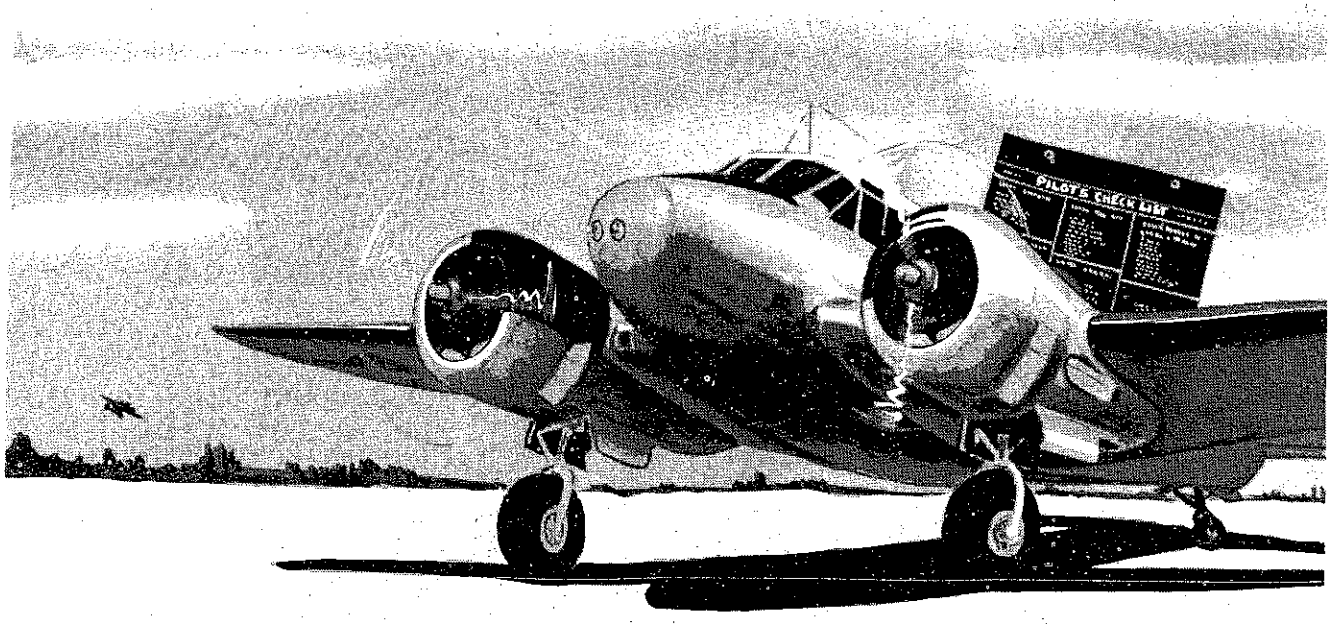

section II NORMAL PROCEDURES

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STATUS OF AIRCRAFT.

FLIGHT RESTRICTIONS.

Refer to Section V for limitations on the aircraft.

CRUISE CONTROL.

Refer to Appendix I to determine fuel, airspeeds and power settings required for safe and efficient completion of the proposed mission.

WEIGHT AND BALANCE.

Know the take-off and anticipated landing gross weight and balance. Refer to weight limitations specified in Section V; Handbook of Weight and Balance, T. O. 1-1B-40; and Basic Weight Check List, T. O. 1C-45G-5. Refer also to Form F to ascertain loading is within weight and balance limits.

BEFORE EXTERIOR INSPECTION.

Personal gear should be stowed aboard and the following safety check completed:

Ignition Switches - OFF.

Battery Switches - OFF.

Landing Gear Lever - DOWN.

Flight Controls - Unlocked.

Check engineering status on USAF Form I.

EXTERIOR INSPECTION.

The exterior check will begin at the cabin door and proceed clockwise around the aircraft (figure 2-1) ending at the cabin door. The following inspection will be accomplished:

1.—Fuselage — Skin and windows for damage.
Top antennas—Taut and securely mounted.

2.—Left fuel access doors — Closed and secured.
Left wing, top surface — No skin damage or leakage from the nacelle.
Left flap — Top and bottom surfaces undamaged and hinges secure.

3.—Left Aileron — Top and bottom surfaces undamaged, no play in hinges and unobstructed full travel. Bonding intact.
Aileron trim tab — Securely hinged and in a neutral setting.

4.—Left wing tip — Undamaged with the left position light securely installed.

5.—Deicer boot — Securely attached and undamaged.
Passing light — Unbroken and securely in place.
Left wing, bottom surface — Skin surface undamaged and free of any accumulation of mud or dirt. Landing light fully retracted, clean and unbroken, wing tie-down removed.

6.—Left engine cowling — Securely fastened.
Left cowl flaps — Mechanical linkage secure.
External power — Connected.

CAUTION

External power should be used for starting the aircraft to relieve the batteries of the extra load. Starting by use of the aircraft batteries is emergency procedure.

Left landing gear doors — Linkage and hinge secure; and the structure undamaged.
Left landing gear shock strut — 2½ inches of extension.

