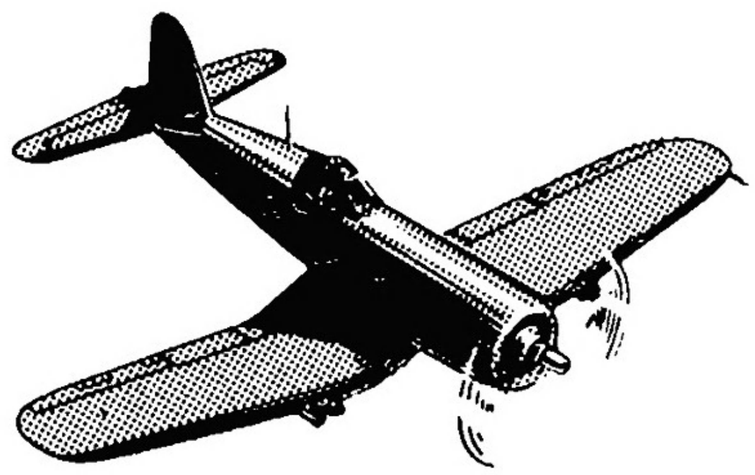
corsair

RESTRICTED

CHANCE VOUGHT AIRCRAFT

DIVISION OF UNITED AIRCRAFT CORP., STRATFORD, CONNECTICUT

corsair 5



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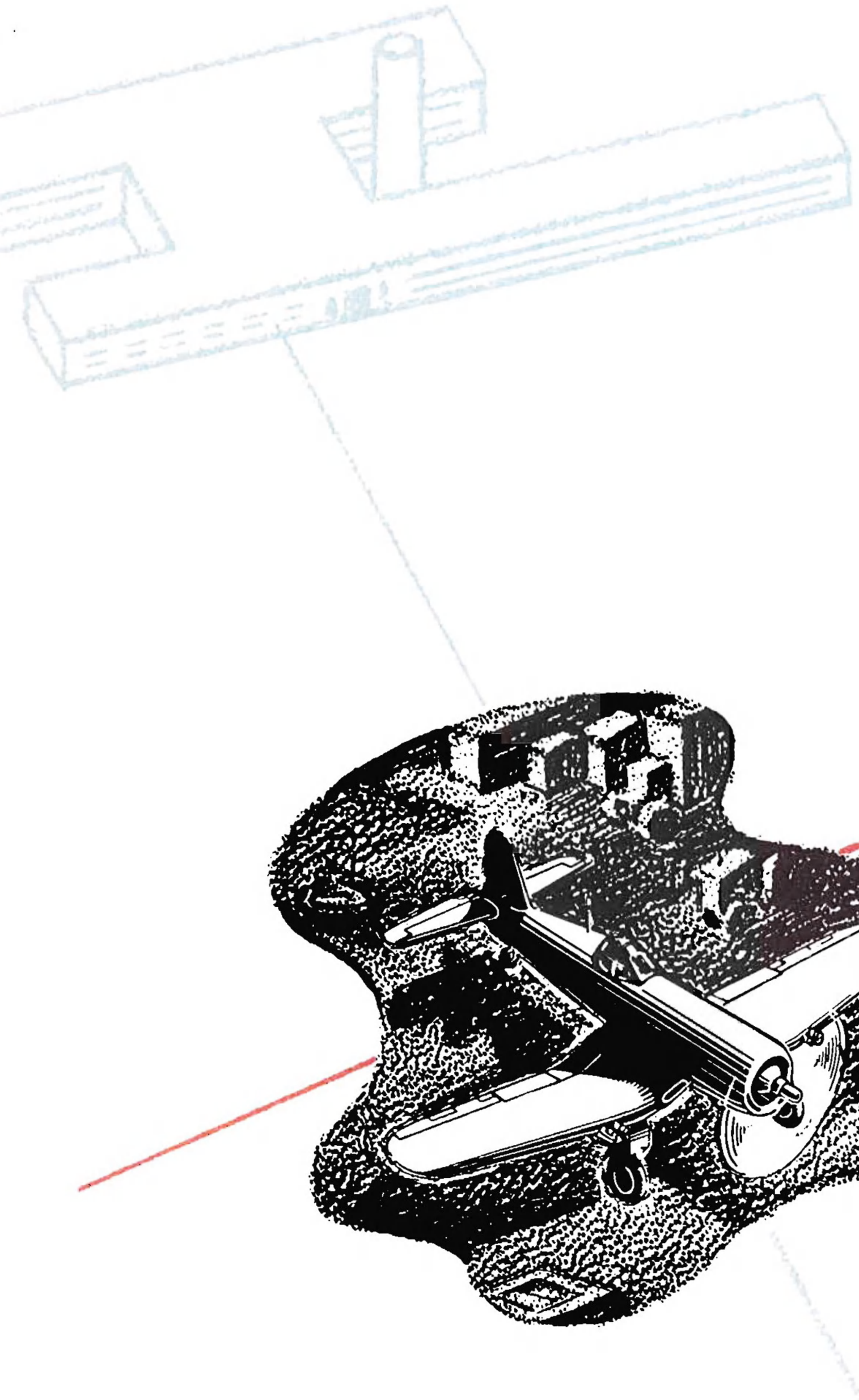
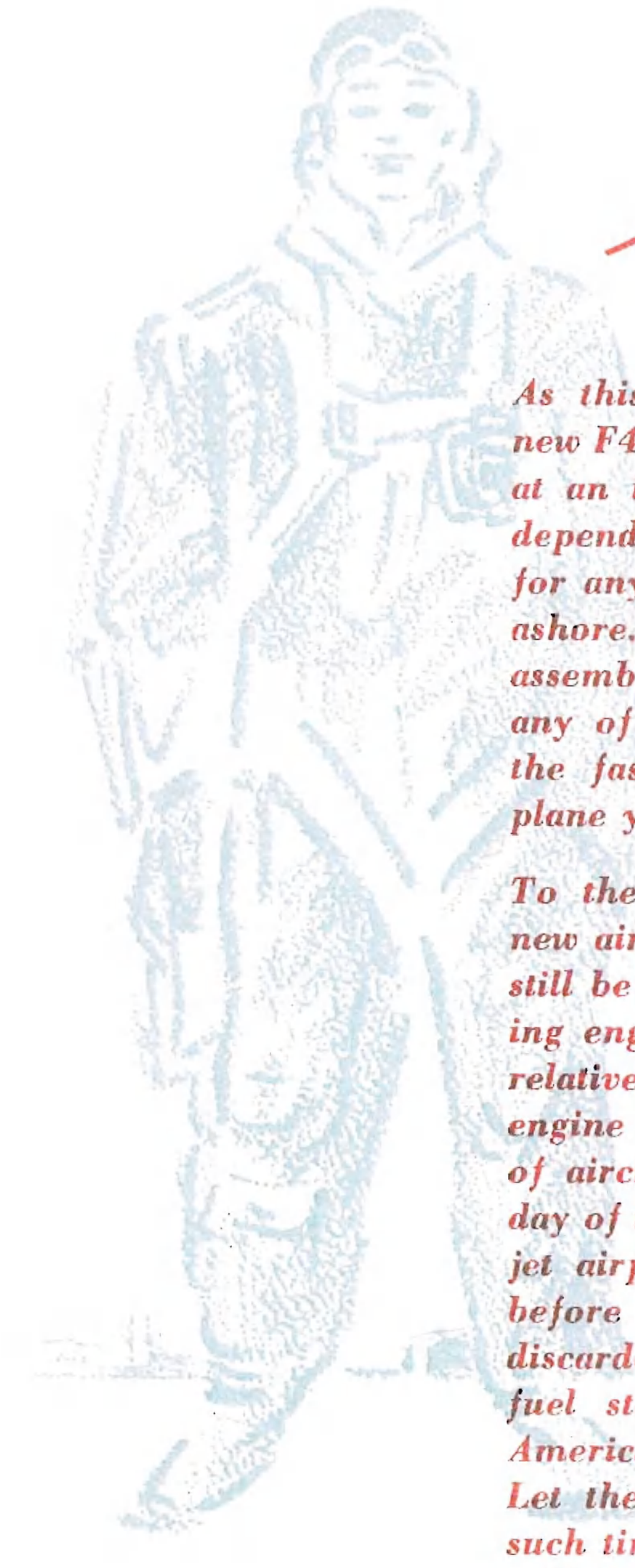
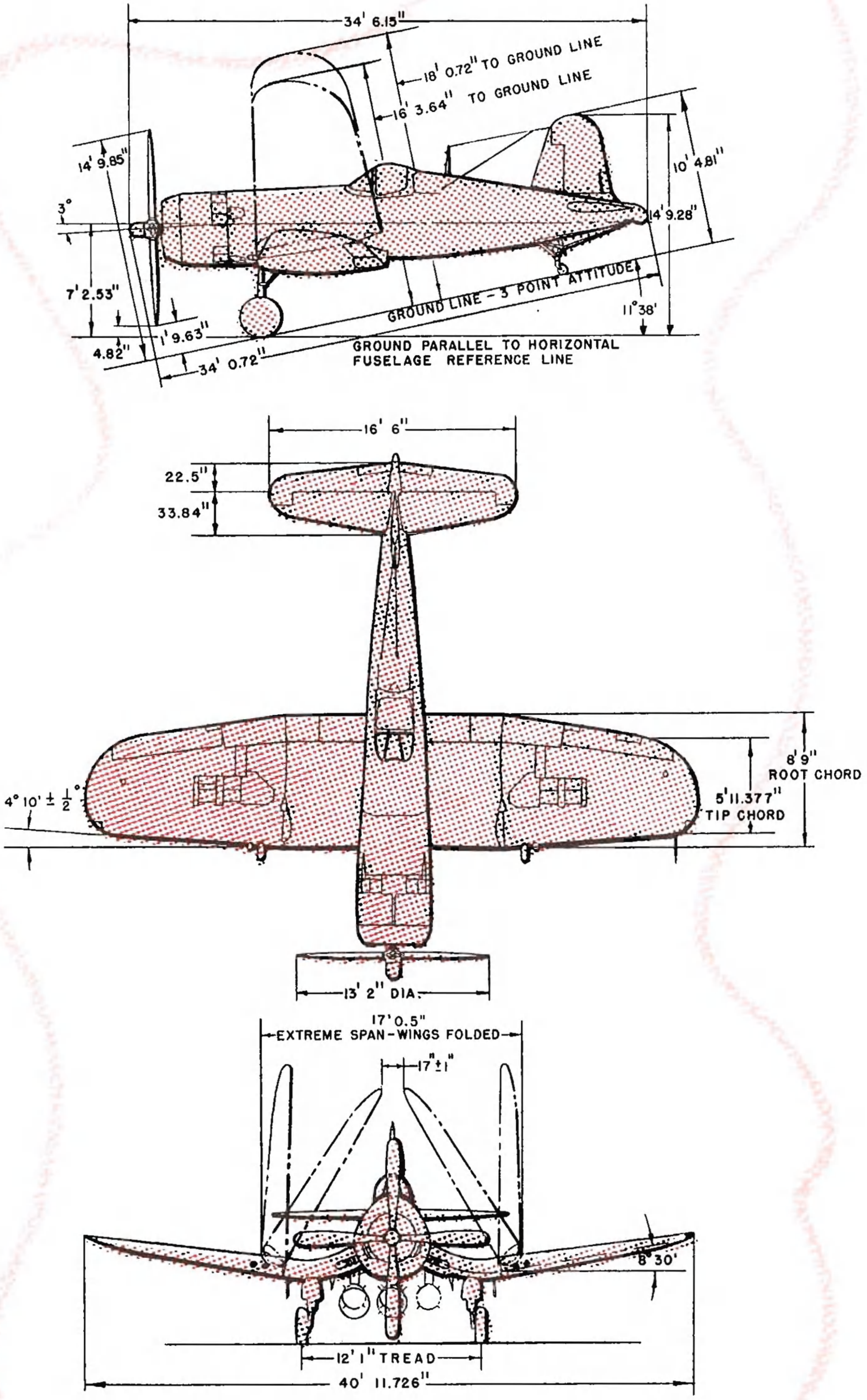




