once through the forward crew hatch. This access tunnel runs beneath the cockpit and is a tight fit!

Positioned right in the nose of this section is the Norden Bomb sight. Kept highly secret during the war, the Norden was capable of extremely accurate bombing computations and was also used exclusively in the Boeing B-17 heavy bomber.

If you are touring the interior of your B-25 with the Showcase Camera, climb up the forward crew hatch steps and you can access the Bombardier’s Station via the tunnel to the left and beneath the cockpit. of the Pilot Station. Mind your head!

The Norden Bomb sight was a jealously-guarded secret throughout World War II and was also fitted to the famous Boeing B-17 Bomber.

The Turret

The B -25J has a Bendix powered upper turret. It is fitted with twin 50 caliber Browning Machine Guns and is operated by the Engineer crew-member. He sits on a bicycle type sprung seat and his feet rest on stirrups which are actually the gun charging (cocking) levers. To charge the guns he would push forcibly down with his feet and a system of pulleys and wires would then operate the cocking levers of the guns.

Using the control levers he could elevate the guns and rotate the turret as well as firing the weapons.

The turret is equipped with oxygen supply, heated suit control, ammunition boxes and special feeds and spent shell collection bags.

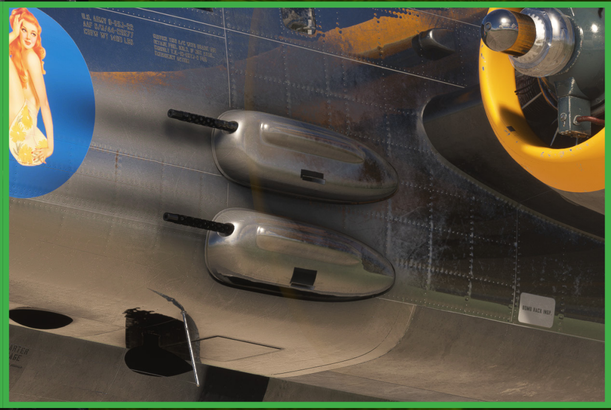
TURRET CAM

TAIL GUNNER

The “sting in the tail” comes from a pair of 50 cal. Browning Machine guns operated by the Tail Gunner crew member.

CHEEK PODS

Either side of the fuselage below the cockpit are two “pods (each side) which house yet more 50 cal. machine guns. These are operated by the pilot, usually on strafing runs. The pods could be detached to save weight. A thick armour-plate was attached to the fuselage sides to protect the metal skin from blast damage.



Flying the B-25J Mitchell.

At the end of this manual you will find a complete set of CHECKLISTS. However, it will be useful to run through a few things about handling and flying the Mitchell.

So, let's get started. We are going to assume you are using the "Cold-Dark" start method. That is, all switches OFF, all controls neutral.

Firstly, board the crew. Bring up the **"Options" Panel** to configure the crew stations.

Check that the **Landing Gear Lever (64)** is down and **LATCHED (65)**

Check that the **Parking Brake** on the **Co-Pilot Sub Panel** is **ON**

UNLOCK the controls by using the lever which is down by the base of the control column just in front of the right rudder pedal. Check for controls free -movement.

Now you need some power. Switch on the **Battery Switches.(42)**

Check that the emergency fuel cutoffs are **OFF (UP)** In emergencies you push these button switches down to cut the fuel to the engines.

Engine Start. (per engine) We always start the **RIGHT ENGINE FIRST**

COWL FLAPS (73) should be **OPEN** when operating on the ground for maximum cooling.

Switch ON the **RIGHT Fuel Boost Pump (35)** and observe the **Fuel Pressure Gauge needle (18)** for pressure.

Open the **RIGHT Throttle 1/2 inch**
RIGHT Propeller Control lever to MAXIMUM
RIGHT Mixture Lever to FULL RICH (forward)

Switch the **RIGHT Oil Dilution Switch to ON (44)**

Switch the **Master Ignition Switch to ON (33)** and switch the **RIGHT Magneto Switch** to **BOTH**

The start procedure uses 3 SWITCHES (36) - Primer, Energise and Start

Push the PRIMER SWITCH UP (for right engine)
Push the ENERGISE SWITCH UP (for right engine)

The propeller will begin to turn slowly and gather speed

WAIT FOR 5 SECONDS OR COUNT 15 BLADES

Switch ON the STARTER Switch. The engine should fire and run.

CARRY OUT THE SAME PROCEDURE FOR THE LEFT ENGINE.

Once the engines are running satisfactorily, return throttles to idle Check all instruments for proper operation and correct readings.

Run-up Tests. (per engine)

To check that everything is order, there are several checks to be made whilst warming up the engines, prior to taxying out.

Set throttles to give 1,000 R.P.M. idle.

