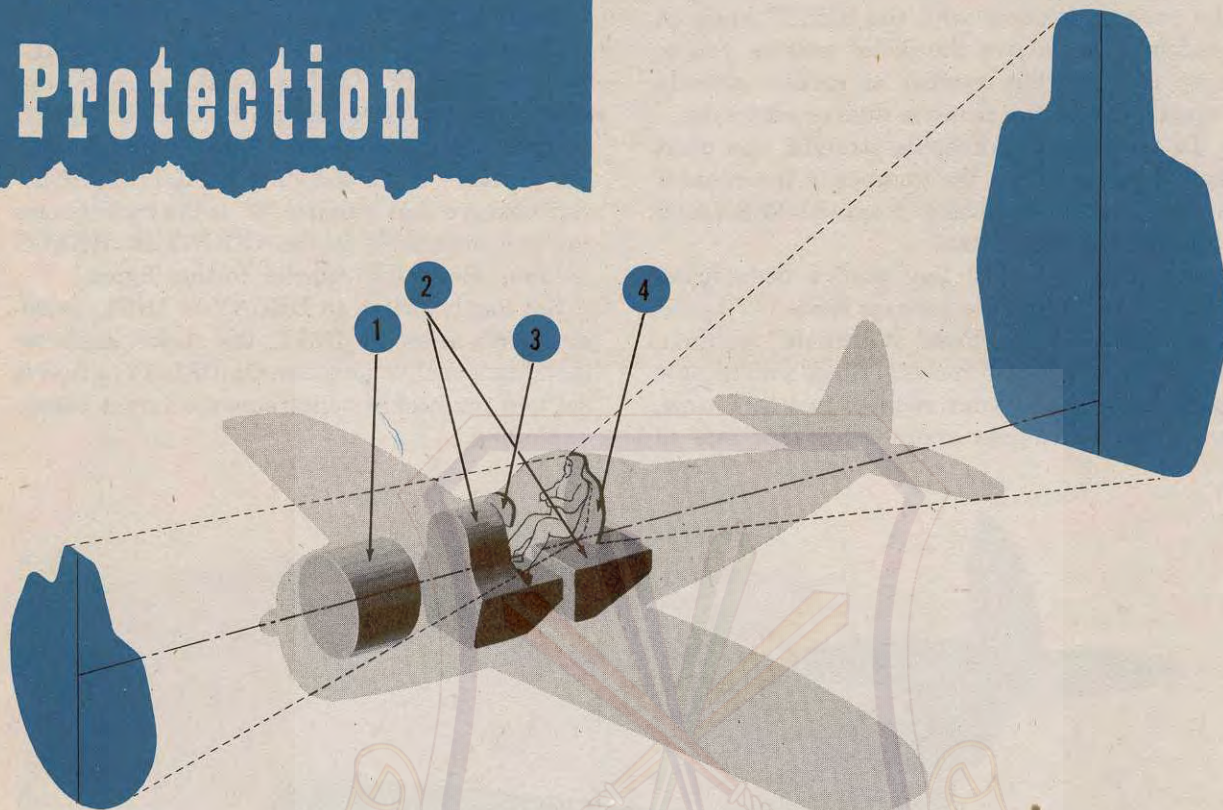
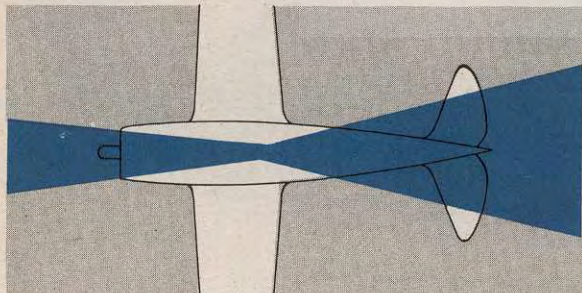


Armor Protection

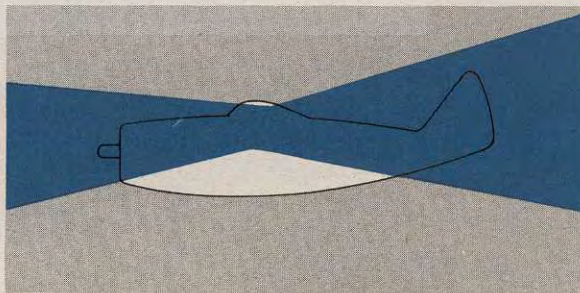


THE ARMOR PROTECTS THE PILOT
FROM FIRE ORIGINATING WITHIN
THIS AREA

1. ENGINE
2. FUEL TANKS—SECONDARY PROTECTION
3. FACE HARDENED $\frac{3}{8}$ " ARMOR PLATE—FRONT
4. FACE HARDENED $\frac{3}{8}$ " ARMOR PLATE—REAR



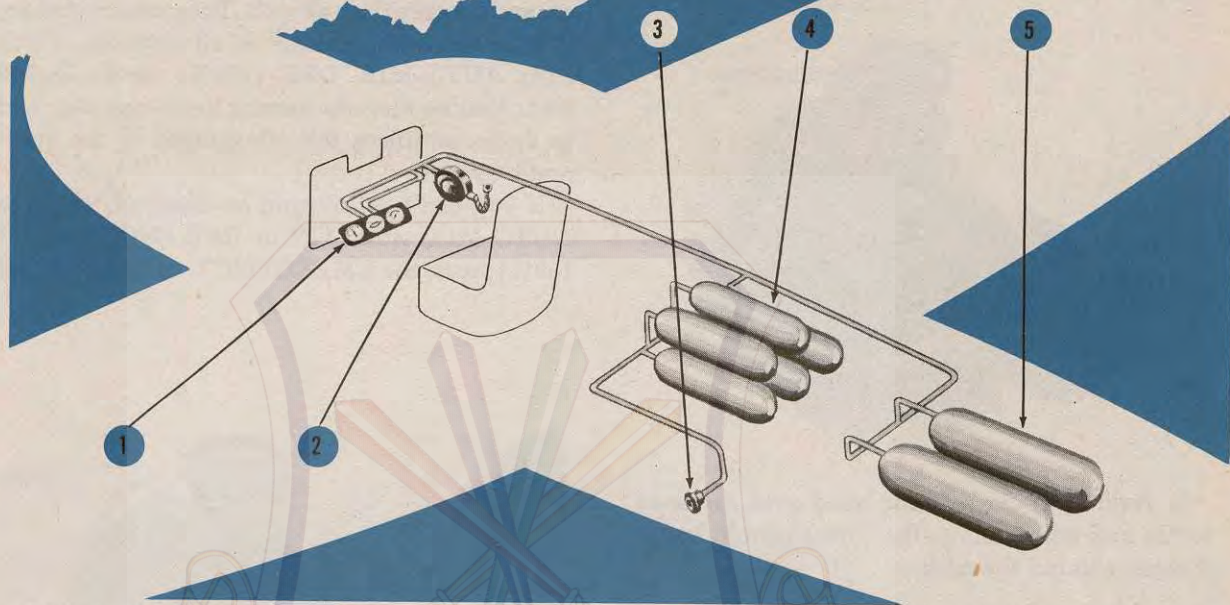
PLAN VIEW



SIDE VIEW

Oxygen System

1. OXYGEN GAGES
2. DEMAND REGULATOR
3. SYSTEM FILLER VALVE
4. TYPE D-2 BOTTLES
5. TYPE F-1 BOTTLES



Here is the N's demand-type oxygen system. It's used with the demand-type (A-14) mask.

Your mask will be fitted by the personal equipment officer. It must be sufficiently tight to allow not more than 5% leakage.

Join the mask to the regulator hose with the quick-disconnect fitting. The regulator has two valves. By turning the **EMERGENCY** valve **ON**, you get a large flow of oxygen under pres-

sure. The position of the **AUTO-MIX** valve determines whether you get air and oxygen mixed in the proper proportion or pure oxygen, delivered on demand.

A gage on the panel shows you the amount of oxygen aboard. An adjacent blinker flow indicator keeps time with your breathing to show that oxygen is being delivered.



INSTRUMENT PANEL NO. 34

RESTRICTED

During your cockpit check, inspect the oxygen equipment as follows:

Mask

1. Clean and free of foreign matter.

(Wash the mask periodically with mild soap and water, wipe with a soft cloth, and leave in airy spot to dry thoroughly.)



2. Hold the palm of your hand over the hose outlet and inhale normally. There should be no leakage around the edges.

Quick-disconnect Fitting

1. Male end on the mask should fit snugly into the female end attached to the regulator hose. The connection should withstand about a 10-pound pull.

Note: Clip the hose to your shoulder harness, not your parachute harness. You might forget the clip in case of a bailout. When fixing the clip, see that there are no kinks in the hose or strain on the connection.

If at any time you aren't getting oxygen, always suspect a parted connection. Your body movements might bring it about.

Demand Regulator

1. See that the knurled collar holding the hose to the regulator is tight.
2. Turn AUTO-MIX valve OFF. (100%)
Note that the blinker operates.
3. Turn the AUTO-MIX valve ON. (NORMAL.) When you breathe normally, the blinker should show that little oxygen is being deliv-

ered. (As you are on the ground, you should get almost pure air.)

4. Check the gage for pressure. You require at least 400 psi.

The system was designed for use with the AUTO-MIX in the ON (NORMAL) position. This keeps you from wasting your oxygen supply by using pure oxygen when a mixture of air and oxygen does as well. The proper mixture is obtained automatically at all altitudes. Don't turn AUTO-MIX OFF (100%) above 30,000 feet. You're already getting pure oxygen, and to do so sacrifices the advantages of the automatic system.

If you can't get oxygen on demand, with the AUTO-MIX either ON or OFF (NORMAL or 100%), turn the EMERGENCY valve ON to get



Clip oxygen hose to shoulder harness, not parachute harness, to afford quick getaway

a steady flow under pressure. If you detect fumes in the cockpit, turn the AUTO-MIX to OFF (100%) to shut out outside air. If you have become dizzy turn on the emergency flow a few moments to clear your lungs.

When using your oxygen on **EMERGENCY** continuously you've got to get downstairs. The supply won't last long.

In extremely cold weather, when the temperature in the cockpit may be below freezing, squeeze the face piece occasionally to check on ice formation. If present, manipulate the mask to break it up.