Foreword

As this booklet goes to press, sleek and shiny new F4U-5 CORSAIRS roll from the assembly line at an increasingly rapid rate. Fast, rugged, and dependable, these CORSAIRS are plainly ready for any and all types of service with the fleet or ashore. Modernized from power plant to tail assembly, more powerful and more versatile than any of its distinguished forebears, the F4U-5 is the fastest, most powerful propeller-driven airplane yet produced for the Navy in any quantity.

To the uninitiated it may seem strange that a new airplane in this day of jet propulsion should still be equipped with a propeller and reciprocating engine. However, a realistic appraisal of the relative merits of jet-propelled and reciprocating-engine powered aircraft against the background of aircraft carrier requirements reveals that the day of the latter is not yet done. Among the many jet airplane problems that remain to be solved before conventionally-propelled aircraft can be discarded as obsolete are power plant reliability, fuel storage aboard ship, and deck handling. American ingenuity will find the way as always. Let there be no doubt on this score; but until such time the main-stay of the Naval air-arm will still be the conventionally-propelled fighter airplane, capable of taking-off from carrier decks with an amazing load and variety of ordnance. In this connection, CORSAIR 5 will fill a vital need in the nation's first line of defense.



GENERAL ARRANGEMENT

corsair F4U-5

identifying features

The modernization which has taken place in the Corsair is not too readily discernible externally. The airplane still retains the distinctive inverted gull-wing which characterized all earlier models of the Corsair. Perhaps the best identifying feature is the engine cowl which when viewed from dead-ahead presents the viewer with air-intake scoops at "four o'clock" and "eight o'clock". From astern it may be possible to see that the last vestige of fabric has disappeared from the outer panels which are now metal covered. To improve maintenance, a large access door has been provided on the right side of the fuselage just aft of the pilot's seat.

Specialized versions of the F4U-5 have additional distinctive identifying features. For example, as a bomber the F4U-5 can carry external stores on a centerline pylon in addition to the center section pylons. On the night fighter, a large radar nacelle projecting from the leading edge of the right hand outer panel should help in identification. The F4U-5P, photo-reconnaissance version of the Corsair is somewhat more difficult to identify from the standard day fighter. However, a close-up view reveals sliding camera vision doors on port and starboard sides as well as on the bottom of the airplane, aft of the pilot's cockpit. In addition, the fin leading edge includes a streamlined blister which houses the compass transmitter in an area free from electrical disturbances.

performance

From the following tables and curves it can be seen that the F4U-5, now in quantity production, is the fastest carrier-based fighter in the world. A high speed of 408 knots together with a sea level rate of climb of more than 4800 ft./min. and a service ceiling of over 42,000 feet result in an airplane with all-round performance that is unexcelled by any other carrier-based aircraft in service today.

• The maximum range can be increased to approximately 1575 nautical miles if two drop tanks are carried.