EXTERIOR INSPECTION

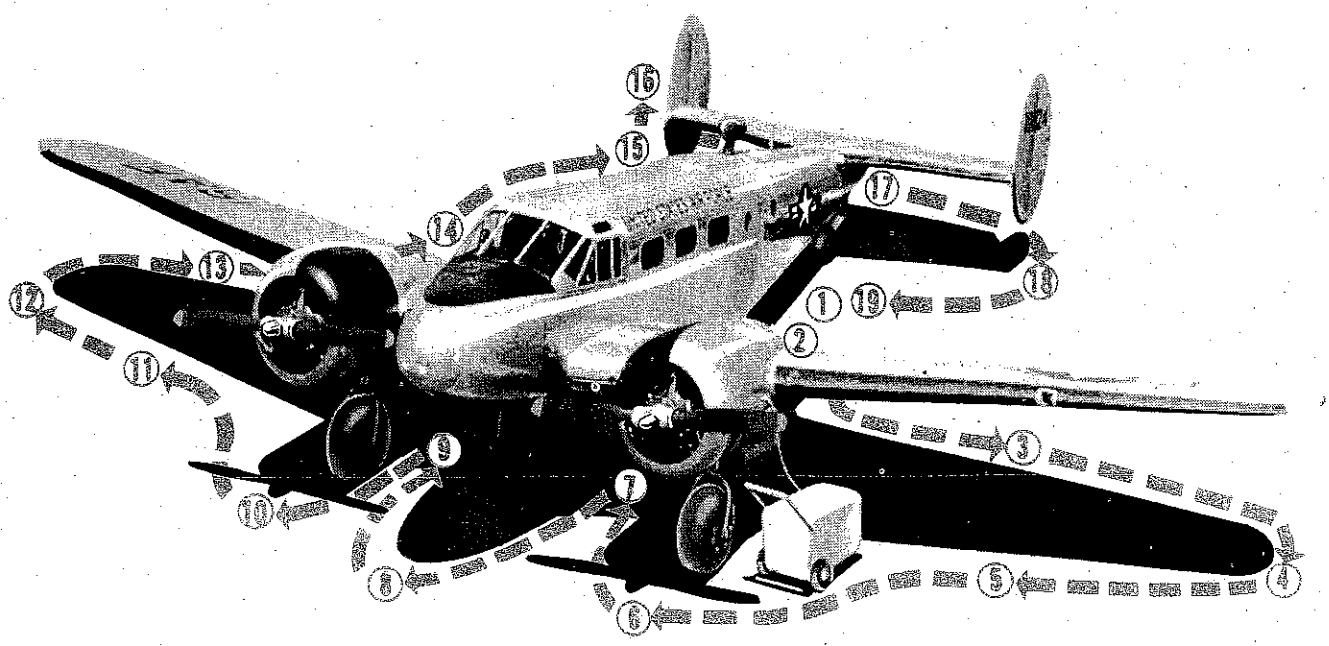

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Figure 2-1

CAUTION

Damage to the landing gear may result if the aircraft is operated when there is less than 1½ inches of shock strut extension after the aircraft is loaded. Below this minimum, shock absorbing action is insufficient for landing.

Left brake actuators — No leakage.

Left tire — Properly inflated and without cuts, cracks or badly worn areas.

Wheel chocks — In place.

Left propeller blades and hubs — No cracks, nicks or deep scratches. No apparent leakage.

Left engine — No crankcase leakage. Air scoops unobstructed.

Landing gear wheel well — No apparent engine or hydraulic oil leakage. No ruptured tubing, broken wiring or damaged equipment. Entire compartment free of any accumulation of oil. Landing gear slide tube free of dust or dirt.

WARNING

The area surrounding the aircraft will be inspected for evidence of leakage or spillage of inflammable liquids which might be ignited during the starting operation.

7.—Aircraft belly — Antennas taut and forward mounts secure. All access doors secure. Belly skin and structure undamaged.

8.—Pitot tubes — Uncovered and unobstructed.

Nose compartment — Door closed and securely latched.

Taxi lights — Lens clean and unbroken. Retaining rings secure.

9. through 13.—The right engine, engine cowling, propeller, landing gear, tire, wing, deicer, aileron, flap, lights and fuel access doors will be inspected in the manner prescribed for the corresponding left-hand components.

14.—Fuselage — Skin and windows for damage.

15.—Aft belly antenna mount — Secure.

Right static port — Unobstructed.

Horizontal stabilizer — Top and bottom surfaces of the left side undamaged. Deicer boot undamaged and secure.

16.—Right vertical stabilizer — Securely attached and undamaged.

Right rudder — Undamaged, bonding intact, no hinge play and unobstructed through its full range of travel.

17.—Elevator — Top and bottom surfaces undamaged. Unobstructed through the full range of travel. Hinges secure with no apparent play. Bonding intact.

Top of aircraft fuselage — Undamaged.

Tail position light — Securely attached and undamaged.

Elevator tab — Undamaged with hinges and linkage secure. Note position.

Tail cone drain — Unobstructed.

18.—Left rudder — Unobstructed through the full range of travel, undamaged, securely hinged, no hinge play and bonding intact.

Rudder trim tab — Set in neutral and undamaged. Hinges and linkage secure.

Vertical stabilizer — Undamaged and securely mounted.

Horizontal stabilizer — Top and bottom surfaces of the left-hand side undamaged. Deicer boot undamaged and secure.

19.—Tail wheel assembly — Structure undamaged and free of an accumulation of mud, rust or dirt which would restrict operation.

Left static port — Unobstructed.

Aft belly antenna mount — Secure.

Fuselage — Portion aft of the cabin door undamaged.

Tail tie-down — Removed.

ON ENTERING AIRCRAFT.

CABIN COMPARTMENT.

After entering the aircraft, the main cabin door should be checked, noting the security of the latch. The lavatory compartment should be inspected. Weight and balance limitations do not permit stowage of gear in this compartment. First aid kits in place. Proceeding forward through cabin, check as follows:

There should be no loose gear in the cabin area.

There are to be seat belts available to all passengers.

Emergency escape hatch — Secure.

Fire extinguisher — In place and secure.

BEFORE ENTERING PILOT COMPARTMENT.

Generators — Check ON.

Anti-icer tank gage — Full.

PILOT COMPARTMENT.

Loose gear — Stowed or removed.

Control lock — Stowed.

Seat, safety belt and shoulder harness — Adjusted.

All control tab indicators — Coincide with the actual positions.

(Battery switches — ON for this check, then — OFF.)

All ignition switches — OFF.

Engine selector — OFF.

Ignition booster, starter and primer switches — Cover down.

Battery switches — OFF. (Do not use ship's batteries for starting except in emergencies.)

Fuel booster switches — OFF.

Instrument inverter switch — OFF.

All light switches — OFF.

Fuel quantity gage — Check all tanks.

Propeller levers — TAKE-OFF RPM.

Manifold heat levers — COLD.

Throttles — CLOSED.

Mixture levers — IDLE CUT OFF.

Oil shutter levers — COLD.

Cowl flap handles — OPEN.

Landing gear lever — DOWN.

Flap lever — UP (Flaps retracted).

NOTE

If flaps are not fully retracted, retract them to prevent damage from objects which may be thrown against their lower surface.

Left engine fuel selector handle — OFF.