The five small (D-2) oxygen bottles shown in the illustration each hold 500 cu. in. The two large bottles (F-1) hold 1000 cu. in. each. When used with the **AUTO-MIX** valve **ON (NORMAL)** the supply lasts approximately as follows, at various altitudes:



ALTITUDE

15,000 feet
 20,000 feet
 25,000 feet
 30,000 feet
 35,000 feet
 40,000 feet

DURATION

12 hours
 10 hours
 8¼ hours
 9 hours
 13 hours
 17 hours

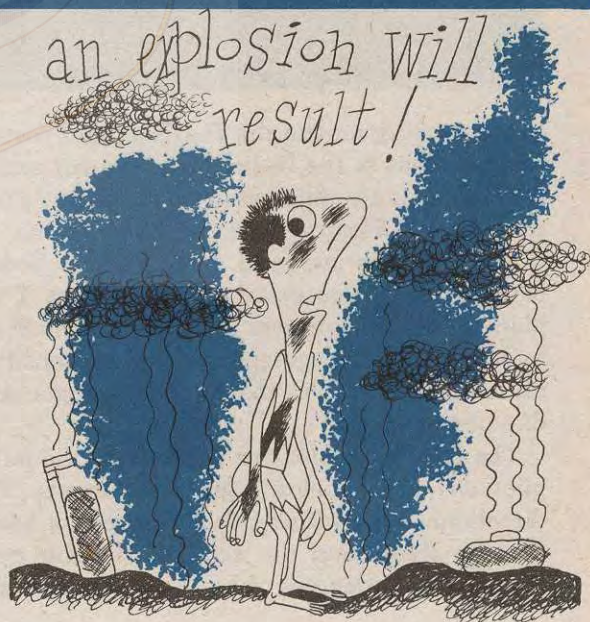
ALWAYS USE OXYGEN ABOVE 10,000 FEET

Notice that the consumption of oxygen increases steadily up to 30,000 feet as the **AUTO MIX** uses more oxygen and less air to keep a proper mixture as the air becomes rarefied. Above 30,000 feet, the consumption starts to fall off and the supply lasts longer. This is because outside atmospheric pressure is not sufficient to force oxygen into the blood stream.

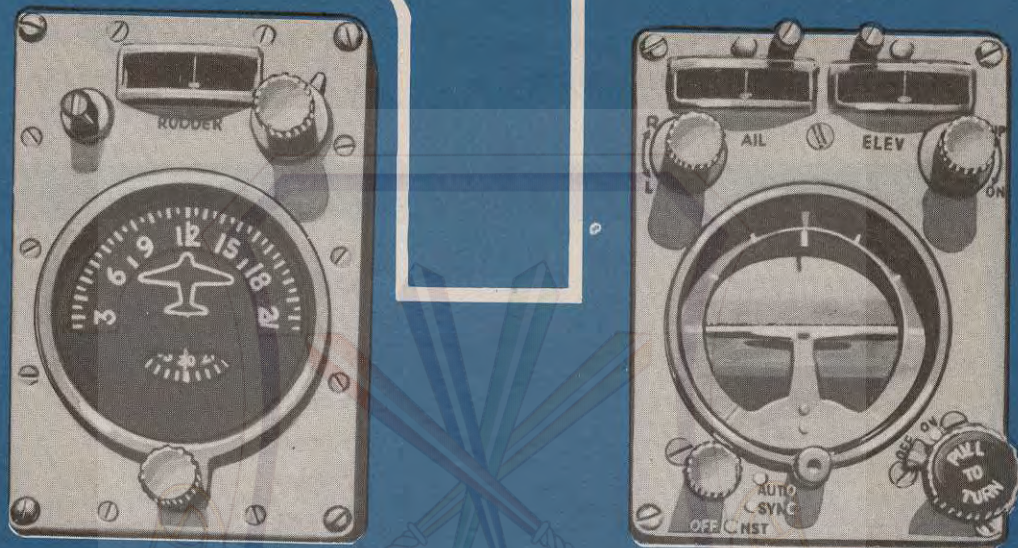
Thus, though the **AUTO-MIX** is metering you pure oxygen above 30,000 feet, your supply will last longer than it will at 25,000 feet.

Oxygen is literally your life in high altitude flying. Read your **PIF** and listen carefully to your personal equipment officer's explanation of anoxia, the proper use of oxygen, and all details pertaining to the system.

an explosion will result!



Automatic Pilot



INSTRUMENT PANEL NOS. 8 AND 12

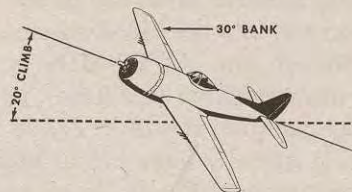
Noteworthy among the P-47N's flight instruments is that in the N-2 and subsequent series, the fighter is equipped with an automatic pilot, the General Electric type G-1 installation.

With George on, and your rudder pedals dropped back, you relax on long flights. Your plane's control surfaces will be adjusted by hydraulic servos regulated by electric sensitive units incorporated in the artificial horizon and directional gyros.

The two gyros also are used (with the autopilot off) as orthodox flight instruments. The directional gyro withstands 60 degrees of bank, dive or climb, and the artificial horizon gyro withstands 90 degrees of bank without spilling.

Cage the instruments before exceeding these limitations; leave them uncaged at all other times.

The autopilot is not effective in maintaining an attitude beyond approximately 30 degrees



of bank and approximately 20 degrees of climb or dive. Any time you plan a more radical

change of attitude, turn off the autopilot and take over the controls.

You do not engage the autopilot before reaching at least 2,000 feet, but the gyro instruments are used from the ground up as ordinary flight instruments. Procedure:

Before takeoff.

1. Turn control switch on the artificial horizon gyro to "INST.," setting the gyros in mo-



tion. On the autopilot the gyros are electrically driven and required about three minutes to work up speed.

2. See that the artificial horizon gyro is uncaged.

3. With course setting knob on directional gyro adjust the dial until the heading corresponds with the magnetic compass heading.

4. Uncage the directional gyro.

In flight.

1. When flying level, place the miniature airplane and the horizon bar in alignment.

To use autopilot:

1. Gyros in operation as described above.
2. Trim the plane to fly hands off.



(Now is the time to trim the plane. Do not touch the trim tabs after the autopilot has been turned on.)

RESTRICTED

3. Set the three sensitivity controls to the left of vertical (between 9 and 11 o'clock).

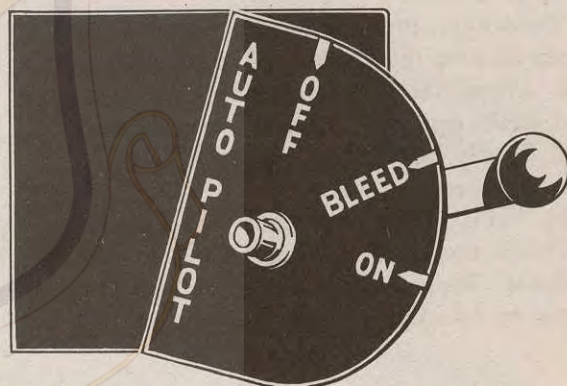
Bear in mind that these controls regulate the



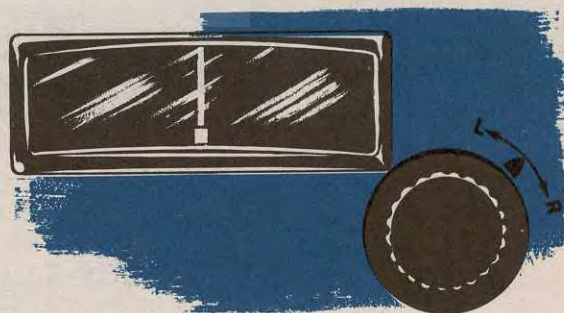
speed of your plane's response to correction by the autopilot. Don't adjust them near the ground (you may get a sudden change in attitude), and when you do make an adjustment to eliminate flutter of controls or a tendency of the plane to hunt, move the knobs slowly and cautiously. Never turn them fully clockwise or counterclockwise.

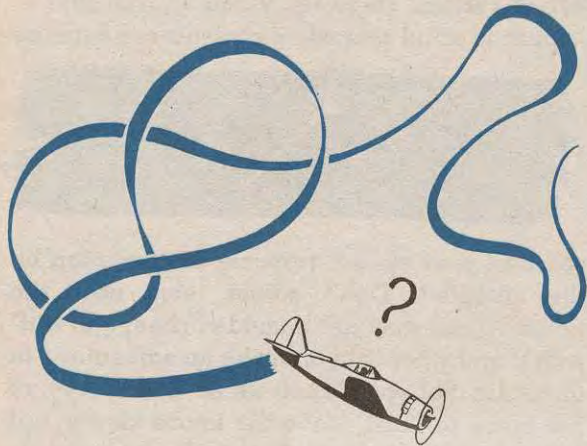
4. Turn control switch to "SYNC."

5. After one minute (to allow servo-amplifier tubes time to warm up), turn ON-OFF switch to "BLEED."



6. Turn the rudder trim control knob in one direction until the indicator moves in same direction, then align the indicators.





Remember: Once you turn the autopilot on, the indicators control the attitude of your plane. If they are not in adjustment when you turn the control on, your plane will immediately respond to their actual setting. The reaction may be violent.

The pointer must move in the same direction. Keep turning the knob until it does.

7. Adjust the aileron and elevator trim control knobs until the pointers are lined up.
8. Slowly turn ON-OFF control to ON.
9. Turn control switch to AUTO.
10. Trim plane with control knobs.

Check the directional gyro every 15 or 20 minutes. The gyro undergoes a small drift because of rotation of the earth and mechanical

friction. Place your plane back on your magnetic heading with the rudder trim knob. To reset the directional gyro:

1. Turn control switch to SYNC.
2. Turn ON-OFF control OFF.
3. Turn airplane to correct magnetic compass heading.
4. Cage directional gyro, set to agree with compass heading, uncage.
5. Re-align indicators, if necessary.
6. Slowly turn ON-OFF control ON.
7. Turn control switch to AUTO.

To take the autopilot out of operation you simply turn the ON-OFF control to OFF and the control switch to INST. If you want to shut down the instruments too, turn the control switch OFF and cage the gyros.