•• The combat radius is defined as follows:

a. 20 minutes for warm-up and idling.

b. 1 minute at rated take-off power.

c. 20 minutes for rendezvous at 60% normal sea-level power (n.s.p.) and normal mixture.

d. Climb to 15,000 ft. at 60% (n.s.p.) and normal mixture.

e. Cruise out at V for maximum range and normal mixture.

f. Drop bombs and droppable tanks (if carried).

g. 20 minutes for combat at 15,000 ft. (10 minutes at combat rated power and 10 minutes at military rated power.)

h. Descend.

i. Cruise back at 1500 ft. at 170 knots true airspeed and normal mixture.

j. 60 minutes at V for maximum range and normal mixture as allowance for rendezvous, landing and reserve.

Fuel consumption data have been increased by 15% in calculating range and combat radius.

••• The combat radius of action can be extended substantially in two ways:

1. By reducing combat time — 1 min. = 9 nautical miles.

2. By carrying 2 external fuel tanks to the objective and back — radius of action = 425 nautical miles.

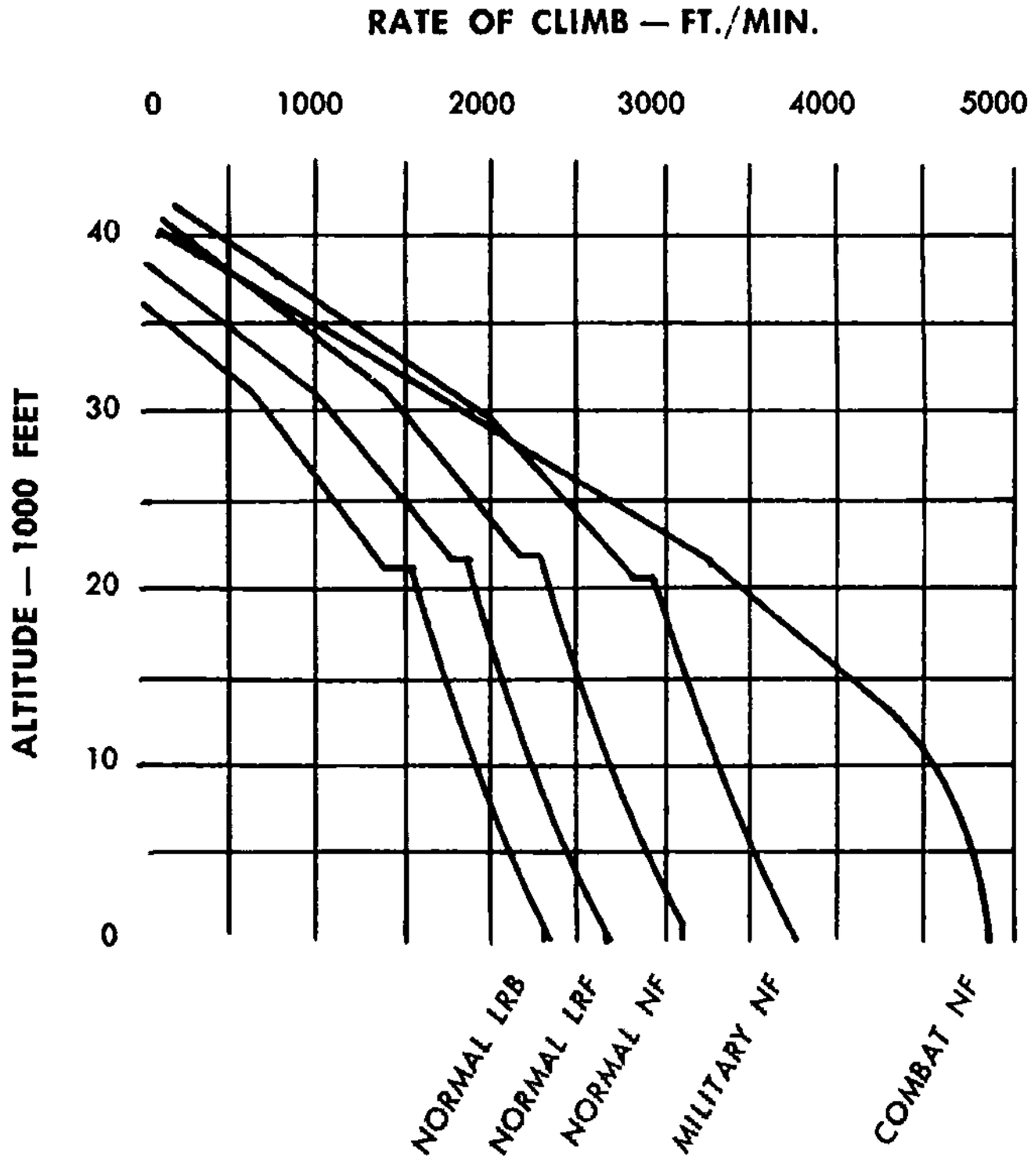
SUMMARY OF BASIC F4U-5 PERFORMANCE

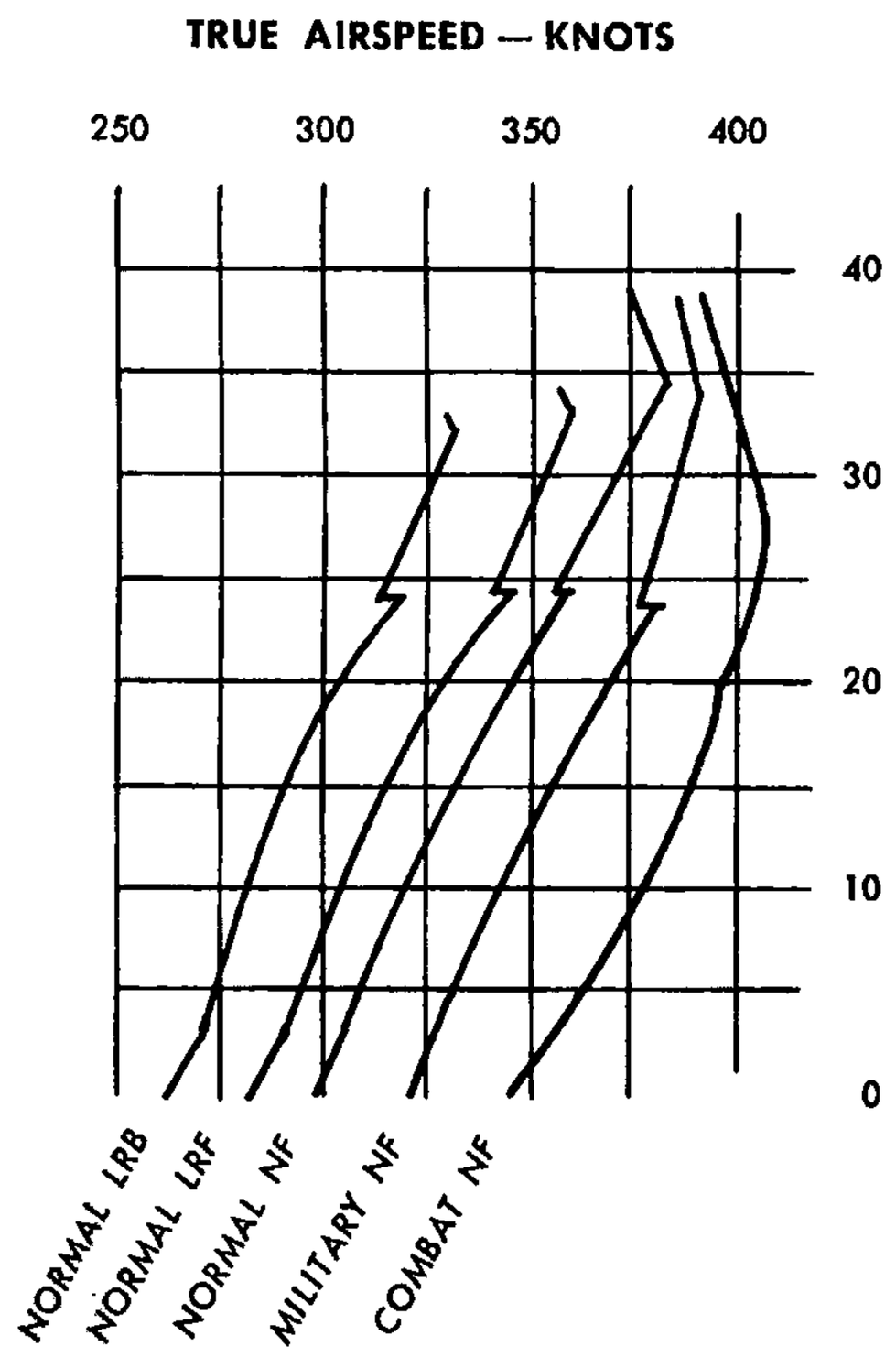
LOADING CONDITION		NORMAL FIGHTER (CLEAN)	LONG RANGE FIGHTER (1—150 GALS. EXTERNAL TANK)	LONG RANGE BOMBER (1—1000# BOMB 1—150 GAL. EXTERNAL TANK)
GROSS WEIGHT	LBS.	12,873	14,085	15,133
FUEL/OIL	GALS.	234/16	384/27.5	384/27.5
V_{MAX} —SEA-LEVEL	KNOTS, TRUE			
NORMAL		299	284	267
MILITARY		323	309	291
COMBAT		347	328	309
V_{MAX}/CRITICAL ALT.	KNOTS (TRUE)/FT.			
NORMAL		384/34,700	360/33,700	332/32,800
MILITARY		391/34,000	376/33,500	351/33,000
COMBAT		408/27,000	393/26,300	369/25,600
V STALL, GROSS WEIGHT, AT SEA LEVEL	KNOTS, TRUE			
POWER OFF, FLAPS & GEAR UP		92.9	97.1	100.7
POWER OFF, FLAPS & GEAR DOWN		79.8	83.4	86.5
POWER OFF, FLAPS & GEAR DOWN LESS FUEL		75.3	76.3	79.6
POWER ON, FLAPS & GEAR DOWN		71.3	74.4	77.3
RATE OF CLIMB S.L.	FT./MIN.			
NORMAL		3,120	2,680	2,330
MILITARY		3,780	3,290	2,900
COMBAT		4,850	4,240	3,770
TIME TO CLIMB TO 10,000 FT.	MIN.			
NORMAL		3.4	4.0	4.7
MILITARY		2.8	3.2	3.7
COMBAT		2.1	2.4	2.8
TIME TO CLIMB TO 20,000 FT.	MIN.			
NORMAL		7.5	8.9	10.6
MILITARY		6.0	7.0	8.2
COMBAT		4.7	5.4	6.3
SERVICE CEILING	FEET			