Tail wheel handle — LOCKED.

Right engine fuel selector handle — OFF.

Parking brake handle — ON.

Oil by-pass button — COLD.

Landing gear circuit breaker — Check. (Push to reset.)

Engine fire extinguisher switches — Check safetied.

NOTE

If the safety wire is broken on the guards for the extinguisher switches, it may be the system has been discharged. The pressure gage should be checked.

Fuel cross-feed handle — OFF.

Propeller anti-icer — Place knob at NORMAL. Allow to remain a few seconds and check for alcohol flow at the propeller. Return knob to OFF.

NOTE

If there is no indication of alcohol flow within a few seconds with the knob at NORMAL, the knob should be slowly turned toward MAX and the position at which flow begins noted.

Deicer button — OFF.

Pitot heat switches — OFF.

Windshield wiper switch — OFF.

All indicator lights — Push to test.
Pilot's instruments lights knob — OFF.
Engine and subpanel instruments lights knob — OFF.
Pilot's turn-and-bank power selector switch — NORMAL.
Propeller feathering circuit breaker — Check ON.
Manifold pressure gage — Check (Note indication for power check).

NOTE

Manifold pressure gages should indicate the current barometric pressure. Any variation should be noted.

Copilot's instruments lights knob — OFF.

ADDITIONAL CHECK (NIGHT FLIGHT).

If operation during the hours of darkness is initiated or anticipated, the following additional checks will be completed:

All interior and exterior lights — Check for proper operation.
Flashlight — In operating condition and accessible to the pilot.

STARTING ENGINES.

As a precaution against liquid lock, each engine should be pulled through 4 blades. This may be accomplished with the starter when external power is utilized. The starter should be used intermittently in such a manner that rotation will be in approximately 90-degree increments.

NOTE

A liquid lock will be recognized by the resistance it offers to rotation. When liquid lock is detected, it is not to be relieved by turning the engine in either direction. The spark plugs for those cylinders affected are to be removed and all fluid drained.

Determine that the area to the rear of the aircraft is clear and that no damage will result from the propeller air stream.

The fire guard, who is to stand by for all starts, should be in such position that he is visible to the pilot to indicate the area is "clear." No start should be attempted until the "clear" signal is received. The left engine should not be started with the cabin door open.

RIGHT ENGINE.

Right Engine Fuel Selector Handle — RIGHT FRONT.
Right Cowl Flap Handle — Check OPEN.
Right Throttle — 1/8 OPEN.
Right Mixture Lever — FULL RICH.
Right Fuel Booster Switch — ON.
Master Ignition Switch — ON.
Engine Selector Switch — RIGHT.
Starter Switch — ON.
Allow engine to turn two revolutions, then:
Right Ignition Switch — BOTH.
Ignition Booster Switch — ON.
Primer Switch — Use until the engine fires and is operating smoothly.
Starter Switch — Release.
Ignition Booster Switch — Release.

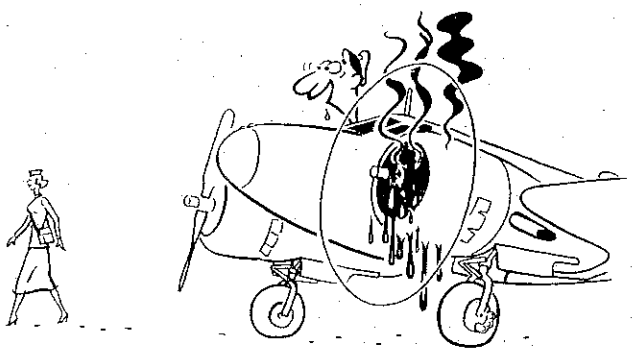
NOTE

If engine ceases to fire after starting, move the Mixture Lever to IDLE CUT OFF until it again begins to fire. Then return the Mixture Lever to FULL RICH.

CAUTION

Overheating of the starter motor will occur with prolonged operation. Thirty seconds should be considered as the maximum period of continuous operation without a cooling period.

Adjust engine speed to 1000 rpm.
Fuel Booster Switch — OFF.
Engine Selector Switch — OFF.



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CAUTION

If oil pressure is not indicated within 30 seconds after starting, shut down engine and investigate.

Refer to Section III for the procedure to be followed in the event of engine fire.

Position controls and start the left engine in the manner prescribed for the right engine.

Instrument Inverter — ON.

All components of the radio system should be individually checked for proper operation.

Receivers should be checked in each tuning range, if multiple and on a known frequency for proper calibration.

Direction finding equipment is to be operated both manually and automatically and checked visually and aurally. The visual indicator should be checked on a know station for proper indication.

Each transmitter should be checked on more than one frequency to determine proper operation of the remote tuners.

NOTE

Since the marker beacon receiver cannot usually be adequately checked on the ground, it should be both visually and aurally noted at the first opportunity in flight. During the radio check, local altimeter setting and correct time should be obtained and the instruments correctly set.

CAUTION

Since the generators are not operative at warm-up rpm, the radio check is to be accomplished on external power. If engines are warm and there is a possibility of overheating, this check may be made prior to starting.

External Power — Disconnect.

Battery Switches — ON.

ENGINE GROUND OPERATION.

When oil pressure has stabilized within limits, engine speed should be increased to the smoothest operating speed between 1200 rpm and 1600 rpm for the remainder of the warm-up period.

Avoid prolonged ground operation because of the high cylinder head temperatures that may result.

NOTE

For any given throttle setting, maximum cooling will result from maximum rpm. Therefore, for all ground operation the propeller control lever should be positioned for TAKE-OFF RPM.

GROUND TESTS.

For the ground testing of systems and accessories the aircraft should be headed into the wind, the tail wheel locked and the parking brake set. Checks of the generator, flap and propeller systems are combined.

1. Engine Speed — 1600 rpm.
2. Right propeller feathering button — PUSH until drop of approximately 200 rpm then pull out.