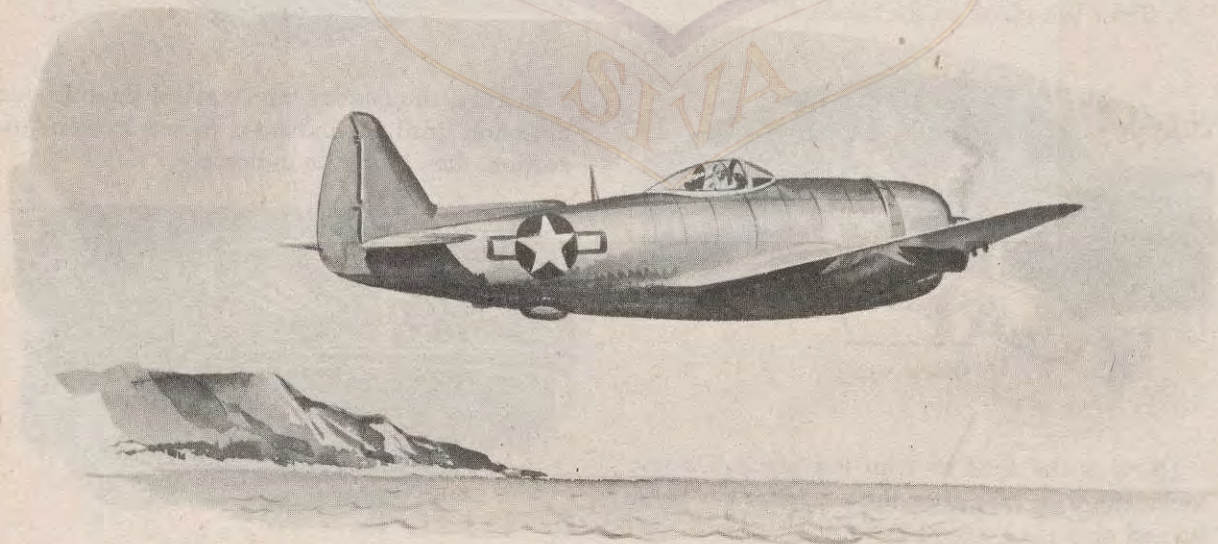
IMPORTANT: Never turn the control switch to INST before turning the on-off control OFF.

If you spill a gyro, quickly turn the on-off control OFF and right your plane manually. Cage both gyros to restore their equilibrium and then use as desired.

TIPS:

Thirty pounds pressure on the controls will overpower the autopilot. If you use the autopilot through a long climb or descent, disengage it every 10,000 or 15,000 feet, retrim the plane and engage again.

When ready to drop external tanks, take over the controls yourself, jettison the tanks, retrim, and turn it back over to George.



Personal Equipment

On all flights, wear:

1. Helmet
2. Goggles
3. Gloves
4. Life vest
5. Parachute
6. Oxygen mask
7. First aid and emergency kit
8. One-man life raft (when flying over water)
9. Knife

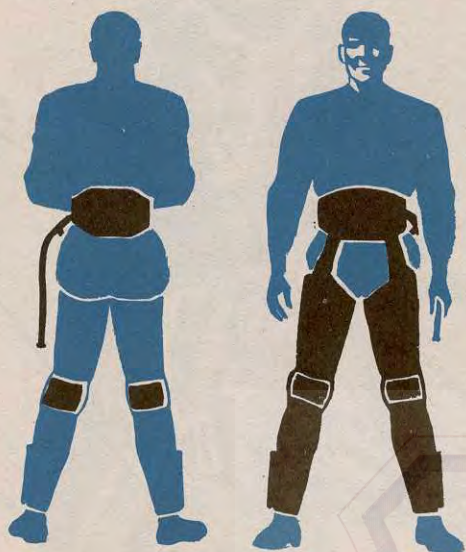
The mask is worn on all flights to accustom you to it and to protect your face in case of fire. You wear gloves as a fire protection and to prevent skinned knuckles, which are inevitable without gloves. Use your goggles when needed. Do not wear commercial polaroid glasses. Use only government issue. The knife is carried to puncture your dinghy should it accidentally be inflated. It must be worn where it can be reached easily, preferably on the calf of your leg.

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Anti-G Suit



Planes from the N-5 on are equipped for use of the Anti-G suit. The suit, known officially as the Type G-3 Pilot's Pneumatic Pressure Suit, consists of five bladders spaced to exert pressure against your calves, thighs and abdomen to keep blood in the upper part of your body and reduce the likelihood of "blacking out."

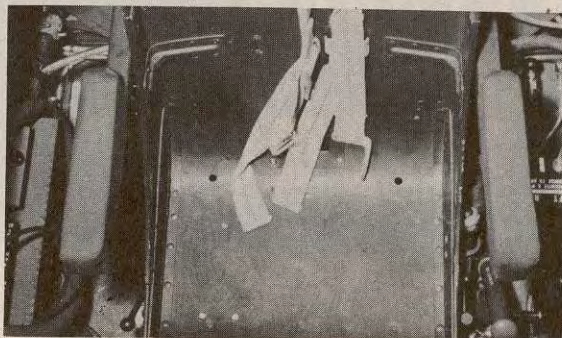
The bladders are inflated by exhaust from the vacuum pump. One pound of pressure is forced into the bladders for every G of pull out acceleration in excess of 2¾ G's. You fasten the suit to a quick disconnect valve on the left side of the seat.

The accelerometer on the instrument panel records the number of G's you pull on a maneuver. The instrument has a main pointer and two auxiliary pointers that remain fixed, until reset, at the maximum positive or negative reading attained by the main pointer.



INSTRUMENT PANEL NO. 22

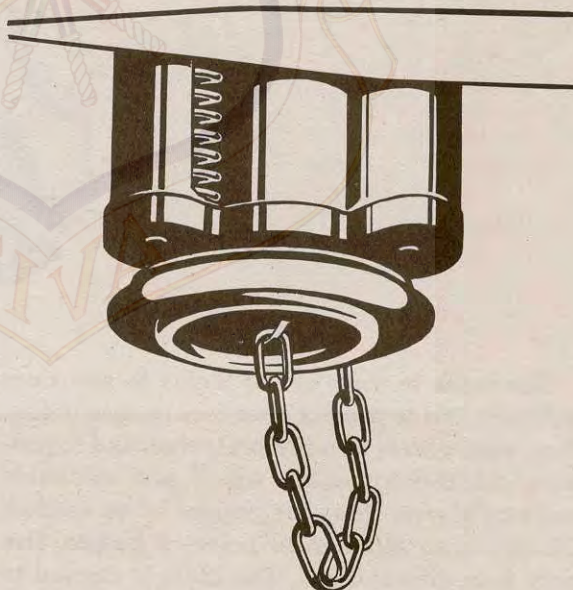
Arm Rests



Planes from the N-15 on contain arm rests to reduce fatigue on long flights. Prevents that tired businessman feeling, in other words.

Flare Gun Adapter

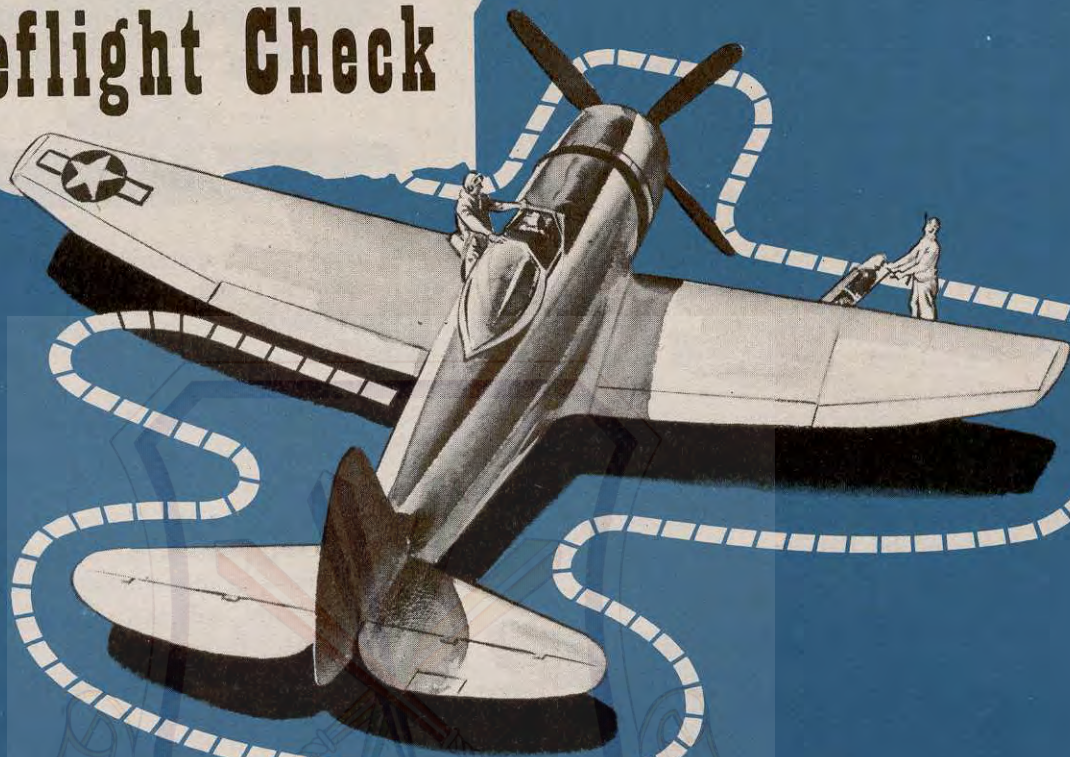
An opening in the right side of the cockpit is fitted to hold the muzzle of your Very pistol. To fire signal flares, remove the gun from the compartment to the rear of your map case, insert the muzzle in the adapter, and pull the trigger.



RIGHT SIDE NO. 5

Pilot's Preflight Check

THE ROUTE



The preflight check starts before you reach your airplane. Survey the proposed taxiing route for any possible future obstruction, such as a fuel truck about to move. Study the ramp area for stray equipment or rubbish and rags that might be blown into the airscoop or tail assembly by prop blast.

See that a ground crewman is on hand with a fire extinguisher and portable battery cart.

If the plane has been standing for more than two hours, instruct the ground crew to pull the prop through four blades. Two complete revolutions of the engine are needed to clear the lower cylinders of oil.

A complete circuit of the plane, starting at the left wingtip, is required to check the P-47N.

The sketch shows your route as you check the following items:

1. Pitot tube—Cover removed.
2. Navigation light—For cracks and cleanliness. (Same check on right wing.)
3. Landing light—For cracks and cleanliness.
4. Guns—Plugs inserted and blast tubes snug. (Same check on right wing.)
5. External wing tank (if carrying) — For firm connections and solid bracing. (Same check on other external tanks.)
6. Wheels—Chocked.
7. Turbo waste gates—Open. (Same check on other side.)
8. Tires—For proper inflation and alignment on wheels.
9. Oleo struts—For some extension. (Extension varies with loading.)
10. Inspection plates—All closed.
11. Propeller—For nicks.