Check the following:

OIL PRESSURE	**75 - 90 P.S.I**
OIL TEMPERATURE	**50 -80 ^{0}**
CYLINDER HEAD TEMPERATURE	**100 -205^0**

Set throttles to give 2,000 R.P.M. CHECK MANIFOLD PRESSURES (10) which should be 28.5 inches Hg.

Run each engine singly to 30 inches Hg. and check for 2,400 R.P.M.

Check operation of flaps. The **flap lever (72)** can be moved to three positions - UP, DOWN and NEUTRAL. To lower the flaps, push the lever DOWN and hold it there until the flaps are at the desired angle, indicated on the **Flaps Position Indicator (26)** on the Main Instrument Panel. Once you are happy with the flaps angle, release the flaps lever and it will automatically spring back to NEUTRAL. Raising the flaps is the same process in reverse.

Magneto Tests.

Check correct operation of Magnetos.

Set throttles to give 1,500 R.P.M. idle.

Starting with the **RIGHT MAGNETO**, turn the switch from **BOTH to RIGHT** Check the **RIGHT RPM needle** on the **Tachometer (11)** You are looking for a **drop in RPM of approximately 100. No More.** Immediately turn the switch from **RIGHT to BOTH.** Now turn the switch from **BOTH to LEFT** and for a **drop in RPM of approximately 100. No More.** Immediately turn the switch from **LEFT to BOTH.**

Now test the **LEFT MAGNETO** in the same fashion.

Taxying.

The B-25 has a tricycle undercarriage and therefore has a nose wheel. This makes the aircraft much easier to control on the ground than a "tail-dragger" like a DC-3. However, the two Cyclone radials are powerful engines and care is needed when operating on the ground. Before moving off, ALWAYS check for controls free movement.

Although the B-25 can be steered using rudder input alone, the more "correct" method to steer on the ground is to use engine power from left or right to turn.

Taking off.

Once lined up with the runway, set the bakes.

NOTE: A B-25J Mitchell loaded to 33,500lbs TOW, needs up to 4000 ft of runway to take off depending on headwinds. In a 15kt headwind this can be 2,700 ft. So, be mindful of your runway length, payload weight and wind strengths and directions when making your takeoff run.

Set flaps to 20^0 down.
Set Elevator Trim slightly nose up.
Other trims to neutral.
Set Throttles to idle.
Propeller controls fully forward.
Mixture controls fully forward.
Check fuel contents.
Check engine instruments.
Booster pumps OFF

Open up smoothly and slowly and release the park brake. As the aircraft gathers speed, correct any tendency to swing with rudder input.
Accelerate smoothly and when the speed reaches 80-90mph, gently **RAISE THE NOSE WHEEL OFF THE GROUND** This places the aircraft in a positive angle of attack. As speed continues to pick up, your B-25J will/should fly itself off the ground. **RAISE THE GEAR** by first raising the **GEAR LATCH SAFETY(75) and then raising the GEAR LEVER (74)**.

Level off at 800 ft., **Raise the flaps, Close Cowl Flaps** and allow the aircraft to gain safe flying speed of **140 m.p.h.** before attempting to climb.
commencing a gentle climb out.

Climbing.

Best speed for climbing is **160 - 170m.p.h.**
Above 5,000ft. start leaning of mixtures.
For best economy in a climb, recommended speed is 170m.p.h. with Mixture leaned.

General Flying.

Check the fuel gauge contents.
Keep your B-25 trimmed at all times for less-stressful cruising.

An AUTOPILOT and Garmin-style GPS system has been added to the Co-Pilot's Sub-Panel. Although technically non-authentic, we have provided it for those used to and preferring more modern technology. If you wish to keep everything authentic, stay away from the optional GPS button!

You will find conventional **NAV, ADF and COMMS radios** on the cockpit walls and **RMI and NAV1 indicators** together with an **ADF indicator** on the panel.

For flying at night, the Main Panel Instruments are UV lit and there are several cockpit floodlights operated by **switches (40) (46)** on the **Pilot's Electrical Panel**

Superchargers.

There's a Supercharger lever **(71)** for each engine. For most of your flying you will leave these in the **LOW** position (UP) and **LOCKED**.At altitudes above 8,000 ft.it is useful to shift the Superchargers from **LOW** to **HIGH** (first **UNLOCK** the levers) and obtain a higher power output for climbing. You then need to balance your Prop and Mixture levers to achieve a steady 48 inches. Exceeding the red line on the gauge will damage your engines, and they could fail. **ALWAYS LOCK** the levers once set.

Approach and Land.

The B-25J Mitchell is a very easy aircraft to land.