NOTE

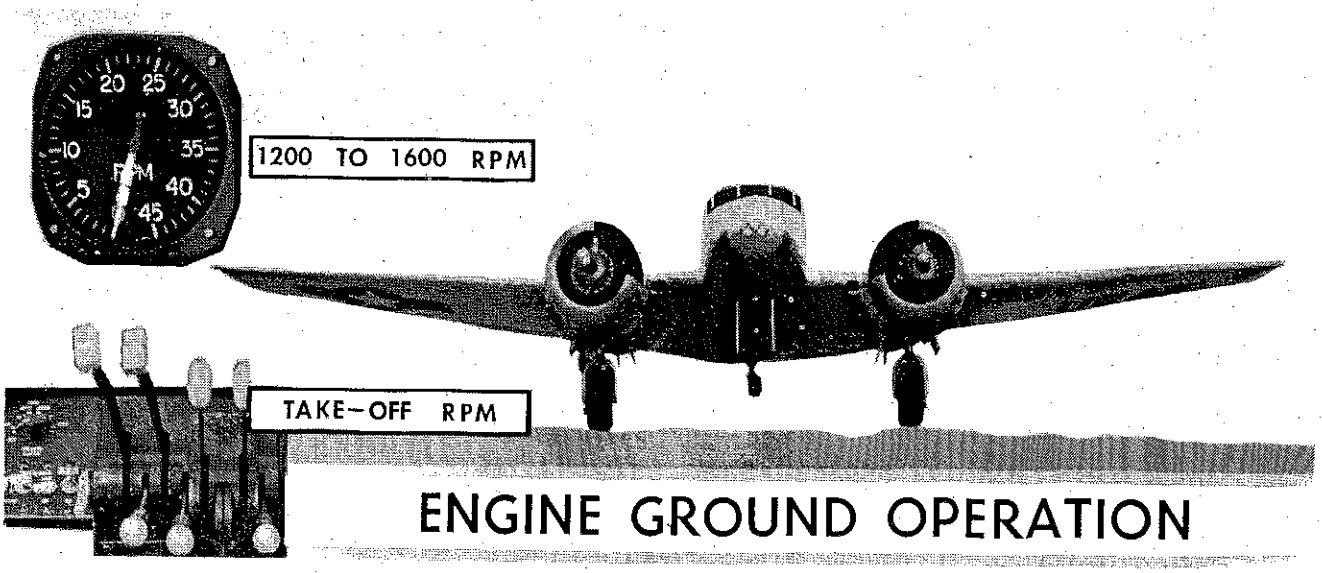
If the engine is operating at approximately 1500 rpm before feathering, it will continue to run fully feathered at about 450 rpm. Under these conditions, once the propeller is feathered, it will tend to slowly and steadily come out of the feathered position. This should not be considered abnormal since it is caused by the engine oil remaining under pressure.

3. Right propeller — UNFEATHER (Pull feathering button).

NOTE

(Deleted)

4. Repeat for the left propeller.
5. Left battery and generator switches — OFF.
6. Voltmeter selector switch — RIGHT.
7. Retard throttle to 900 rpm.
8. As engine speed decreases, the generator control circuit should disconnect the generator. This should occur at approximately 1000 rpm and will be indicated by a sudden "drop-off" of the volt and loadmeters.
9. Advance throttle on the right engine to 1900 rpm.
10. Observe volt and loadmeters — generators should reconnect at approximately 1200 rpm.
11. Lower flaps approximately 25 degrees. While the flaps are operating, observe the load and volt-



ENGINE GROUND OPERATION

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meter readings. The flap motor should draw approximately .3 load and the voltage should not exceed 29 volts.

12. Check if flaps are in the indicated position.

13. Pull the right propeller lever back to the LOW RPM (high pitch) position. Engine speed should stabilize at approximately 1200 rpm.

14. Return the right propeller lever to TAKE-OFF RPM position. Engine should again stabilize at 1900 rpm.

15. Lower flaps full down. Operation of the flap limit switches can be checked by noting the generator load drop-off as the flaps reach the FULL DOWN position.

16. Retard the right engine to warm-up rpm.

17. Left battery and generator switches — ON.

18. Right battery and generator switches — OFF.

19. Voltmeter selector switch — LEFT.

20. The left propeller and generator systems are checked in the same manner as the right (steps 7 through 17), with the exception that flaps are raised instead of being lowered.

21. Voltmeter selector switch — LEFT.

22. If icing is anticipated, check boots for proper operation by pulling the deicer button out and watching the boots go through several complete cycles.

23. Set and uncage gyros.

24. Instrument vacuum — Check.

25. Pitot heat — Check. (Increase on the loadmeter indicates operation.) Each engine, having been operated on their respective main tanks, should now be checked on other tanks in the following manner:

26. Fuel cross-feed — On.
    Right engine fuel selector handle — NOSE.
    Left engine fuel selector handle — OFF. Leave in this position 15 seconds.

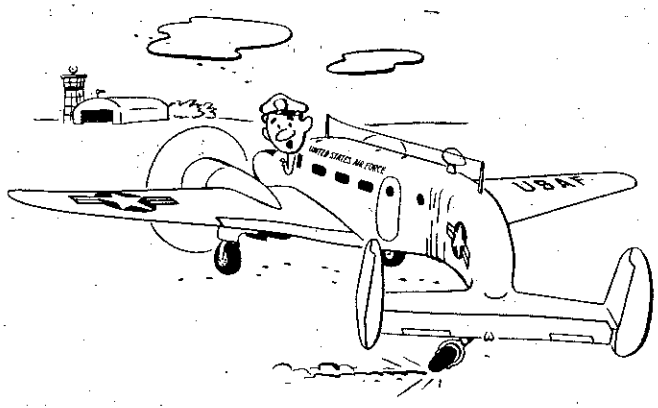
27. Left engine fuel selector handle — NOSE.
    Right engine fuel selector handle — OFF. Leave in this position 15 seconds.

28. Left engine fuel selector handle — LEFT REAR.
    Right engine fuel selector handle — RIGHT REAR.
    Fuel cross-feed handle — OFF. Leave in this position 15 seconds.

29. Left engine fuel selector handle — LEFT FRONT.
    Right engine fuel selector handle — RIGHT FRONT.

TAXIING INSTRUCTIONS.

Have chocks pulled and release the parking brake. As the aircraft first begins to move, brakes should be applied to determine that adequate brake is available for stopping. It can also be noted if there is grab, drag or other malfunction of either brake.



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The tail wheel must be unlocked before attempting any turn.