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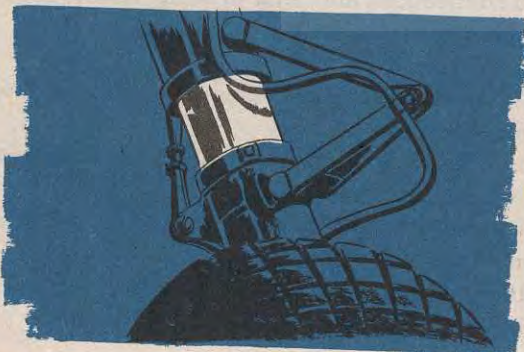
RESTRICTED

12. Airscoops—For foreign objects.
13. Leading edge of wings—For dents.
14. Camera glass—For cracks, scars, or yellowed appearance.
15. Ailerons—For foreign objects.
16. Fuel drain cocks—Safetied.
17. Intercooler doors—Open. (Same check on other side.)
18. Radio antenna—For proper tension and security of mounting.
19. Tail surfaces—For damage or foreign objects.
20. Tailwheel—For proper extension.
21. Interior of supercharger flight hood—For accumulated oil or dirt.
22. Canopy—For scratches, scars, dirt, or oily film.

The outside bead of the tire tread, under normal loading, should just touch the ground. A line painted from the rim to the tire indicates proper alignment. If the line has parted, strain is being placed on the inner tube valve stem. Write up the lack of a line in Form-1A.



Lack of proper oleo extension to cushion a landing places a terrific strain on the tires and wings. A blowout or weakened wing structure may result. Any time the oleos are down, therefore, instruct the crew chief to check them.



Fire Prevention



To inspect the supercharger hood, you must squat and look inside. A film of oil doesn't matter, but wipe up any large drops or small pools. Hot exhaust gases ignite such accumulations every time.

See that all three drain holes in the hood are unstopped. The holes prevent oil from collecting.

As a pilot new to the N you may not know whether nicks in the prop, dents in the wing, oil on the plane, or other defects are serious. If you are in doubt, call the engineering officer. You are entitled to be satisfied with the condition of your plane before taking off.

Here's a tip: If a plane is generally dirty, inspect it with utmost care. Such a condition denotes sloppy maintenance.

The first pilot of the day has an additional check: The battery drain jar, reached by unfastening the cowling on the right side of the accessories section.

See that the inch-thick pad in the bottom is well saturated with neutralizing fluid—sodium bicarbonate and water. The fluid neutralizes battery acid that bubbles up during flight. It must be renewed every four to six flights.

Inspect tubes leading from the battery for kinks or bends. Battery acid causes these tubes to kink easily. See that the opening of the impact tube, protruding from the lower right side of the accessories section, faces to the front. The tube keeps the proper air pressure in the jar.

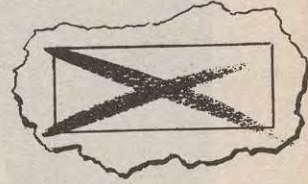
Unless the drain jar is properly maintained, excess acid creates combustible gases in the battery, or weakens other parts by corrosive action.

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Cockpit Check

RESTRICTED

FORM 1A IS YOUR BIBLE.
NEVER FLY AN AIRPLANE THAT
IS CARRYING A RED CROSS.



Enter the N from the left, using the built-in hand- and footholds. Don't step on the wing flap. Open the canopy using the release latch located below the canopy rail.

Unlock the controls and waggle for freedom of movement, then settle in the seat. Remove Form 1 and Form 1A from the data case. Form 1A is your bible on the plane's condition. If you don't understand what any red diagonal or red dash signifies, ask the crew chief or engineering officer to explain. Nobody has been killed yet for asking questions.

Never fly an airplane that is carrying a red cross.

Before signing an exceptional release, know what you are signing.

Unless the preflight box has been initialed, don't start the engine. The plane hasn't been preflighted.

The servicing section shows the quantity of fuel aboard. Here is where you get the accurate information.

The "Remarks: Pilots and Mechanics" section contains the comments of the preceding pilot. Note what he says, and when in turn you make

an entry be clear and concise. If necessary, elaborate on the trouble when talking with the crew chief, but do not omit any important point from the Form 1A.

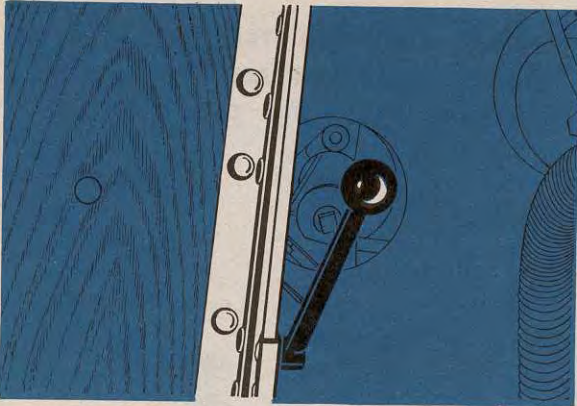
When returning the forms, examine the case for the following publications:

- Maps of the local flying area
- Radio Facilities Charts
- T. O. 01-65BD-1.

Fasten your safety belt and shoulder harness. Tighten the harness straps sufficiently to keep them on your shoulders during normal movements. A lever on the left side of the seat enables you to lock and unlock the harness. Lock the harness for the takeoff.



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Adjust the seat with the lever on the right side, to maximum height, for taxiing. When ready to take off, readjust as desired.

Regulate the rudder pedals for equal extension and complete control at extreme positions. Arrange the mirror for rear view.

Lock the brakes by pulling out the parking brake handle (on the lower center edge of the instrument panel), pump up the brakes and then depress the toe tread of each rudder pedal. Check the ratchet on the inside of each pedal to determine the extent that each brake has been engaged. Release the pedals and then the handle.

To release the brake, further depress the toe treads, disengaging the ratchet.

Make the cockpit check from left to right, performing it in the same manner each time until it becomes second nature.

Check:

- | | |
|--|--|
| 1. Carburetor air filter | OFF (unless needed). |
| 2. Trim tab controls | Set for takeoff: |
| Ailerons | N (neutral). |
| Rudder | TO (takeoff). |
| Elevator | N (neutral). |
| 3. Flap handle | UP (full forward). |
| 4. Landing gear handle | DOWN (with safety latch in place). |
| 5. Main fuel selector | MAIN. (On N-15 and subsequent series, also turn external selector cock to EXTERNAL OFF.) |
| 6. Supercharger control | OFF (full rear). |
| 7. Throttle | Cracked one inch. |
| 8. Propeller control | INCREASE RPM (full forward). |
| 9. Mixture control | IDLE CUT-OFF (full rear). |
| 10. Propeller selector switch | AUTO. |
| 11. Autopilot on-off control | OFF. |
| 12. Fuel booster pump | Start and Altitude. |
| 13. Internal wing tank fuel pump | OFF. |
| 14. All circuit protectors | IN. |

Check:

- | | |
|---|---|
| 15. Generator | ON. |
| 16. Water injection switch | AUTO. |
| 17. Gun switch | GUNSIGHT & CAMERA. |
| 18. Gunsight | FIXED & GYRO. |
| 19. Supercharger regulator switch | ON. |
| 20. Armament switches | OFF. |
| 21. Ignition switch | OFF. |
| 22. Battery switch | ON (OFF if using external power source). |
| 23. Intercooler shutters | FULL OPEN—MANUAL. |
| 24. Oil cooler shutters | FULL OPEN—MANUAL. |
| 25. Cowl flaps | FULL OPEN—MANUAL. |
| 26. Altimeter | SET. |
| 27. Parking brake | SET. |
| 28. Gyro flight instruments | UNCAGE. |
| 29. Hydraulic pressure gage | Operate hand pump and note that pressure rises. |
| 30. Fuel | Check all internal tanks for quantity. |
| 31. Oil | Check for quantity. |
| 32. Oxygen pressure gage | 400-450 psi. |
| 33. Radios | OFF. |
| 34. Tailwheel | UNLOCKED. |

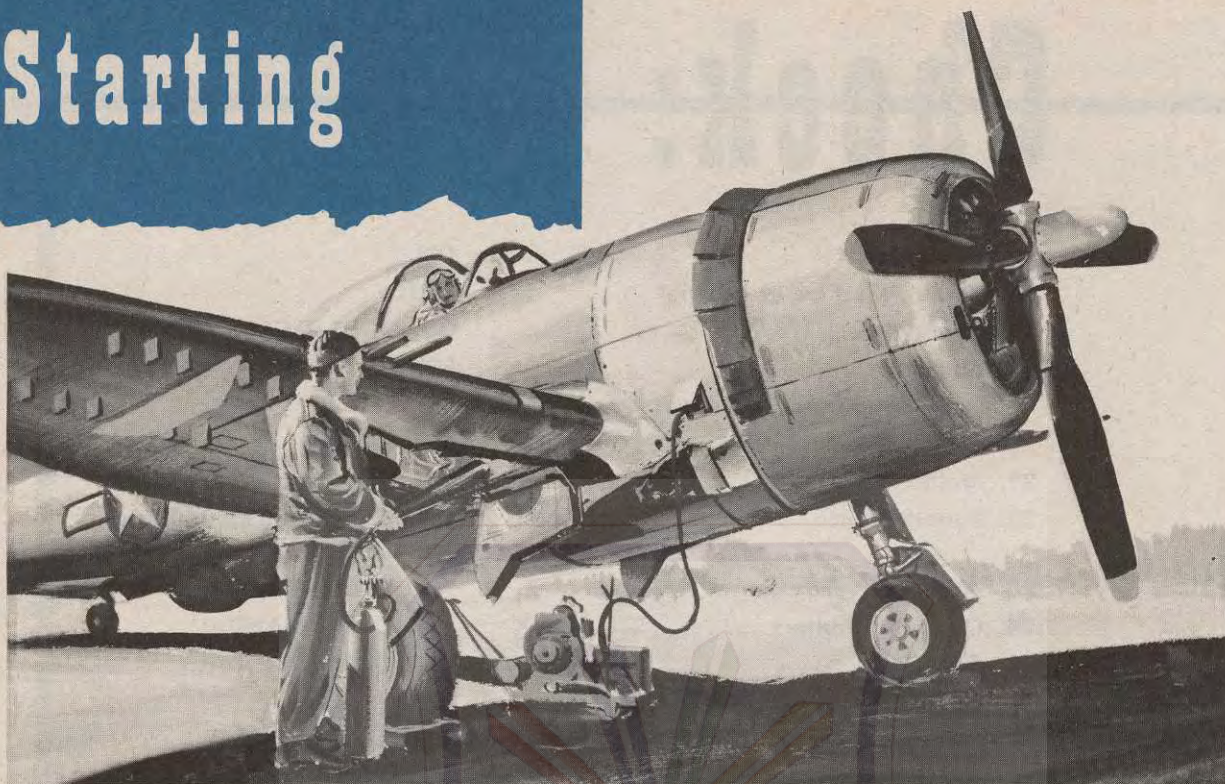


A cockpit check isn't an ironclad guarantee that everything is O.K. Use your eyes, ears, and nose to detect any unusual condition. Don't fly a plane with hydraulic fluid on the floor, a sure indication of a leak. Don't take off with gas

fumes, or raw gasoline, in the cockpit. This is a fire or explosion hazard. While inspecting the cockpit, examine the fume boot at the base of the stick. A tear permits noxious gases to enter.