NORMAL		40,600	38,100	35,600
MILITARY		42,300	40,000	37,700
COMBAT		40,400	38,600	36,800
TAKE-OFF DISTANCE	FEET			
IN CALM		736	907	1,081
IN 25 KNOT WIND		353	453	554
MAXIMUM RANGE AT ●				
1500 FT.	NAUTICAL MILES	830	1,230*	1,080
AVERAGE SPEED	KNOTS, TRUE	156	156	152
MAXIMUM ENDURANCE, S.L.	HRS.	5.8	8.2	7.4
AVERAGE SPEED	KNOTS, TRUE	130.	130.	125.
RADIUS OF ACTION ●●			●●●	
	NAUTICAL MILES	—	260	228

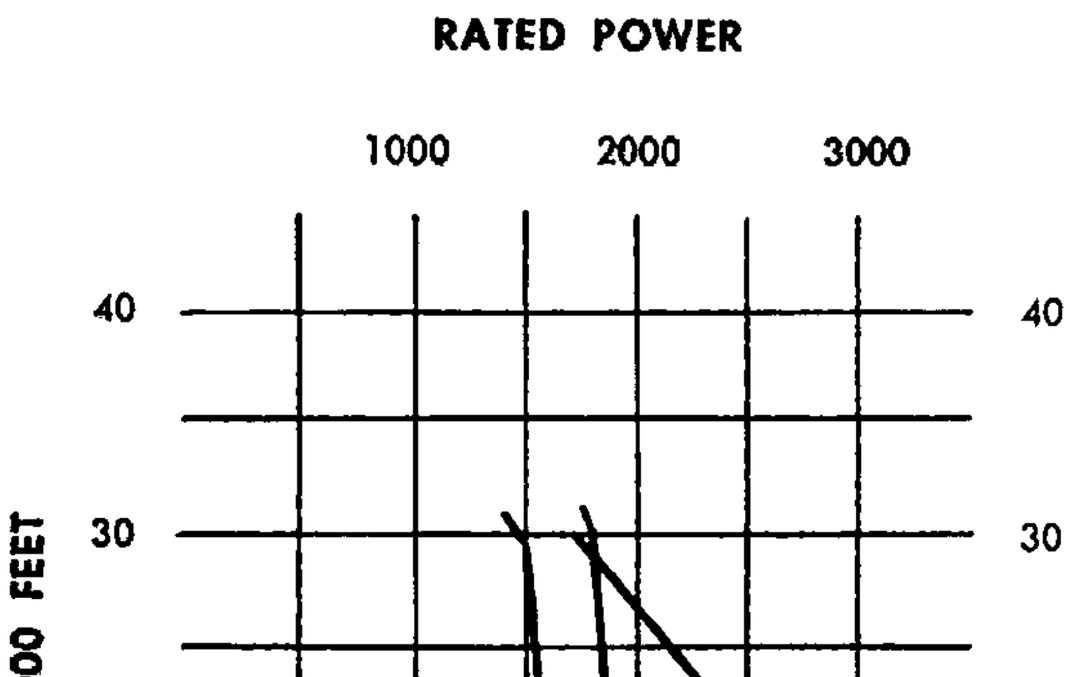
effect of external equipment on performance

The following table presents the effect on the performance of the F4U-5 of adding external equipment. It can be seen from this table that appreciable losses in performance result if the center section pylons and the Mark 9 rocket launchers are kept on the airplane. In view of these losses, it becomes desirable to remove these items whenever they are not being used, if the maximum performance is to be obtained from the airplane. For various combinations of the following items, the performance changes may be added directly to the performance shown in the accompanying tables and curves in order to estimate the approximate performance of the F4U-5 under various loading conditions.

EXTERNAL EQUIPMENT	INCREASE IN WEIGHT LB.	DECREASE IN V_{MAX} AT CRIT. ALT. KN. (TRUE)	DECREASE IN R/C AT S.L. FT./MIN.	INCREASE IN T.O. DIST. 25-KN. WIND FT.	DECREASE IN N.MI./GAL.
1 C.S. PYLON WITHOUT SWAY BRACES	45	2	30	3	.1
1 C.S. PYLON WITH SWAY BRACES	69	5	50	5	.1
2 C.S. PYLONS WITHOUT SWAY BRACES	90	4	60	6	.1
2 C.S. PYLONS WITH SWAY BRACES	138	9	100	10	.2
1 C.L. PYLON WITHOUT SWAY BRACES	65	3	50	5	.1
1 C.L. PYLON WITH SWAY BRACES	89	5	70	6	.1
1 150-GAL. D.T. ON C.S. PYLON W/S.B.	1,105	15	590	85	.5
1 150-GAL. D.T. ON C.L. PYLON W/S.B.	1,126	15	600	87	.5
1 1,000-LB. BOMB ON C.S. PYLON W/S.B.	1,069	21	610	83	.6
1 1,000-LB. BOMB ON C.L. PYLON W/S.B.	1,089	21	620	84	.7
1 2,000-LB. BOMB ON C.L. PYLON W/S.B.	2,089	29	1,000	175	1.0
8 MK-9 ROCKET LAUNCHERS	37	4	30	2	.1
8 MK-9 ROCKET LAUNCHERS AND 8 5-IN. ROCKETS (5-IN. MOTORS)	1,157	15	620	90	.5
2 11.75" TINY TIMS ON C.S. PYLONS W/S.B.	2,698	24	1,080	230	1.0
F4U-5N AN/APS-19 RADAR INSTALLATION	427	15	500	54	.2
F4U-5 PHOTOGRAPHIC AIRPLANE	140	1	60	7	Neg.