In taxiing, pilot visibility is restricted by the nose, in an area to the right and forward of the aircraft. To determine adequate clearance in this area will require an occasional S-turn.

Insofar as is possible, directional control should be maintained and turns executed by varying the power of the engines. This will permit minimum use of brakes.

The tendency for this aircraft to nose-over is not critical; however, brake application should be made with caution when the aircraft is empty or lightly loaded.

During taxiing turns, the gyro instruments should be checked for proper operation.

BEFORE TAKE-OFF.

PREFLIGHT ENGINE CHECK.

1. Both engines idle speed — Check (500 rpm).

2. Advance both engines to 700 rpm.

3. Ignition Switch — Check.
   Turn right ignition switch to OFF. As soon as it is determined that the engine ceases to fire, return the switch to BOTH. Repeat for the left engine. Any delay in returning the switch to BOTH after the engine has stopped may result in backfire.

4. Advance both throttles to Field Barometric pressure.

5. Check RPM. The engine speed should be approximately 1950 ± 50 rpm.

6. Left Engine — Warm-up rpm.

7. Right Engine Ignition — Check.
   Advance the throttle to field barometric pressure. Switch from BOTH to R, observe rpm, return to BOTH and allow rpm to stabilize. Switch from BOTH to L, observe rpm, return to BOTH. The maximum allowable drop is 65 rpm in either the R or L switch position.

CAUTION

To avoid detonation, a period of 1 minute will be considered maximum for operating the engine on single ignition at this speed.

8. Right Engine — 1700 rpm.
9. Cruising Fuel Air Mixture — Check.
   Move mixture control into the MANUAL LEANING RANGE until an approximate 100 rpm drop is noted; then return to RICH. During this operation the engine speed should increase very slightly before decreasing. An immediate decrease indicates the mixture is set too lean; a momentary increase in excess of 25 rpm indicates the mixture is set too rich.
10. Right Engine Oil Temperature — Check.
11. Right Engine Oil Pressure — Check.
12. Right Fuel Pressure — Check.
13. Right Cylinder Head Temperature — Check.
14. Right Manifold Heat — HOT and check for carburetor mixture temperature rise.
15. Right Manifold Heat — COLD.
16. Right Engine — Warm-up rpm.
17. Left Engine — 1950 rpm.
18. Check left engine in the same manner as steps 7 through 16 for the right engine.

NOTE

Throughout the engine check, with the mixture RICH, acceleration or deceleration should be both smooth and rapid with no tendency to miss or backfire.

19. Batery Switches — ON.
20. Fuel Booster Switches — ON.
21. Propeller Levers — TAKE-OFF RPM.
22. Manifold Heat Levers — COLD.
23. Mixture Levers — RICH.
24. Oil Shutter Levers — As required.
25. Pedestal Levers Friction Locks — Tighten to prevent creeping.
26. Right Engine Fuel Selector — RIGHT FRONT.
27. Left Engine Fuel Selector — LEFT FRONT.

PREFLIGHT AIRCRAFT CHECK.

Elevator Tab Wheel — Set for take-off.
Rudder Tab Crank — NEUTRAL.
Aileron Tab Wheel — NEUTRAL.
Flaps — Retracted.
Deicer Button — OFF.
Pitot Heat Switches — As required.
Gyro Instruments — Set and uncaged.
Instrument Inverter Switch — ON.
Safety Belt and Shoulder Harness — Check. (Shoulder harness unlocked.)
Flight Controls — Check for free and correct movement.

WARNING

If atmospheric conditions are conducive to the formation of carburetor ice, the induction system should be cleared, immediately before take-off, with manifold heat. Take-off, however, is to be made with the manifold heat levers in the COLD position to obtain maximum power. Heat may be reapplied when maximum power is no longer required.

TAKE-OFF.

The following techniques, when employed, will produce the results set forth in the Take-Off Curve, Appendix I.

WARNING

Do not take-off or land with the lavatory compartment occupied. The occupying of this compartment exceeds weight and balance limitations.

NOTE

Cylinder head temperature will increase 25° C to 50° C (45° F to 90° F) during the take-off run. Prior to take-off, temperatures should be sufficiently low that this increase will not cause the maximum allowable temperatures to be exceeded.

Tail Wheel Handle — LOCKED.
Cowl Flap Handles — TRAILED.
Apply take-off power with a slow, easy throttle movement.

NORMAL TAKE-OFF.

Take-off power is to be used for all take-offs. It is to be maintained until all obstacles have been cleared and the "Best Rate-of-Climb" speed is reached.

Directional control by use of the rudder is ineffective at airspeeds of less than 35 mph (30 knots) IAS. No attempt to raise the tail on take-off run below these minimums should be made.

There will be a tendency for the aircraft to "lift off" at 85 to 90 mph (74 to 78 knots) IAS and very little control pressure will be necessary at this speed to become airborne. This characteristic makes it possible for the aircraft to be "flown off" the ground, as compared to the more definite and abrupt "pull-off".

CROSS-WIND TAKE-OFF.

The only particular problem encountered making cross-wind take-offs with this aircraft is directional control at slow speeds. During the take-off runs, control can be facilitated by the application of power with the up-wind engine slightly in advance and in excess of power supplied by the down-wind engine, holding the tail down a little longer than for a normal take-off to minimize the weather-vaning tendency and by use of up-wind aileron. When enough speed

for directional control by rudder has been attained, the power output of the engines should be equalized. At approximately 60 mph the tail should be lifted and the aircraft flown off as soon as practicable.

NIGHT TAKE-OFF.

Normal take-off technique can be employed for night take-offs with the exception that acceleration after take-off should be accomplished in a climbing attitude. No level-off to attain "Best Rate-of-Climb" speed should be made under the reduced visibility conditions encountered at night.

MINIMUM RUN TAKE-OFF.

The following procedure for take-off is to attain a minimum take-off run.

Flaps — 15-degrees down.
Take position on the runway.
While holding the toe brakes, apply take-off power.
Release brakes.
Raise the tail in a normal manner.

NOTE

Hold control column in full aft position until brakes are released and aircraft begins to roll.