Enter the pattern at 150 -170 m.p.h. and 800 -1000 ft. above the ground and perform the landing checks:

Autopilot (if used)	**OFF**
Fuel Pressure	**CHECK**
Fuel Levels	**CHECK**
Booster Pumps	**ON**
Mixtures	**FULL RICH**
Carb Heat	**Normal**
Propellers	**2400 R.P.M.**
Landing Gear	**DOWN and LATCHED**
Flaps	**20°**

Once established on Approach, lower flaps to FULL

Lower your speed to 120 -130 m.p.h. and allow the aircraft to lower to the ground with speed bleeding off to 80 -90 m.p.h. as you near the threshold.

Once over the threshold, reduce the throttles and place the aircraft in a nose-up attitude to land on the mains. Keep the nose up as you roll to assist with slowing down. DO NOT APPLY BRAKES WITH THE NOSE WHEEL OFF THE GROUND!!

Ease off the pressure on the elevator and allow the nose to drop and ground the nose wheel.

Close the throttles and brake if needed.

Cowl Flaps	**UP**
Wing Flaps	**UP**
Booster Pumps	**OFF**

Park and Shutdown.

The B-25J Mitchell's nose wheel must be left in a fore-aft position. So if you have steered into a parking spot, roll forward slightly with no rudder or brakes to set the nos wheel straight then apply the park-brake.

Bomb Doors	**OPEN**
Mixtures	**IDLE/CUTOFF**
Throttles	**FULL OPEN (as R.P.Ms die)**
Ignition Switches	**OFF (when props have stopped turning)**
Radios	**OFF**
All Switches	**OFF**
Control Lock	**ON**

CHECKLISTS

PRE-START

CREW	ABOARD
ENTRANCE	CLOSED
PARKING BRAKE	ON
CONTROLS LOCK	OFF
MASTER BATTERY	ON
MAGNETOS	OFF
UNDERCARRIAGE	DOWN AND LATCH LOCKED
FLAPS	20^0
COWL FLAPS	OPEN
LANDING LIGHTS	OFF
FUEL CONTENTS	CHECK
FUEL CUTOFFS	OFF (UP)
PITOT HEAT	ON
DILUTION SWITCHES	ON

START (No.2 First)

BOOST PUMP	ON (PER ENGINE)
THROTTLE	OPEN 1/2 INCH
MASTER IGNITION	ON
MIXTURE	FULL RICH
PROPELLERS	100% MAX REVS (PER ENGINE)
MAGNETOS	ON (BOTH) (PER ENGINE)
PRIMER	ON (PER ENGINE)
ENERGISER	ON (PER ENGINE) 15 BLADES
STARTER	PUSH (PER ENGINE)

ENGINE WARM AND RUN-UP

FUEL PRESSURE	6 - 7 PSI
BRAKE PRESSURES	CHECK
ALTIMETER	SET
TEMPERATURES	CHECK

MAG TEST (Per engine)

THROTTLE	1,500 R.P.M.
RIGHT MAG	BOTH TO RIGHT 100 RPM DROP
	BOTH TO LEFT 100 RPM DROP
LEFT MAG	BOTH TO RIGHT 100 RPM DROP
	BOTH TO LEFT 100 RPM DROP
THROTTLE	IDLE
PROPELLER	100% MAX REVS
NAV LIGHTS	ON

TAXY

PARKING BRAKE	RELEASE
INSTRUMENTS	CHECK
ALTIMETER	SET

PRE-TAKEOFF

ENGINE	CHECK INSTRUMENTS
THROTTLE	IDLE
FLAPS	20^0
TRIM	NOSE UP SMALL AMOUNT (CHECK GAUGE)

TAKEOFF

BRAKES	RELEASE
THROTTLE	MAX
ROTATION	80 - 90 MPH (NOSE WHEEL ONLY)
GEAR	UP (ABOVE 150 FT.)
ATTITUDE	LEVEL UNTIL 170 MPH
SUPERCHARGERS	LOW AND LOCKED.

CLIMB

THROTTLE	AS REQUIRED
MIXTURES	BEGIN TO LEAN ABOVE 5,000 FT.
TRIM	MAINTAIN 750 FPM AT 165 MPH
FLAPS	UP
COWL FLAPS	CLOSED
SUPERCHARGERS	AS REQUIRED ABOVE 8,000 FT.

LANDING

THROTTLE	TO MAINTAIN 120 MPH (APPROACH) THEN 80 MPH (NEAR THRESHOLD)
LANDING LIGHTS	ON
TRIM	AS REQUIRED
GEAR	DOWN and LATCHED
FLAPS	DOWN FULL (ON FINAL)
THROTTLE	TO GIVE 70 MPH OVER THRESHOLD
THROTTLE	IDLE TO LAND AT 68 MPH

AEROPLANE HEAVEN

You're virtually there.

NORTH AMERICAN B-25J MITCHELL

CREDITS

MODELING AND TEXTURES	AEROPLANE HEAVEN
PROGRAMMIMG CODE	AEROPLANE EHAVEN
FLIGHT MODEL	WELLS SULLIVAN
SOUNDS	ECHO 19