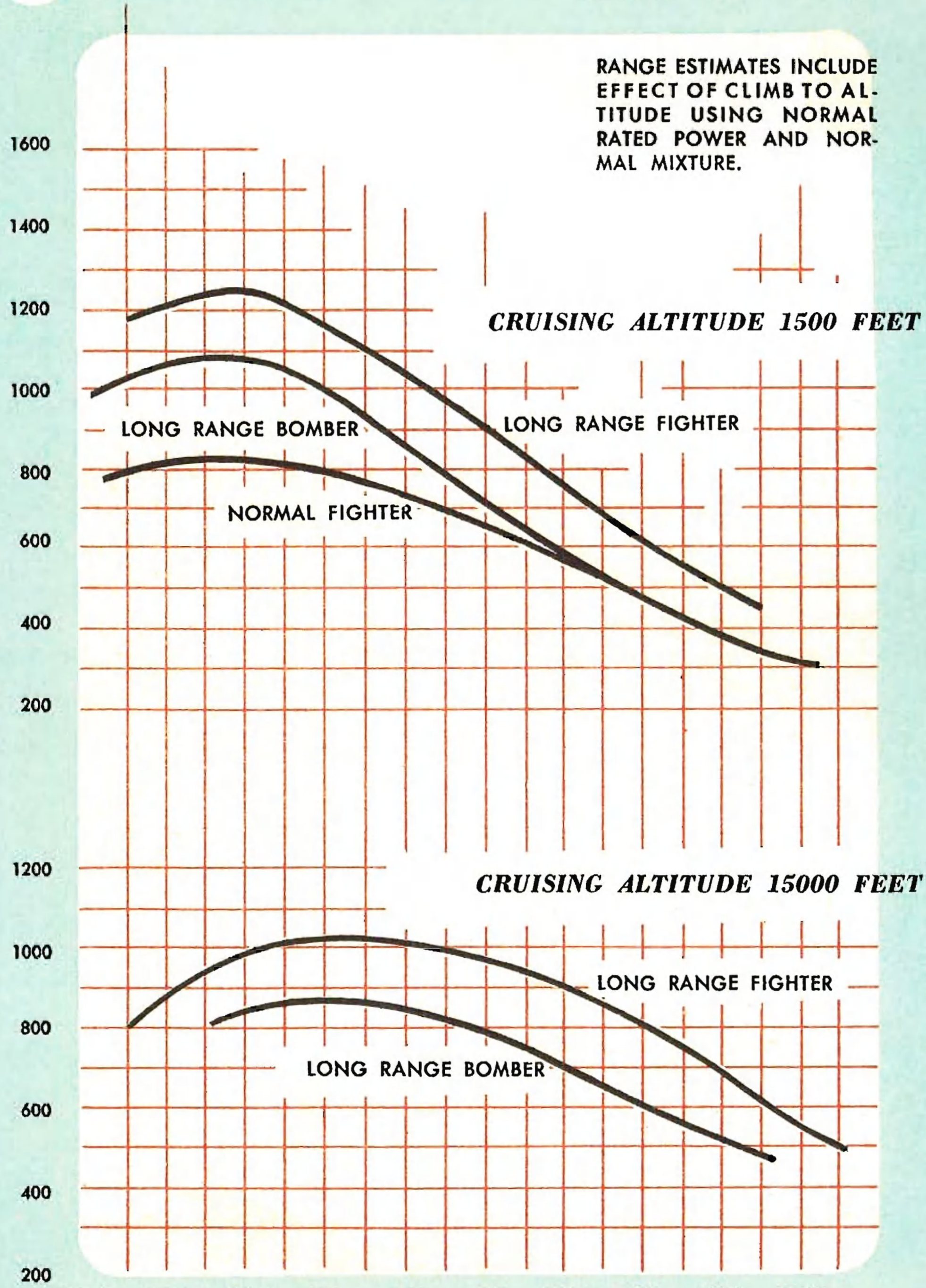
CONDITION	WEIGHT - LBS.	DRAG CONDITION
NF — NORMAL FIGHTER	12873	CLEAN
LRF — LONG RANGE FIGHTER	14085	ONE MK-5 DROP TANK
LRB — LONG RANGE BOMBER	15133	ONE MK-5 DROP TANK PLUS ONE 1000 LB. BOMB

MODEL F4U-5 AIRPLANE
PERFORMANCE VS. ALTITUDE

corsair 5

MODEL F4U-5 AIRPLANE
RANGE VS. VELOCITY

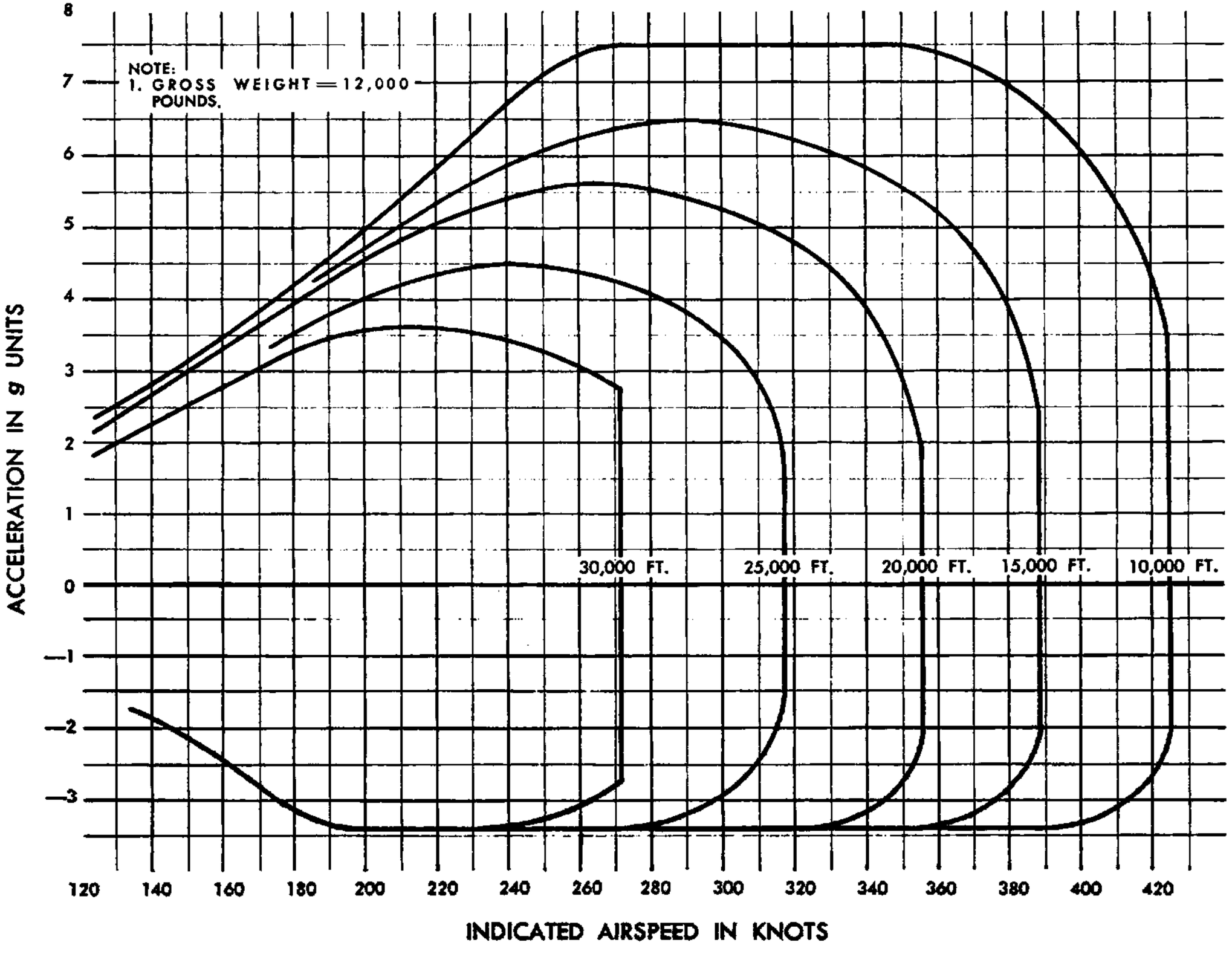
RANGE ESTIMATES INCLUDE EFFECT OF CLIMB TO ALTITUDE USING NORMAL RATED POWER AND NORMAL MIXTURE.