Check the landing gear warning light by turning the switch on the switch panel ON. If light doesn't glow, ask the crew chief to investigate. You need the light to tell when your gear is operating satisfactorily. Check the position of the push-pull controls of the ventilator and defroster for desired cockpit temperature.

Starting



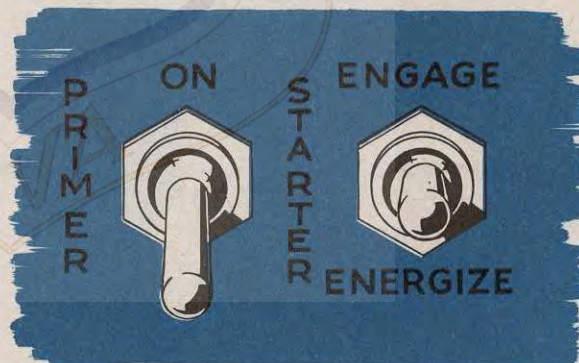
To start the engine:
Shout "Clear!"

Get acknowledgment. The crew chief may be adjusting a chock, or he may have wandered off, leaving you no fire protection.

If the engine doesn't fire within a couple of seconds, release the priming toggle switch to avoid flooding the engine.



Turn ignition switch to **BOTH**.
Flick starter switch to **ENGAGE**, then **OFF**,
to seat starter brushes on the commutator.
Energize for 15 to 20 seconds.
Engage the starter and prime simultaneously.



After the engine fires, move the mixture control to **AUTO RICH**. Hold the toggle switch in **ENGAGE** for a few seconds after the engine fires. This provides a hotter spark and is a starting aid.

Warm up the engine with the throttle set to produce 800 to 1000 rpm.

If the oil pressure doesn't come up within 30 seconds, shut off the engine at once. Lack of lubrication will destroy an engine in a short time.

If you are using an external power source, turn on the battery switch after the engine catches and signal the ground crewman to unplug the power unit.

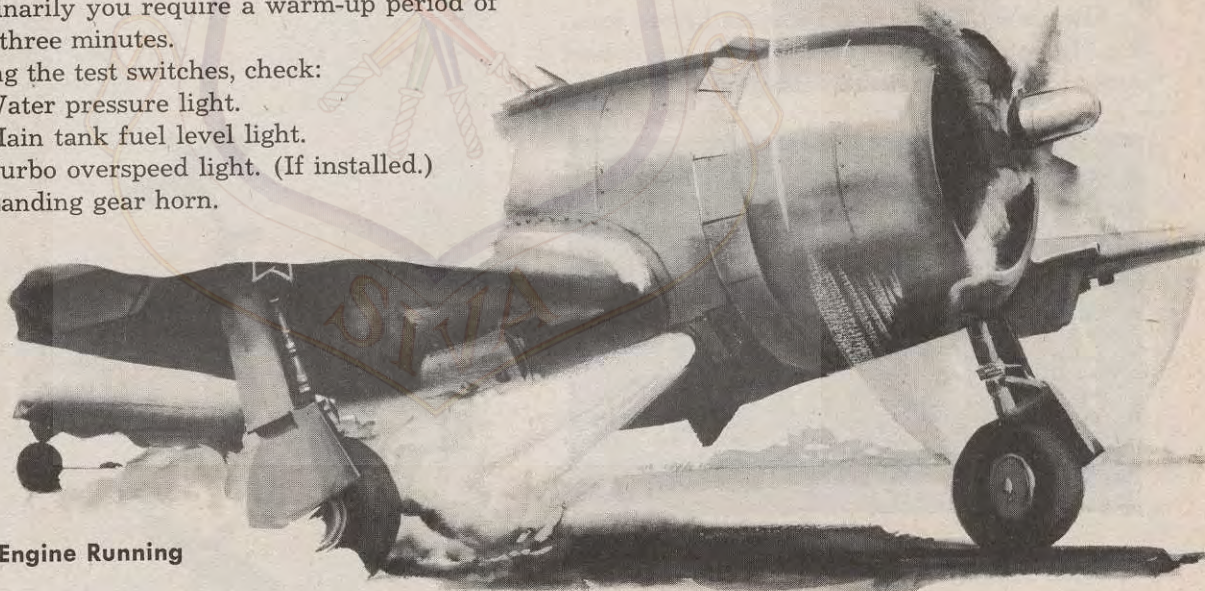
Keep the engine below 1000 rpm until the oil temperature rises above 40 degrees C. and the oil pressure settles between 70-90 psi. On a cold engine, the oil pressure may mount to 200 psi, but it comes back down after it warms up. For scramble takeoff, in combat emergency, oil dilution may be used to obtain proper oil pressure at moderate power.

Check your fuel pressure on all tanks. (See Fuel System section.) Check your water pressure.

Ordinarily you require a warm-up period of about three minutes.

Using the test switches, check:

1. Water pressure light.
2. Main tank fuel level light.
3. Turbo overspeed light. (If installed.)
4. Landing gear horn.



Keep Engine Running

Leave the plastic dimmer hoods open for daylight flights.

If plane is equipped with autopilot, turn gyro control switch to INST.

Turn on your radio and get taxi instructions from the tower.

Signal the crewman to remove the chocks.

If the engine quits, return the mixture control to IDLE CUT-OFF without delay. Raw fuel pouring into the engine, unless it's firing, creates a serious fire hazard. However, if the engine is taking hold but fire is noticed, persist in starting. Once the engine is running, it will blow out the flames. If necessary, advance the

throttle to 2000 rpm to accomplish this. If the fire persists, return the mixture control to IDLE CUT-OFF and turn selector valve to OFF.

Don't hold the starter switch in ENGAGE longer than 30 seconds. Let the starter cool for one minute, then ENERGIZE again.

Taxiing

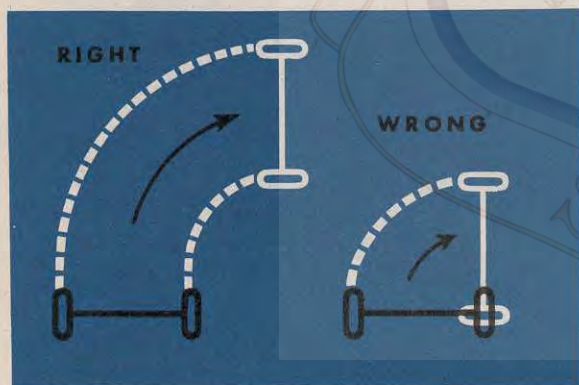
Release your brakes and pump them up while moving slowly forward.

If your N is parked in a congested area, as it is likely to be, don't start rolling until a man is stationed at each wingtip. The wing walkers must stay with you until you are 100 feet from the parking area.

The crew chief guides you out of the congested area, using the universal taxiing signals, as set forth in PIF. But keep your eyes moving; the crew chief is merely an aid. You are responsible for any collisions.

Know what's behind you before opening the throttle to start rolling. Nobody appreciates being caught in prop blast, particularly superior officers, and it's awfully easy to blow stones or debris into other equipment.

Always acquire forward motion before turning. If you turn on a dime, with one wheel locked, you're certain to damage a tire.



While taxiing, use only one brake at a time, applying pressure with a gentle pumping motion. You invite trouble by using both brakes simultaneously.

Use between 800 and 900 rpm. This keeps your speed down sufficiently to avoid having to jam on the brakes, and enables you to stop almost in place.



Takeoff

Taxi as slowly as you like in the N. Simply run up the rpm every few minutes to keep the engine from loading up.

Keep far enough behind the plane ahead to avoid the necessity of slamming on the brakes. S in the opposite direction from that plane. This keeps it on your open side. In other words, zig when he zags. If you ever lose the plane, or there is doubt in your mind as to its exact position, stop. Cut off the engines and get out and look, if necessary.

Judge the location of your wheels on the taxi strip by referring to the inboard guns. The guns are approximately over the wheels. If you run off the strip, and 1000 rpm won't move your plane, don't try to blast clear. You probably couldn't control the plane after it broke out. Cut your throttle and call for a tug.



If it requires continuous pumping to get brake action, return to the ramp. Call a tug if you don't get pressure on either or both brakes, something is wrong with the hydraulic system—a leak, low fluid supply, or air in the line. Write up any brake trouble in Form 1A.

The P-47N handles easily on the ground because of its weight, widespread wheels, and centrally located CG. But it is a **blind** airplane. To see ahead you must S. Don't make the mistake of allowing your eyes to follow the course of your plane while S-ing. Look into the area opened up.

Keep both wheels rolling in a turn.

Keep your head and eyes out of the cockpit and constantly roving.

Do not taxi with the flaps extended or with the tailwheel locked.

If you slam on the brakes, you nose up, even if you are taxiing no faster than a man walks.

RESTRICTED



When lining up for the takeoff check, park so that your prop blast won't affect other planes. Head upwind to keep dust from blowing back into your engine and to keep the engine cool.

Check your wing flaps, then run up the engine to 30" Hg and 2400 rpm. If your brakes won't hold this power, return to the line, by tug if they're extremely weak.

The check:

Turn the mag switch from BOTH to R (right), back to BOTH, then to L (left); then back to BOTH. The drop on each mag must be less than 100 rpm. The difference in the drop on the 2 mags should not exceed 40 rpm.

If you get a drop in excess of 100 rpm but the engine isn't running rough, continue the runup for a minute or so and try again. After you clear the engine, the mags may check OK. However, if you still get an excessive drop return to the line.

Check the ammeter to see that the generator is delivering electricity to the battery.

Check the propeller.

Make the manual check first. Hold the selector switch in DEC RPM until you get a drop of 400 rpm. Shift the switch to INC RPM until the rpm returns to 2400. Return the switch to AUTO.



The "N" flies off the ground from a three point attitude.

Pull back on the propeller control handle until you get a drop of 200 rpm. Leave for a moment to insure that the tachometer does not oscillate more than 100 rpm. Return the handle full forward.

If your prop check is unsatisfactory, return to the line.

Check the water pressure (if carrying water).
Check the oil pressure (70-90 psi) and oil temperature (40-100°C.).