At an IAS of approximately 70 mph (60 knots), apply elevator pressure to pull the aircraft off the ground.
When the aircraft is airborne, level off to accelerate.
Landing gear — UP.
Flaps — UP.

TAKE-OFF TO CLIMB OVER OBSTRUCTIONS.

For maximum performance when take-off with a climb-out over obstructions is required, the procedure for "minimum take-off run" is employed up to the stage where the aircraft becomes airborne. From that point it varies as follows:

When airborne, Landing Gear — UP.
Maintain a climbing attitude, but allow acceleration to 100 mph (86 knots) IAS as rapidly as possible.
Maintain this airspeed in climb until all obstructions are cleared.
Level off to accelerate, retracting flap when maximum flap speed is reached.
Re-establish a climbing attitude after attaining "Best Rate-of-Climb" speed.

AFTER TAKE-OFF.

Immediately after take-off, climb to a safe altitude, level off and maintain level flight until "Best Rate-of-Climb" speed is attained. Retract landing gear. (Gear retraction required 4 seconds.) Retract as soon as practicable since single-engine performance is greatly improved with the gear in the UP position.

WARNING

Before raising the landing gear, be certain that the aircraft is not only airborne but sufficient control can be exercised to maintain flight. Any settling back to the runway with the landing gear unlocked and in an intermediate position will result in structural damage or complete collapse of the landing gear assembly.

CAUTION

Except under conditions of emergency and to prevent damage to the retracting mechanism, landing gear operation should never be reversed. That is, the lever should not be placed in the DOWN position while the gear is retracting or in the UP position while the gear is extending.

WARNING

At no time should the landing gear be retracted when sufficient runway for landing, in an emergency, remains ahead of the aircraft.

When the aircraft has reached its cruising altitude, trim for level flight and maintain climb power until cruising airspeed is attained. Accomplish the following:

Establish cruise power.
Fuel Booster Switches — OFF.
Mixture Levers — Adjust.
Manifold Heat Levers — As required.
Oil Shutter Levers — As required.
Right and Left Engine Fuel Selector Handles — REAR Tanks.
Cowl Flap Handles — CLOSED.

CLIMB.

See Take-off, Climb and Landing Curves in Appendix I. For climb performance, as specified in Appendix I, set up power for climb and establish an attitude which will produce the best rate-of-climb for your particular altitude.

FLIGHT CHARACTERISTICS.

Refer to Section VI for information regarding flight characteristics.

SYSTEMS OF OPERATION.

For information regarding the operation of the various systems, refer to Section VII.

DESCENT.

Preparatory to starting normal descent, accomplish the following:

Left Engine Fuel Selector Handle — LEFT FRONT.
Right Engine Fuel Selector Handle — RIGHT FRONT.
Fuel Cross-Feed Handle — OFF.
Mixture Lever — RICH.

NOTE

The Mixture Lever should be positioned in RICH for all descents since the correct mixture at cruising altitude will be excessively lean as more dense atmosphere is encountered at lower altitudes.

Manifold Heat Lever — As required.

Reduce power to establish the desired rate of descent and trim the aircraft. Maintain constant airspeed throughout. Use power variations to increase or decrease the rate of descent as desired. Frequently note that cylinder head temperatures are within operating limits.

CAUTION

In determining the necessity of manifold heat, it should be remembered the fuel air ratios and power settings normally used during descent offer those conditions which are most conducive to the formation of ice in the induction system.

PRE-TRAFFIC PATTERN CHECK.

The purpose of the Pre-Traffic Pattern Check is to prepare the aircraft for landing, insofar as is practicable, well in advance of the period when the pilot's full attention is required in observing other traffic and landing. In this check, proceed as follows:

Altimeters — Set (Local altimeter setting).

Gyros — Set and uncaged.

Fuel Booster Switches — ON.

Fuel Quantity — Check.

Mixture Lever — FULL RICH.

Left Engine Fuel Selector Handle — LEFT FRONT.

Tail Wheel Handle — LOCKED.

Right Engine Fuel Selector Handle — RIGHT FRONT.

Brakes — Check.

Parking Brake Handle — OFF.

Fuel Cross-Feed Handle — OFF.

Landing Weight — Check.

Seat belts and shoulder harness, crew and passengers — Secure.

Enter the traffic pattern at 120 mph (105 knots) IAS at an altitude of 1000 feet.

TRAFFIC PATTERN CHECK LIST.

Propeller Levers — Set for 2000 rpm.

Manifold Heat Levers — As required.

Oil Shutter Levers — As required.

Deicer Button — OFF.

Landing Gear Lever — DOWN.

Recheck landing gear for down and locked position by use of all indicators and by visual check.

NOTE

(Deleted)

Decrease IAS to 115 mph (100 knots).

Cowl Flap Handles — As required.

Flap Lever — DOWN.

Immediately prior to flare out:

Propeller Levers — TAKE-OFF RPM.

NOTE

If it is necessary to use manifold heat during the approach to landing, the manifold heat levers should be placed COLD prior to landing. This should be accomplished at the time propeller levers are positioned for TAKE-OFF RPM. Manifold heat levers are managed in this fashion so that full power will be available for go-around if the landing cannot be completed.