flight characteristics

The flight characteristics and flying qualities of the F4U-5 Corsair are essentially those of the F4U-4. High speed maneuverability has been enhanced by the use of spring tabs for the elevator and rudder controls. Landing condition and clean condition stalls for power "on" and power "off" are identical with those of the F4U-4 airplane and the normal buffet warning is present several knots above the final stalling of the wing. Due to the more forward location of the airplane center of gravity and to the down-tilted propeller thrust axis, longitudinal stability is more positive in the F4U-5 airplane than in the F4U-4. Thus again are the flying qualities of the airplane improved to keep step with all around improved performance.

The spring tab provision for elevator and rudder controls decreases the control forces required of the pilot by approximately 40% at high speed as compared to the F4U-4. Thus, it will be found that changes in rudder and elevator forces with changes in speed (gunnery runs), stick forces required during dive recovery and forces required during high speed maneuvering will be conveniently reduced. Less attention is required of the pilot for changes in trim tab position. Aileron control and aileron operation found to be excellent on the F4U-4 have been retained in the F4U-5 airplane unchanged. All normal flight maneuvers and aerobatics can be performed in the F4U-5 airplane using essentially the same entry speeds and technique as in the F4U-4. In both airplanes, vision from the cockpit and normal airplane feel are the same. Landing the F4U-5 airplane is accomplished with the same technique as that used to land the F4U-4. It will be noted, however, that because of the more forward CG location, the tail will be somewhat light and more nose-up trim tab will be required during the landing. When several flights have been made and pilot familiarity gained, this small difference will be difficult to detect.



OPERATING FLIGHT STRENGTH DIAGRAM

structural improvements

The F4U-5 Corsair conforms with the latest applicable structural specifications. In attaining this conformance, tail surfaces and fuselage carry-through structure were strengthened, thereby providing added insurance against gust damage, and rivcted joint strength throughout the mid and aft sections of the fuselage was increased. Further improvement was effected by relocating the catapult hooks in a more forward position, making it possible to catapult the Corsair at any gross weight that can be practicably loaded aboard, and by strengthening the arresting hook shank for the higher gross weight of the F4U-5.

Generally speaking, all structurål improvements and modifications indicated as necessary during the life of the F4U-4 and incorporated in that model by means of the MCR system were also incorporated in the F4U-5.

versatility

A certain degree of versatility has always been required in Naval aircraft. All Corsair aircraft have been generously endowed with this important characteristic, but the F4U-5 is an outstanding performer in a field of stars.

Stripped of all its external stores-carrying provisions, the F4U-5 is a fast and elusive fighter, packing a terrific punch in its four 20mm guns. To increase its range, it is only necessary to install either one or two external fuel tanks on the pylons furnished. Its fire-power can readily be increased by installing eight Mk. 9 Mod. 3 Rocket Launchers which can mount either 3.5″ or five-inch HVAR. As a long range bomber, the Corsair is equipped with three bomb and external fuel tank carrying pylons, eight five-inch HVAR, and four 20mm guns.

As a night fighter the Corsair is equipped with AN/APS-19 search radar.

And finally, the F4U-5 airplane may be employed as a long-range photo-reconnaisance airplane equipped with a unique rotating camera mount which is described in detail farther along in this booklet.

winterization

Cold-weather operations with the F4U-5 Corsair should pose no special problems for maintenance and pilot personnel. Each airplane is equipped with an oil dilution system and provisions for an extra storage battery to simplify cold-starting.

In flight a combustion type heater of generous capacity will, on short notice, flood the cockpit with a satisfying volume of warmed, fresh air while at the same time the snug canopy excludes uncomfortable drafts.

Windshield-defogging is accomplished by directing heated air from the cockpit heater, through an appropriate louver, at the aft side of the windshield. Electric heaters have been provided at the guns and pitot-tube to prevent icing of this equipment.

The airplane is of course operational at all temperatures likely to be encountered up to its service ceiling.

power plant

engine

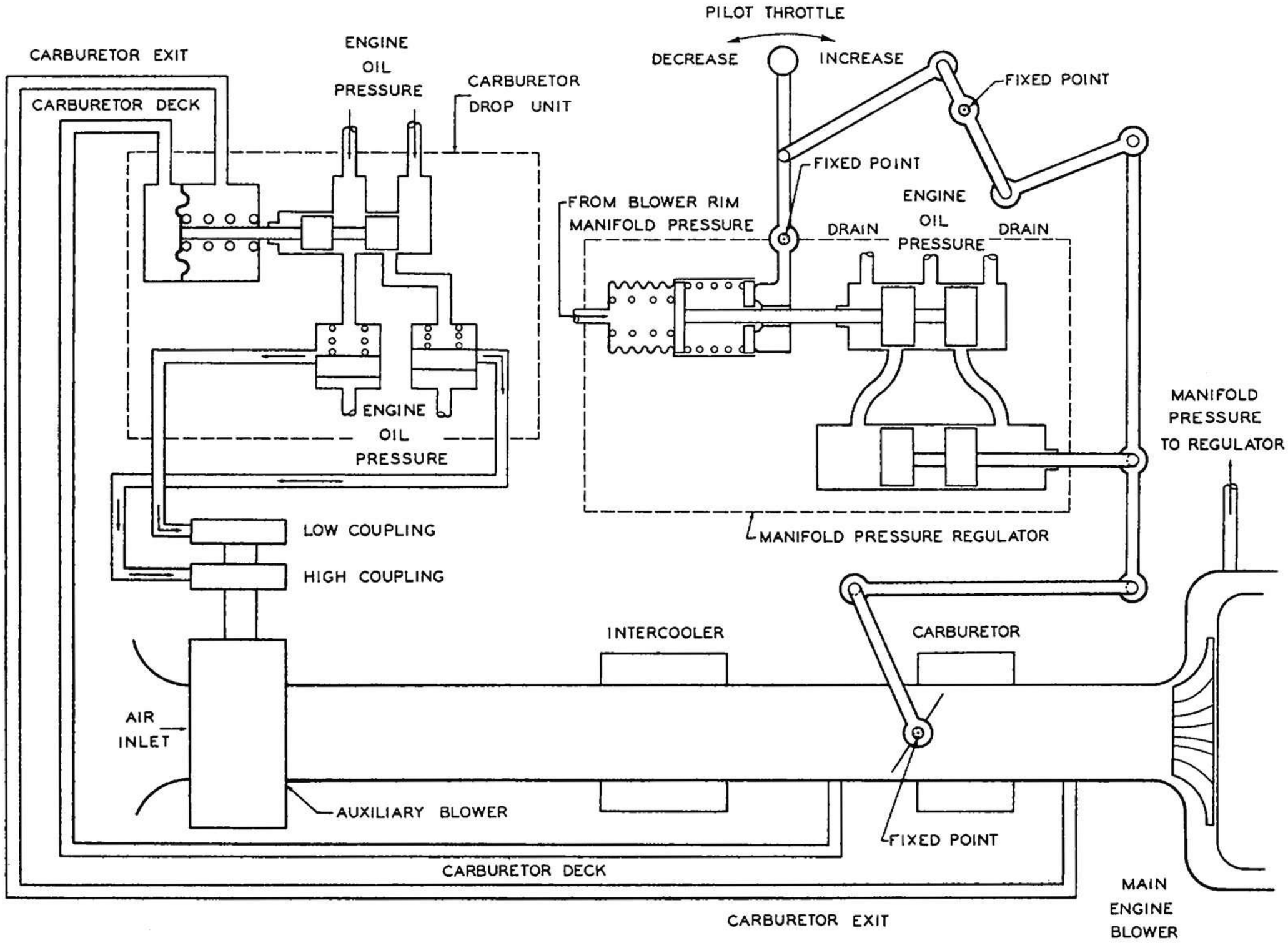
The superb performance of the F4U-5 Corsair is made possible largely by improvements in the famed Pratt & Whitney R-2800 engine with which this airplane is powered. Progressively improved both structurally and mechanically and equipped with dual side-mounted, automatically controlled auxiliary stage superchargers, the R-2800-32W ("E" series 2-stage) is rated as follows:

TAKE-OFF POWER	2300 H.P. AT 2800 R.P.M. AT SEA LEVEL
NORMAL RATED POWER	1900 H.P. AT 2600 R.P.M. AT SEA LEVEL
	1500 H.P. AT 2600 R.P.M. AT 30,000 FEET
MILITARY POWER	2300 H.P. AT 2800 R.P.M. AT SEA LEVEL
	1800 H.P. AT 2800 R.P.M. AT 30,000 FEET
*COMBAT POWER	2760 H.P. AT 2800 R.P.M. AT SEA LEVEL
	2440 H.P. AT 2800 R.P.M. AT 23,000 FEET

*The F4U-5 has a water tank capacity of 28 gallons which will permit better than 10 minutes operation at combat power.

automatic power control

Upon entering the cockpit, pilots will soon discover that the F4U-5 lacks a supercharger control lever on the power quadrant. The elimination of this lever has been made possible by something which should prove to be a boon to pilots, to wit, the automatic power control. This device, which is mounted on the engine, automatically controls the manifold pressure to a constant value for a fixed position of the pilot's throttle control. The automatic control consists of two controlling units; the manifold pressure sensitive unit which controls the position of the butterfly valve in the carburetor, and the carburetor air flow pressure drop regulator which controls the speed of the dual auxiliary-stage blowers.



SCHEMATIC DIAGRAM OF POWER CONTROL

The manifold pressure sensitive unit on the control is directly connected through a line to the manifold pressure. Movement of the pilot's throttle control handle results in setting the control for the manifold pressure desired. Any flight condition change which would affect the manifold pressure (such as changed altitude, airspeed or engine rpm) is compensated for by automatic control movement of the butterfly valves in the carburetor, the valves opening if the manifold pressure is below or closing if above the selected manifold pressure. A change in the position of the butterfly valves results in a change in the engine air flow pressure drop across the carburetor, this change being sensed by the carburetor drop regulator. For a decrease in carburetor drop pressure, the regulator permits increased oil flow to the hydraulic couplings, increasing the speed of the auxiliary stage impellers and resulting in an increase in air flow through the carburetor. The increased air flow through the carburetor increases the carburetor drop to the value for which the regulator is set and the manifold pressure is maintained at the desired value.

propeller

The F4U-5 airplane is equipped with a Hamilton Standard Hydromatic Four Blade Propeller (24E60/6837A-O). This propeller is 13 feet 2 inches in diameter and is similar to that furnished with the F4U-4 airplanes with certain exceptions. The blades have thinner tips to accommodate the higher speed of the F4U-5 airplane and the hub is reinforced to reduce stresses induced by drooping the thrust axis three degrees, for improved longitudinal stability. Like the F4U-4, the F4U-5 dispenses with a propeller accumulator. The design of the oil tank is such that flow to the engine and propeller is maintained even during short periods of negative acceleration and inverted flight.

power plant controls

Chance Vought Aircraft has long endeavored to make the piloting of high performance fighter aircraft as simple as possible, particularly in the matter of power plant management. Pilots in general cannot be expected to be thoroughly versed in the intricacies of the modern day power plant, although the majority of pilots have a good grounding in the fundamentals. Since today's fighter is conceived primarily as a mobile gun platform, the

greater part of the pilot's efforts should be directed toward obtaining the most effective use of the aircraft armament. This philosophy underlies the design of the F4U-5 power plant controls.

Coordination between rpm and manifold pressure throughout the high power range is made possible by the design of the throttle and propeller control handles and their respective linkages. To effect this coordination, the two handles are grasped together and moved simultaneously. However, during takeoff and when cruising at powers up to maximum cruising power, the controls are operated as heretofore; each one individually. Maintenance of constant manifold pressure is accomplished by the automatic power control previously described.

Engine cowl flaps, intercooler flap, and oil cooler flaps are provided with automatic controls which may, however, be over-ridden by the operation of conveniently placed switches in the cockpit.

cowl flaps

Cowl flaps on the Model F4U-5 airplane are provided with a Bristol Company automatic cowl flap control. The flaps are actuated by screwjacks through flexible shafting driven by an electric motor. The switch in the cockpit is provided with manual OPEN and CLOSE positions, a neutral position, and an AUTOMATIC position.

The automatic control system consists of two thermocouples installed on the two hottest cylinders, tentatively, numbers 2 and 4, the controller and the indicator in the cockpit. The controller responds to the temperature of the hotter of the two thermocouples and has a low and a high setting. The low setting is effective below engine rpm's of 2200 to 2300 (propeller governing) and is 232°C. The high setting is effective above 2300 rpm and is 240° to 245°C. Low or high setting is automatically selected by the propeller governor control handle. When the temperature of the hotter cylinder is below the control temperature setting, the cowl flaps will close automatically. As the cylinder head temperature approaches the control temperature, the cowl flaps will start to open. The control is designed to anticipate the change in cylinder head temperature and this results in more stable flap operation with little or no over-travel. Regardless of flap position, the unit always controls to the same temperatures. A microswitch

installed on the left landing gear is arranged to close when the weight of the airplane is on the gear, thus automatically opening the cowl flaps upon landing the airplane.

intercooler flap switch

The intercooler flap pressure switch on the F4U-5 is sensitive to the cooling-air pressure-drop across the left hand intercooler. Setting of the switch increases linearly from sea level to critical altitude approximately, whereas the switch on the F4U-4 had a constant setting with altitude. The model F4U-5 switch results in more effective intercooling by gradually opening the intercooler flap with altitude as required, while operating in "AUTOMATIC". Placing the control switch in "OPEN" or "CLOSE" over-rides the automatic operation.