Reduce power to around 800 rpm and repeat the cockpit check—all of it—plus:

Check hydraulic pressure—1000 psi.

Check canopy operation.

Place oil cooler and intercooler shutters in AUTO.

Set the friction control knob on the throttle quadrant.

If carrying external tanks, set release switches for instantaneous release. (For procedure see Fuel System section.)

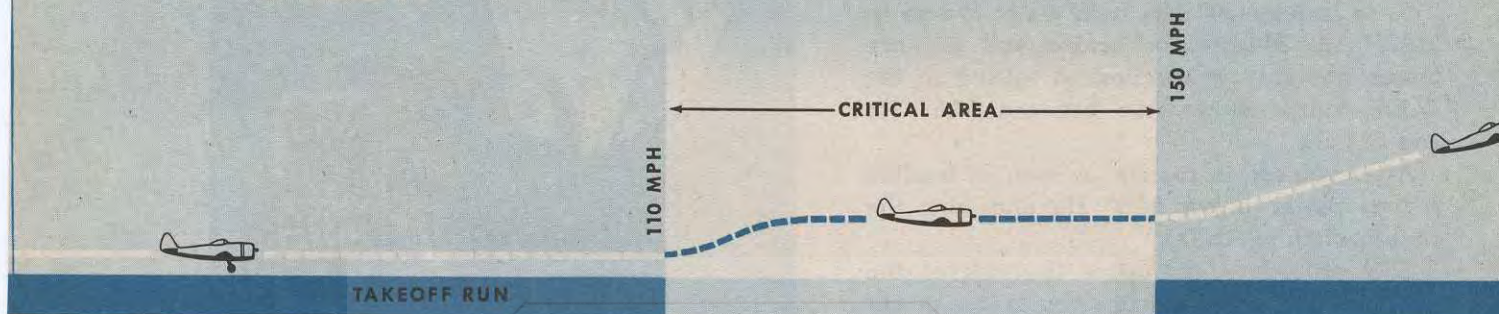
Make certain the runway is clear, then line up in the center.

Open the canopy.

Apply power smoothly to avoid excessive torque.



NORMAL TAKEOFF



Lock the tailwheel, after rolling straight ahead for a few feet, and raise the safety catch on the landing gear lever so you won't have to duck your head in the cockpit during the takeoff run.

Set cowl flaps one-half open manually and leave the switch in MANUAL.

Apply power smoothly to avoid excessive torque. Do not exceed 51" Hg unless you are using water.

The N requires a longer run that you are used to. You may be tempted to exceed the red line to work up speed. Don't do it! Your plane gets off the ground OK using prescribed power limits. When you draw excessive power, you risk detonation and engine failure.

The N flies off the ground from a 3-point position at about 100 mph. However, raise the tail about 6 inches when it wants to lift off. Stay on the ground until reaching a speed of around 110 mph. Then lift the plane off the runway. The raised tail and added speed give much better rudder control.

Use rudder, not brakes, to correct for torque. Rudder is sufficient and it's brutal on the tires to use brakes.

Develop climbing speed before starting to climb. Be easy on the back pressure until you have at least 150 mph, then climb gently. The plane is sluggish before reaching a climbing speed of 170-180 mph. (The best rate of climb is obtained at 155 mph.)

If not pushed, the N picks up climbing speed rapidly. You reach altitude in less time by getting climbing speed first than you do by having your plane labor in a climbing attitude with insufficient speed.

When definitely airborne, raise your wheels. Do not brake them.

Don't start your first turn until you have built up a safe airspeed.

After setting your power for climb, place the cowl flap switch in AUTO.

Always S while climbing or letting down. Any time you fly into the altitude of another plane, particularly a fast fighter, without scanning the sky, you run the risk of a collision. In any event, you need the training for combat where you must keep watch for hostile aircraft.



War Emergency Power Takeoff

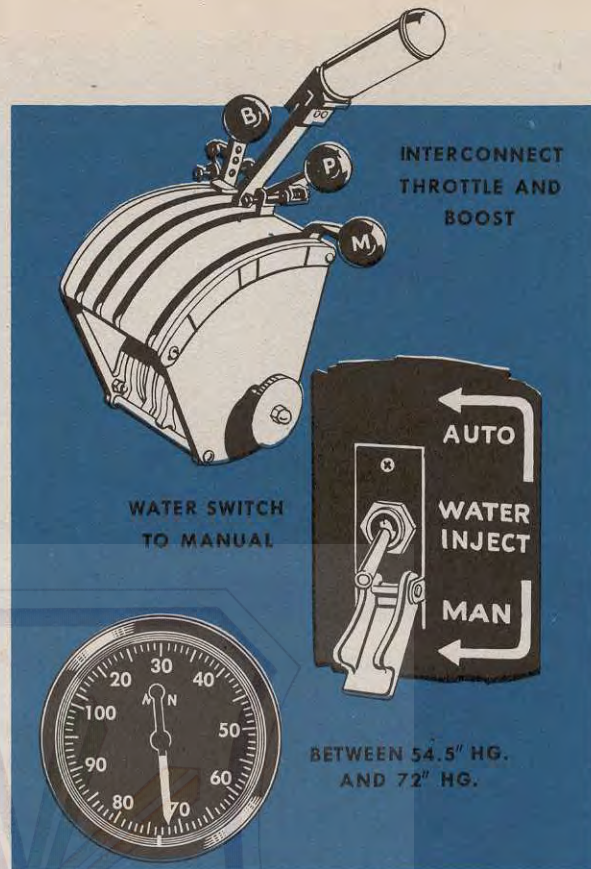
After completing your check, lineup in the center of the runway.

Interconnect the throttle and boost lever.

While holding your brakes, advance the controls to at least 30" Hg, turn water switch to MANUAL. Release the brakes and advance power smoothly to the desired setting in the W.E.P. range—somewhere between 54.5" Hg and 72" Hg.

After you are in the air, as soon as feasible reduce power below 54.5" Hg and turn the water switch to AUTO.

This procedure eliminates the risk of the water cutting in and causing you to lose power momentarily during the takeoff run. (See Water Injection section.)



Maximum Performance Takeoff



The shortest takeoff run or best takeoff from muddy fields results from the use of partial flaps. Tests have shown the best flap setting to be 20°. A slightly shorter run is possible with 30° of flaps, but the advantage is more than offset by the poor handling characteristics of the plane.

When using military power and 20° of flaps, you save about one-fifth of the distance required for a non-flap takeoff. Takeoff distances required under various conditions are listed in Technical Order AN 01-65BD-1.

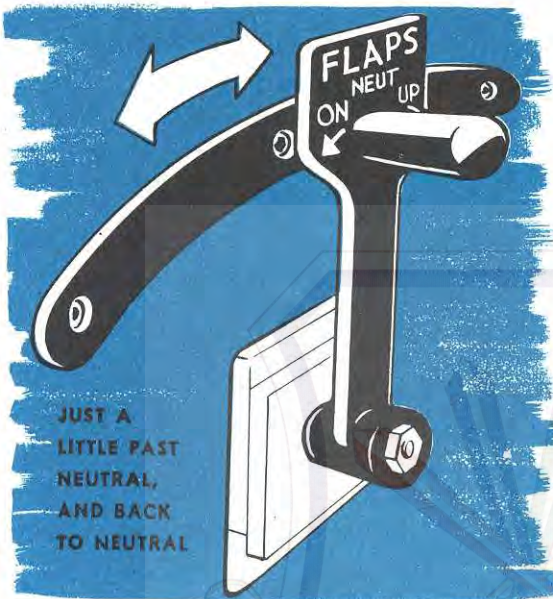
If you plan a takeoff with flaps, run the flaps all the way down, then return them to 20°. This procedure helps insure that the hydraulic pressure will remain steady against both flaps.

It's not advisable to use flaps on takeoff unless the shorter run is absolutely necessary. It is strictly an emergency procedure, as there's always the possibility that one flap may come up, making the airplane difficult to control.

Emergencies

Don't raise the flaps until you reach a minimum altitude of 800 feet . . .

and 150 mph, then milk them up 5 to 10° at a time. Do this by snapping the flap handle a little forward of N (neutral), then back to N. If you



push the handle all the way forward to UP, the flaps will probably raise completely before you can get the handle back.



RESTRICTED

Runaway Prop

If there's enough runway ahead, stop the takeoff. But if you are too far committed, continue the takeoff. Once airborne, place the prop selector switch in MANUAL and regulate for correct rpm. Circle the field and make a normal landing. There is no reason to get rattled. Regard flying in MANUAL as merely a different procedure. It's not an emergency unless you make it one.

Blown-out Tire

Reduce power.

Fight to keep the plane straight on the runway by using opposite brake. Cut off the power as you gain control. Cut the switches if there is any possibility of nosing up or leaving the runway.

Engine Trouble

If the engine misses, backfires, detonates or gives any evidence of supplying less than full power before the wheels are off the ground, cut the switches and return the mixture control to IDLE CUT-OFF. Apply the brakes by pumping. Hold the plane straight on the runway. In case you are running out of field, but your speed has been reduced to 70 mph or less, unlock the tailwheel, and groundloop by holding one brake. However, if your speed is too great, collapse the landing gear and skid to a stop. This is preferable to nosing over or colliding.