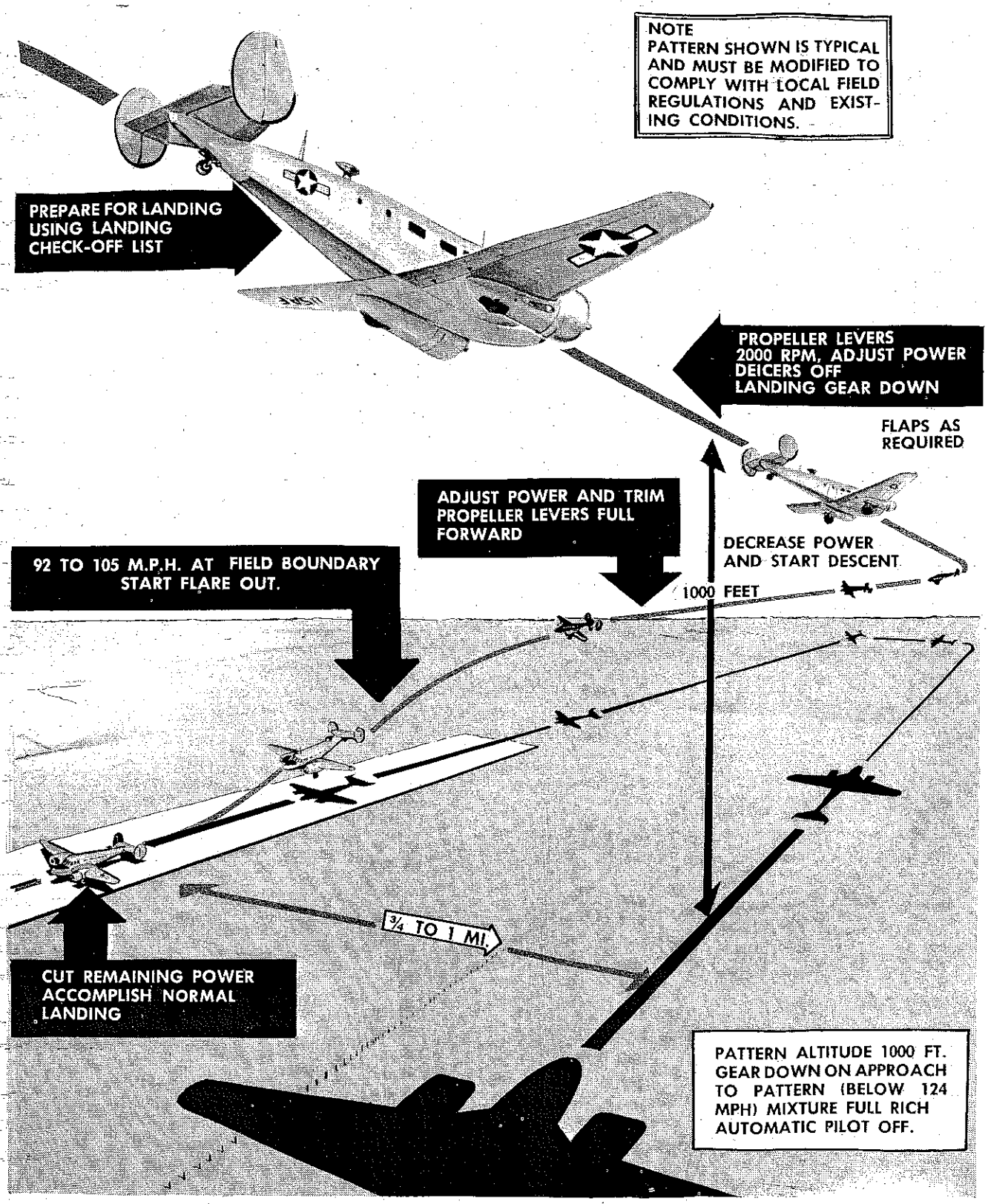
LANDING.

NORMAL LANDING.

There are no outstanding characteristics peculiar to this particular aircraft in landing. The effectiveness of control remains positive throughout the range of decreasing speed and in none of the various operations are control pressures excessive. The procedure outlined in this section will produce the results shown on the landing chart in Appendix I. As with all aircraft, a number of checks and operations must be accomplished in a relatively short period of time. Unless routine checks are accomplished prior to beginning the actual approach to landing, your technique will suffer. On a downwind leg, all checks should be completed, the landing gear extended and speed reduced to 115 mph (100 knots) IAS.

Flaps may be used, on the approach, at the discretion of the pilot. On final approach, speed should have been reduced to 105 mph to 92 mph (90 knots to 80 knots) IAS and full flap applied. Over the end of the runway close the throttle and complete the portion of the check list that is required before flare-out. Through the steady application of back pressure, flare-out the glide angle and establish a slight tail low attitude.

Thoughout the approach, trim the aircraft to relieve elevator pressure as more control is applied to reduce airspeed. Maintain the desired rate-of-descent with power variation rather than causing airspeed fluctuation by using elevators. When the aircraft main wheels have settled firmly on the ground, apply sufficient forward pressure to keep the aircraft in a level attitude and firmly on the runway. At approximately 60 mph the tail should be lowered in one smooth continuous motion. Maintain directional control with rudder as long as possible, using brakes only when necessary. Utilize the full landing area, permitting



LANDING PATTERN DIAGRAM

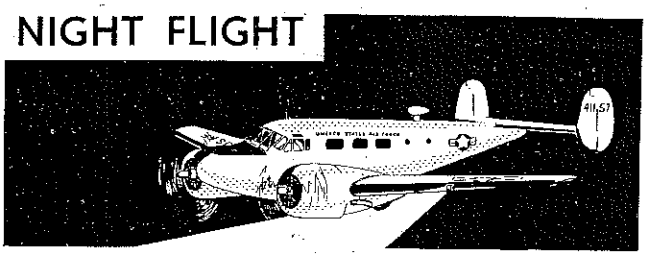
Figure 2-2

the aircraft to roll to a stop, rather than using the brakes unnecessarily.

CROSS-WIND LANDING.

When landing in a cross-wind, normal landing procedure can be employed; however, landing in a more level attitude will make directional control easier after the aircraft is on the ground. On final approach, the up-wind wing should be lowered enough to counteract drift, while the line of flight is maintained by the application of opposite rudder. The result is a slip, equal to and opposite the effect of drift, with the longitudinal axis of the airplane in line with the runway. The slip should be held until touch-down. If it is relaxed prior to the time when the aircraft is on the runway, the purpose is defeated and the aircraft will land drifting. During the ground roll, when airspeed has decreased to approximately 60 mph (50 knots), the tail should be lowered and full back pressure applied in one smooth continuous motion. This technique provides adequate rudder control until the tail wheel is firmly on the ground. Upwind aileron will aid in maintaining directional control on the runway. That period when the tail is lowered is the most critical and it is here that your greatest attention is required.

NIGHT FLIGHT



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NIGHT LANDING.

For night landings, power approaches should be employed. The procedure for accomplishing routine checks is the same as that for a normal landing; however, by utilizing power for the entire approach, the rate-of-descent will be less, permitting an extended landing pattern. The larger approach pattern, at night, makes more apparent the position of the landing area relative to the aircraft. This aids appreciably in planning a constant rate-of-descent. It also permits "lining-up" with the runway a greater distance from the landing area where drift is more apparent and obstructions on the final approach can be more carefully scrutinized. By using power throughout the approach and into the flare-out for landings, rate-of-descent can, at any time, be sharply reduced by increasing power. This decreased rate-of-descent gives more time for accurate appraisal of distance from the ground during the flare-out and touch-down portions of the landing. Landing lights may be used at the discretion of the pilot with the following limitations:

1. Due to the initial surge of electrical current the switches controlling the wing flaps, landing lights and landing gear, should not be turned on simultaneously.

2. Do not exceed specified maximum speed for flight with landing lights extended.

MINIMUM RUN LANDING.

In the execution of a minimum run landing, a power approach should be made to assure minimum safe clearance over obstructions. The approach end of the runway should be crossed with the aircraft in a slightly nose high attitude at 72 mph (63 knots) IAS. In this attitude and with the proper IAS, rate-of-descent is very rapid unless considerable power is used to retard it. Therefore, with power variation the remaining altitude, after obstructions are crossed, can be dissipated with a minimum forward motion. Some power will be required until the aircraft has been flared and landed in a three point attitude. As touch-down is made, the power should be "cut" and the control column pulled full back. This procedure produces a minimum touch-down speed and the aircraft can be braked to a full stop in a very short distance.

HIGH GROSS WEIGHT LANDING.

In the event of a landing at or near the maximum gross weight, you will find that characteristically the aircraft can be flown in the same manner as for a normal landing. As shown on the landing curve Appendix I, speeds are greater with the increased weight. Technique for specific results, however, remains the same.

GO-AROUND.

If at any time during the approach it becomes necessary to abandon the landing, the paramount factor is the regaining of speed for the necessary climb out. If this should occur with any appreciable amount of altitude, the procedure is simply to apply "Climb Power," establish a climbing attitude, retract the landing gear and then the flaps.

NOTE

Keep in mind that the landing gear control circuit breaker must be reset before the landing gear can be retracted.

If proximity to the ground or other object necessitates immediate pull-up, the following procedure will produce the maximum climb in the minimum period of time.

Apply Take-Off power.

Establish a climbing attitude.

Retract Landing Gear.

At a speed of 117 mph (102 knots) IAS — Retract Flaps.

In either case after climb is established, cowl flaps should be positioned for "Trail."

For procedures required in landing emergencies, refer to Section III.

AFTER LANDING.

When the landing roll has been completed, accomplish the following:

Cowl Flap Handle — OPEN.

Wing Flap Lever — UP.

Manifold Heat — As required.

Oil Shutter Levers — As required.

NOTE

If landing is made on a surface such as stone or gravel, wing flaps may be damaged when such material is thrown by the main landing wheels. For this reason, the flaps should be retracted immediately after landing.

Fuel Booster Switches — OFF.

Tail Wheel Handle — UNLOCKED before turning.

Pitot Heat Switches — OFF.

POST FLIGHT ENGINE CHECK.

Complete this check prior to stopping engines.

Ignition Switch — Check ground at 700 rpm. Turn momentarily to OFF. Engine should stop firing.

Idle Speed and Mixture — Check (500 rpm). With engines at idle, slowly move the mixture levers toward Idle Cut-Off and throughout the operation watch the Manifold Pressure Gage. A decrease of more than ¼-inch manifold pressure indicates an excessively rich mixture. An immediate increase in manifold pressure, not preceded by a decrease, indicates the idle mixture is too lean.

Engine power, ignition and the cruising fuel air mixture are to be checked as prescribed in the preflight engine check.

NOTE

If engine operation is found to be rough on one magneto, operate the engine on this magneto alone just prior to shut-down. This procedure will aid in isolating a cylinder which is not firing if maintenance personnel are immediately advised.

All malfunctioning controls or components should be reported on the appropriate form.

BEFORE STOPPING ENGINES.

For cold weather operation, refer to Section IX, Oil Dilution Procedure. Engines should be operated at 1200 rpm until temperatures have stabilized at their lowest reading. If it is not necessary to cool engines, they should be operated a minimum of 1 minute to scavenge the oil system.

STOPPING ENGINES.

Mixture Levers — IDLE CUT-OFF.

After engines have stopped firing:

Throttles — Slowly to FULL OPEN.

After engines have stopped:

All ignition switches — OFF.

BEFORE LEAVING THE AIRCRAFT.

Wheels chocked or Parking Brake — ON.

NOTE

Brake disc warpage may occur if the parking brake is left "Locked" when hot from excessive braking.

Battery Switches — OFF.

Instrument Inverter Switch — OFF.

All Light Switches — OFF.

Flap Lever — UP (Flaps retracted)

Left Engine Fuel Selector Handle — OFF.

Tail Wheel Handle — LOCKED.

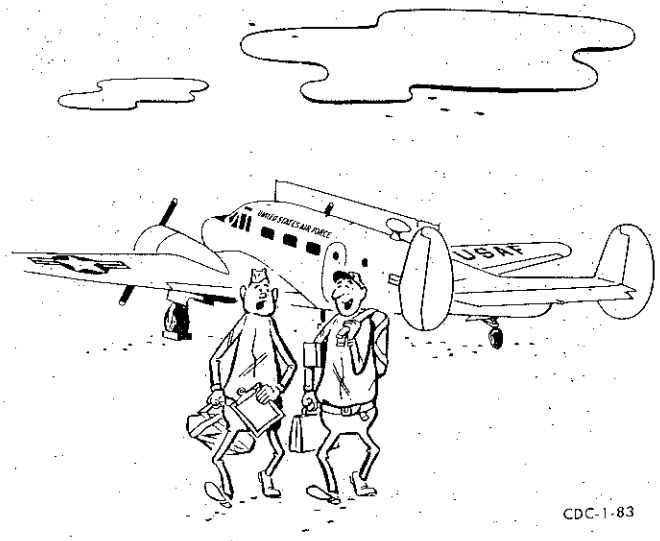
Right Engine Fuel Selector Handle — OFF.

Gyro Instruments — Caged.

Turn-and-Bank Power Selector Switch — NORMAL.

Flight Controls — Locked.

Form 1 complete.



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