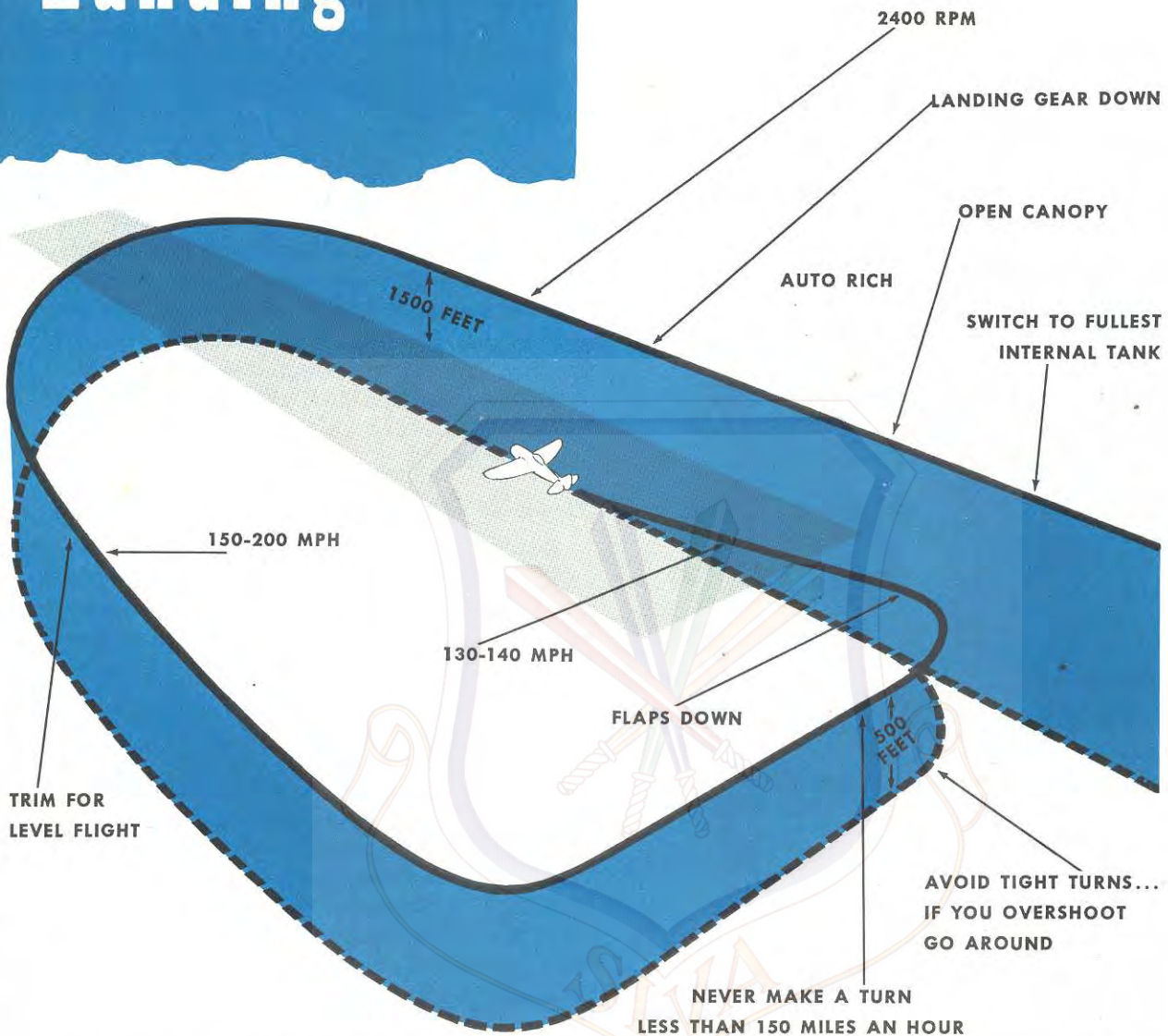
In case you are already airborne, retract the wheels and land straight ahead. Jettison your external load. Push the nose down to keep your airspeed up.

DON'T STRETCH YOUR GLIDE

Don't try to turn. To do so is fatal.

(For procedure see Emergency Landing section.)

Landing



On entering the landing pattern, contact the tower for instructions. Use the correct pattern and obey the tower unless you are in trouble. In that case you are the boss.

During your first few landings fly a fairly large pattern to avoid steep turns.

Never make a turn at less than 150 mph.

Switch to the fullest internal gas tank.

Check to insure that your mixture control is in **AUTO RICH**.

Landing gear lever **DOWN**.

**NEVER MAKE A TURN
LESS THAN 150 MILES AN HOUR**

While your gear is in motion, hydraulic pressure falls off sharply, but returns to 1000 psi when the operation is complete. This provides you with a check to supplement your landing gear lights check.

Trim your plane for level flight.

Advance propeller control to 2400 rpm.

Open the canopy.

Keep your head out of the cockpit, and keep your eyes moving except for the brief glances required to complete checks.

Fly your landing pattern at 150-190 mph.
Pump up your brakes on your downwind leg.

Avoid tight turns. If you are overshooting when turning off of your base leg, don't try to reef the plane in. Go around!

Do not advance your throttle while actually in a turn. It pulls the nose up and makes the turn too steep. If you need additional power, apply throttle before turning or after the turn has been completed.

After you've made a few landings and gotten the feel of the plane, keep your base leg in close. Stay above 1000 feet. Complete the last turn at 500 feet, or more. Hold an airspeed of 130-140 mph on the final approach.

Keep the nose down on the N until you start to break your glide.

Lower your wing flaps on the final approach and trim to relieve the resulting nose heaviness. You may observe pilots lowering their flaps earlier in the pattern, but remember they have more time in the plane than you have.

Carrying external tanks, even though empty, gives the plane unstable characteristics when you turn with flaps down.

The N was designed to land with full flaps. However, you may lock the flaps in any intermediate position by returning the flap control to NEUTRAL. Check the flaps visually for proper extension. Should the flaps come down unevenly, hold the plane with aileron until they even up.

Avoid a long, flat approach with power. Such approaches are dangerous in case of power failure and result in poor landings.

After you throttle back to start your glide, clear your engine at least once. This keeps the engine from cutting out if you need sudden power.

Try for a 3-point landing in the center of the runway. Land in the first 1000 feet. Do not level off too high. The N has no tendency to drop a wing when stalled out, but it settles fast when the speed drops below 110 mph. If you level off too high, add a little power and settle slowly.

There is no harm in a wheels landing, although a longer landing roll results.

When landing behind another plane, be on the lookout for prop wash.

Apply slight brake pressure early in the roll to insure that your brakes are working. Do not apply firmly enough actually to slow the plane, but only sufficiently to reassure you that the brakes are ready for use.

A crosswind landing in the P-47 is relatively easy. Apply the methods learned in flying school. It's easy to get your plane lined up with the center of the runway and to keep it there. Set your base leg a little higher and farther out to give yourself time to establish your approach angle.

After landing, place the cowl flaps in manual full open, raise the flaps (not to be confused with the landing gear) and when ready to turn off into the taxi strip, unlock tailwheel.

Clear the runway quickly, but if you have made a short landing, don't swing into an intermediate taxi strip unless you have received permission from the tower. Go to the end of the runway before turning off.

While preoccupied with landing or taxiing, don't go deaf. Remain conscious of your radio. The tower, at any moment, might have an urgent message for you.

Keep your eyes moving while returning to the parking area.

When parked, hold the brakes, run the engine up to 1000 rpm, move the mixture control to IDLE CUT-OFF. After the engine stops, turn off the ignition and main line battery switches. Shout, "Switch Off."

Turn the fuel selector cock to OFF.

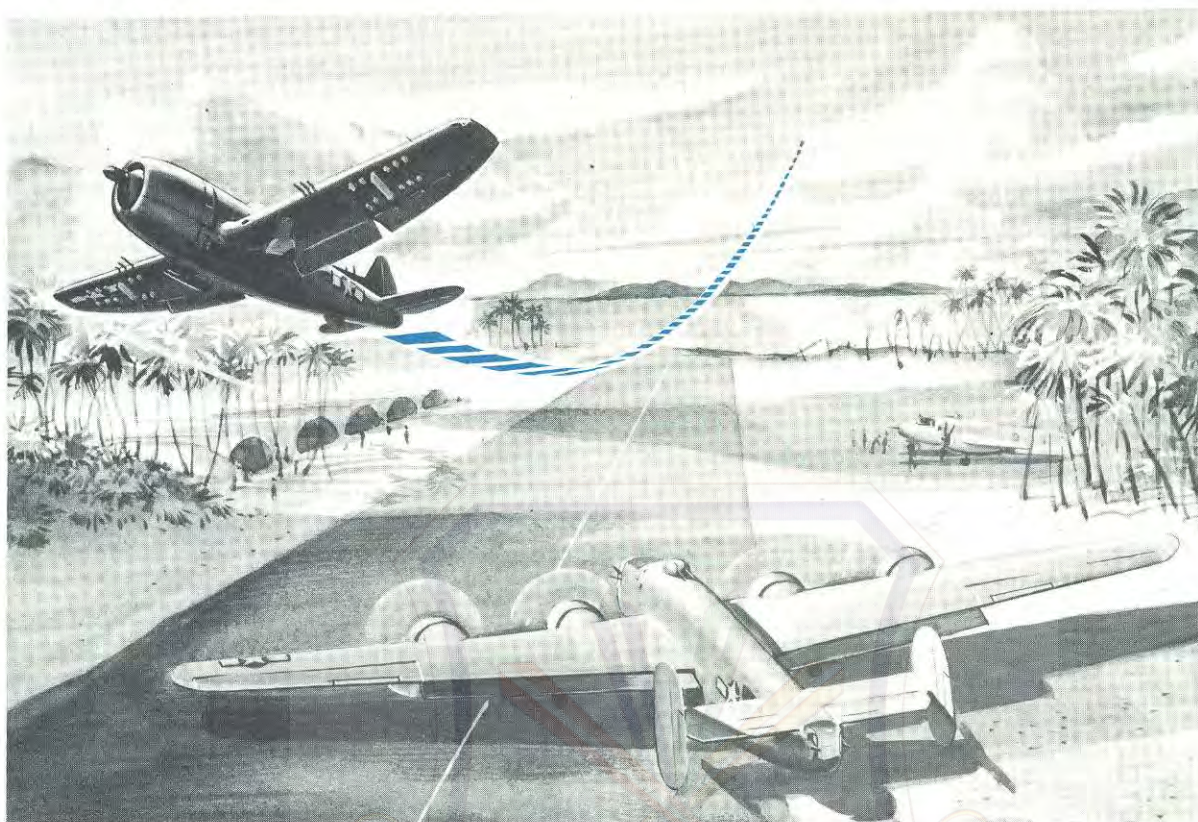
Run through the cockpit check to determine that the plane is set for the next flight.

In windy weather see that the controls are locked.

Don't set the brakes; have the crew chief chock the wheels. The brakes may stick if they're set while hot. Fill out Form 1.

A Pilot's Golden Rule:

When filling out Form 1A, note all defects you observed. Don't undertake to judge whether any defect is important. The crew chief and engineering officer are on the field for that purpose.



Going Around

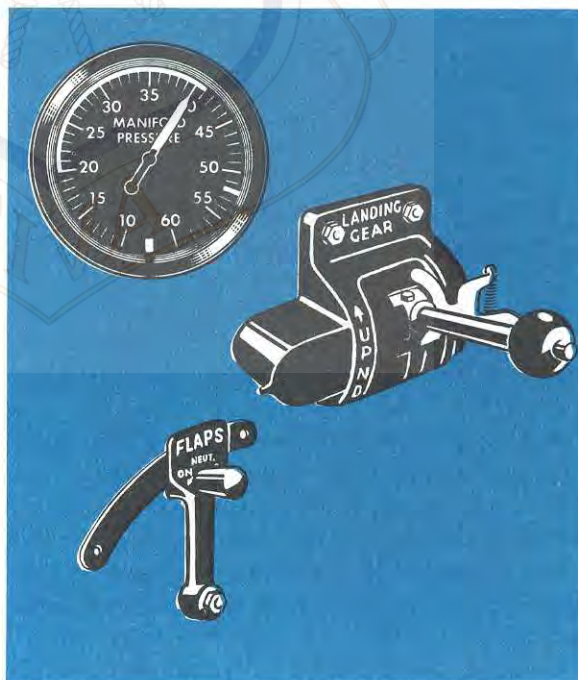
Bad landings in a P-47 almost always are man-made. If you're not sure your approach is 100% correct or that your gear is down and locked, go around. Give yourself a chance to work out your problem, or to discuss matters with mobile control or the tower.

When going around, apply power smoothly, remembering that the torque caused by a sudden surge of power causes your left wing to drop. Always be ready to apply the necessary right rudder.

Open the throttle smoothly to 40" Hg and raise your wheels. Don't forget you must spring the safety latch before the landing gear lever will come up.

Don't pull up too steeply or you may lose control of the plane.

Acquire a safe airspeed, 150 mph, before starting to raise the flaps. Milk the flaps up slowly as described in the previous section. If you spill the flaps suddenly, the plane will mush dangerously.



Flight Characteristics



The P-47N handles much like the AT-6. Some fighters are aileron planes. Others are handled mainly by the rudder. But the P-47N, like a trainer, requires coordination of the two controls to keep the ball centered.

Don't let the Thunderbolt's size give you the notion that it possesses any mysterious qualities. Once the wheels and flaps are up, the size and weight are not noticeable.

You'll be given prescribed missions for your transition. Don't short-change yourself by skimping any assignment. You must master the fundamentals before you can fly with your head out of the cockpit, or in other words, before you can call yourself a fighter pilot.

While performing the mild zooms and dives, Lazy 8's and level flight at varied power settings which make up the exercises, study your engine, airspeeds and the way the plane trims and handles.

Stalls

Try a few partial stalls to identify the buffeting that precedes a stall. Recover when the

plane starts to shudder. Perform the maneuver with power on and off, with wheels and flaps up, wheels down, and finally with wheels and flaps down. Execute the series in turns to the right and left.

In a full stall there is no tendency to spin. The nose, and usually the left wing, drops and the airplane will dive out.

High-Speed Stalls

The approach to a high speed stall is the same as to a normal stall; the plane shudders. Such stalls are brought about most commonly by trying to make a turn too tight.

At high altitudes, high speed stalls result from using too much back pressure to recover from a dive. Light stick pressure has little effect and there is a tendency to overcontrol, resulting in a change of the angle of attack sufficient to break down the airflow.

(See Compressibility section.)

Do not dive faster than 225 IAS or make tight turns when the cowl flaps are open. You may run into tail buffeting.

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Spins

Never spin the P-47N intentionally. The wing loading and design of a modern fighter do not allow enough of a safety factor to play around with them. Furthermore, spin tests on the N have not yet been completed and specific recovery procedures are not available. Use the procedures outlined below until they are modified by a Technical Order or a revision of this manual.

Though dangerous, entry into an accidental spin does not mean that you can't get the plane out.



Recovery from a normal Spin:

1. Cut off the throttle and boost.
2. Apply full opposite rudder sharply.
3. Hold the elevator in neutral. (To do this in a spin you must hold a **slight** back pressure on the stick.)
4. Apply aileron against the spin.
5. As the rotation stops, "pop" the stick forward to break the stall. Move the stick only a few inches, because the weight of the engine is enough to get the nose down and full forward stick might put you in a dangerously steep dive after you get out of the spin.

Use of the throttle should not be necessary in a normal spin, though the torque will help to recover from a spin to the right if opposite rudder doesn't seem to be enough.

As spins wind up they are progressively harder to stop, so get on that opposite rudder at the first degree of turn.

If you get into a normal spin at medium or high altitudes, fight it down to 8000 or 10,000 feet, then bail out.

If you enter a spin between 6000 and 10,000 feet, make one thorough attempt at recovery and, if unsuccessful, get out.

Flat Inverted Spin

There is only one way to get the N into this condition. That is by uncoordinated use of the rudder and ailerons while the plane is stalling on its back.

If you get into an inverted spin, you are in for a hard, violent tussle. Hold on to that stick. If it should be jerked from your hand it will give you quite a chase around the cockpit.



Recovery from an inverted spin:

1. Cut off the throttle and boost.
2. Kick hard opposite rudder.
3. Apply aileron in the direction that you appear to be turning.

4. As the rotation stops, the nose will drop. Stay on your back until you build up safe flying speed and then roll out, being careful to coordinate the controls. If you fall through into a normal spin, use the procedure outlined for that.

Flat Spin

It is also possible to get the N into a spinning attitude where the nose stays near the horizon and the airplane seems to be making lazy, flat circles.



- Recovery from a flat spin:
1. Cut off the throttle and boost.
 2. Apply full opposite rudder.
 3. Hold the elevator in neutral.
 4. Apply the ailerons full against the spin.
 5. Apply repeated bursts of power (50" Hg and 2800 rpm for two or three seconds).

Either the rotation will stop and you can dive out or you will fall off into a normal spin.

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Do not attempt recovery from either a flat spin or an inverted spin below 10,000 feet. Bail out.

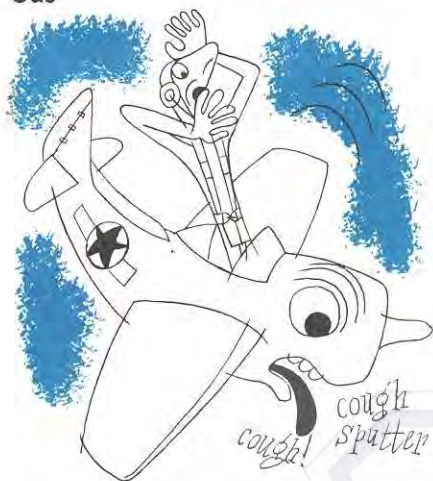
Remember

Any time your N goes out of control or is still out of control below 5000 feet, JUMP.



The use of ailerons against the spin, as recommended here, is based on a maximum ammunition loading of approximately 250 rounds for each of your eight guns. If the loading in your plane is greater than this, use aileron with the spin for recovery. If you're not sure how much you're carrying, follow the normal procedure and if it doesn't work, repeat it, using aileron with the spin.

Out of Gas



If your engine sputters, **immediately** switch gas tanks and turn the fuel booster pump to **EMERGENCY**.

If your trouble is a dry tank and you switch soon enough, the engine will regain power right away. If, by any outside chance, the engine does not re-start in 10-15 seconds, add the following procedure:

1. Check the selector and gages to see that you are on a tank with gas in it. (Leave the booster pump on **EMERGENCY**.)
2. Pull the throttle back to ¼ open.
3. Place mixture control in **IDLE CUT-OFF**.
4. As the fuel pressure comes up, let the engine windmill for a few seconds, to clean it out and stabilize the fuel pump operation.
5. Return the mixture control to **AUTO RICH**.
6. As the engine picks up, open the throttle and go on with your mission.

This procedure will cost you 1500 to 3000 feet of altitude, so don't waste time with it when close to the ground.

If you run a tank dry at high altitude and are unable to re-start, fly the plane down to 10,000 feet and try again before deciding to bail out or make a forced landing.

Engine Failure

Internal engine failure is evidenced by loss of oil pressure, excessively high cylinder head temperature, violent vibration, or a combina-

tion of the three. This usually means that you must choose between making a forced landing and bailing out. Such a failure seldom results in fire. Reduce your power to try for smooth operation. See if you can hold altitude. If you can, you may be able to get back to the field or to some terrain better suited for a belly landing.

Fire

Fire in the air remains the pilot's worst enemy. It is almost always best to bail out. If for any reason you can't or prefer not to, move the mixture to **IDLE CUT-OFF**, turn the selector **OFF**, and open the cowl flaps, then turn off switches. Make a dead stick landing.

Collision

If a cable or control surface is useless, don't waste time trying to recover. If you can't right the airplane get out immediately. Loss of part of a control surface, a wing tip, or damage to a wing, is not necessarily reason for bailing out. Get to a safe altitude and simulate a landing, wheels down, and see where it stalls. If the stalling speed is slow enough, return to the field. If the plane is unsafe or unstable, bail out. Before landing warn the tower that you are making an emergency landing and will make an unconventional traffic pattern.

If you have partial control or if the cables are weak, the trim tabs will help.

Cockpit Fumes

Vapor from a broken fuel line or defective primer is a hazard both as a possible fire or explosion and as a toxic agent on the pilot.

Put on your oxygen mask, take a few breaths from **EMERGENCY**, then turn to **AUTO-MIX OFF** (100% oxygen). Close the cockpit vent and leave the canopy closed.

Make a normal landing as soon as possible, at the nearest field. Don't pull the throttle all the way back during the final approach. A backfire or torching may ignite the fumes.

Never smoke in the P-47N.

Carbon monoxide has much the same effect as anoxia. Any time you feel sleepy or your reactions are sluggish, breathe pure oxygen. If you don't feel better almost at once, go home.



THIS IS A CONSTANT EXPLOSION HAZARD



Experience and statistics dictate the following general policies:

1. If you are lost or running low on gas, pick out a good field and make a belly landing while you still have gas to go around.



2. In case of power failure but full control, make a belly landing if the terrain is favorable. (For procedure see Forced Landing section.)

3. "Favorable" terrain for a belly landing means flat or gently rolling land, no gullies, ditches, or power lines, free from buildings or large, scattered trees. Beaches, pastures, and cultivated farms are best.

4. If the airplane is out of control, bail out.
5. Don't attempt a forced landing at night. Bail out!

Forced Landings

To get maximum glide, with no power, place your propeller manually in the full decrease rpm position. This presents the edge of the blade forward, reducing drag in the same manner that feathering a prop does on a multi-engine plane.

As long as your propeller is windmilling, keep your airspeed above 150 mph. If the engine should freeze, giving you a dead prop, increase your airspeed to above 170 mph to overcome the added drag. With a frozen engine, don't put your wheels and flaps down.

Unless you are on the way to a field of your choosing, with a definite plan of action in mind, bail out before you get as low as 3000 feet. Once you have decided on a course, stick to it, unless a new emergency, such as fire, causes you to reach a new decision.

For trouble developing below 4000 feet, make one quick check—if a solution isn't available instantly, bail out.

Make a forced landing with wheels up, unless you are positive that you can make a runway with gear down.

THREE RULES FOR ANY FORCED LANDING

- 1. Don't Stall**
- 2. Don't Ever Stall**
- 3. Don't Never Ever Stall***

*Ungrammatical, but still true.