At low powers on the ground (taxiing, etc.) the pressure differential is such that the flap will remain open in "AUTOMATIC".

oil cooler flap control

The F4U-5 automatic oil cooler flap control is the same as that used in the F4U-4 airplane. The control is sensitive to the temperature of the oil returning to the oil tank and is set so that the oil cooler flaps start to open at an oil temperature of approximately 78°C and are fully open at an oil temperature of approximately 98°C.

power plant accessories

exhaust collector

The F4U-5 airplane, like all other models of the Corsair, is equipped with a thrust-type exhaust collector. This type collector is frequently viewed askance by maintenance personnel and not without reason since such collectors have been a source of trouble on high performance aircraft. Perhaps a few words of explanation for the choice of this type of collector might help to erase the frowns brought on by the mere mention of a thrust-type collector.

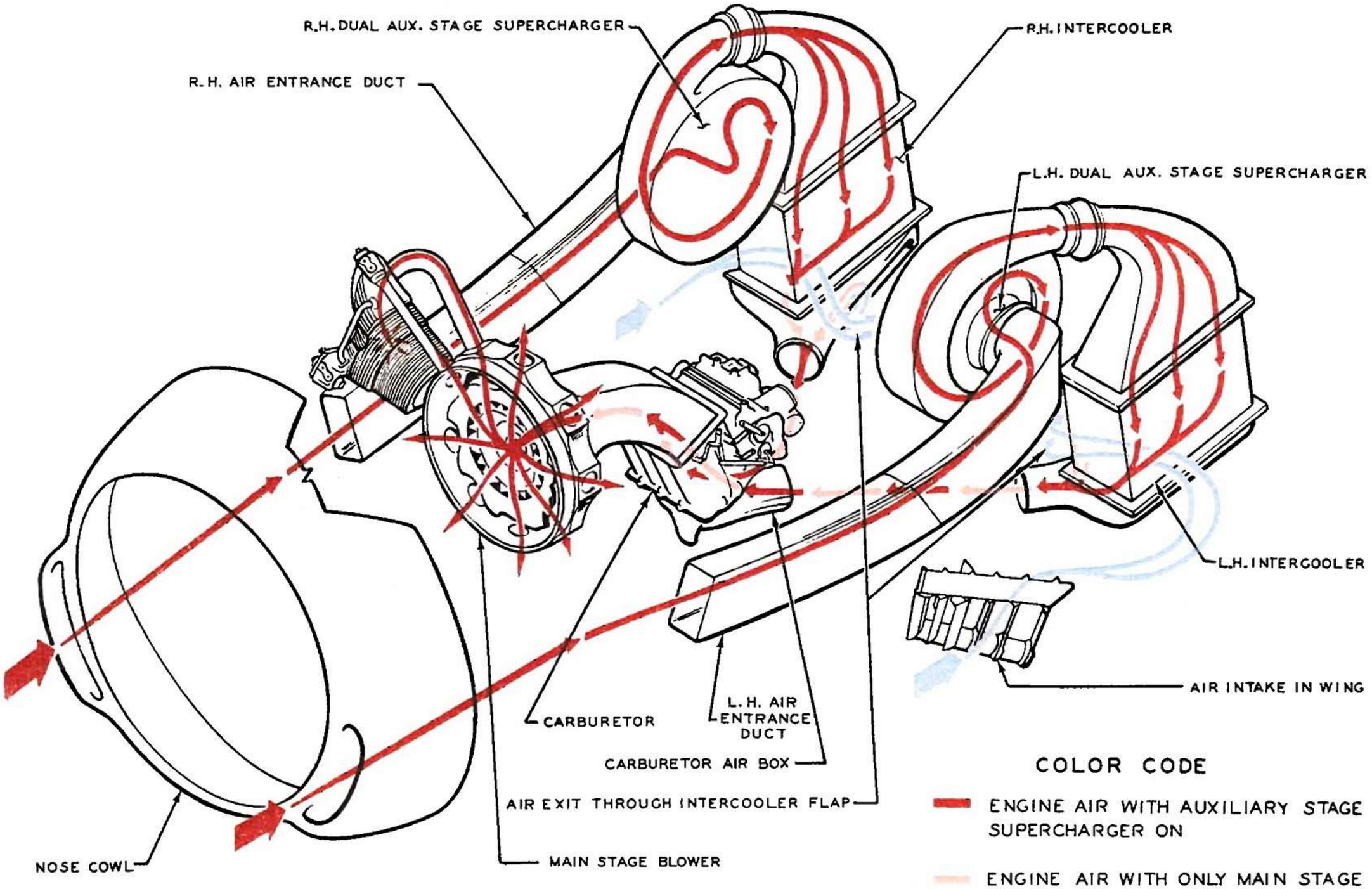
In effect, the thrust-type collector is a thrust augmenter and recovers from the exhaust, the equivalent of 500 brake-horsepower which represents approximately 30 miles per hour increase of speed at Vmax. Under the circumstances, it is hardly to be wondered that any attempt to "simplify" the exhaust collector meets with justified stubborn resistance on the part of aircraft manufacturers.

The design of the F4U-5 exhaust collectors reflects a number of improvements in design and construction. These improvements were made possible by a series of tests at high manifold pressures conducted by the contractor, NATC Patuxent, and NAMC Philadelphia. Improved flange design, method of support, heavier material and the judicious use of slip joints should improve the over-all performance of this collector.

air induction system

Functionally speaking, the induction system is the same as it has been for F4U-1 and F4U-4 airplanes. As can be seen from the accompanying illustration, however, the duct configuration is entirely different. Take-off air is ordinarily taken in through the screened entrance below each of the two intercoolers and flows directly to the carburetor whence it flows into the main stage impeller. When the auxiliary stage superchargers are in use, air is taken in through the nose-cowl ducts, compressed in the dual auxiliary stage superchargers, and cooled by passage through the intercoolers, after which the flow is similar to that which takes place at take-off; namely, the air flows into the carburetor and from the carburetor into the main stage impeller. No provision for air filters has been made; however, they may be retroactively installed, albeit not without some trouble and expense.

Ducts which are mounted on the engine proper are flexibly joined to ducts which are secured to the airplane, by means of molded rubber-impregnated bellows-type duct-connectors which are fastened with simple wrap-around flexible cables. The possibility of leakage at these joints has been minimized by making all duct terminals circular in section.



AIR INDUCTION SYSTEM

starting system

The starting system is conventional but provides one or two noteworthy improvements. For ease of operation, the starting and priming switches are in push-button form mounted side by side on the right-hand console in the cockpit. The direct-cranking electric starter is manufactured by Jack & Heintz and incorporates a novel quick-change device which permits removal of the starter from the engine in a very few minutes.

lubricating system

The lubricating system is basically the same as on the F4U-4. Each airplane is equipped with an oil dilution system by means of which engine lubricating oil may be diluted with fuel, if low temperatures are forecasted for the next flight to be made. The capacity of the oil tank is twenty-seven and a half gallons of oil plus an adequate foaming space. To assist in low temperature starting, the oil coolers have been connected in parallel rather than in series so that partially congealed oil may pass into both coolers simultaneously rather than through one cooler first and then through the second which is the case in the series system.

Although provisions have been made in the cockpit for the installation of an automatic oil cooler by-pass system, this device, which in the event of damage to either oil cooler would automatically by-pass that cooler, is at present unavailable for installation. The installation of this device at some future date may be readily accomplished, if this should become necessary.

fuel system

Like the F4U-4, the F4U-5 is equipped with a self-sealing pressurized main fuel cell with a capacity of 234 gallons. The main tank is pressurized to approximately 2½ pounds per square inch primarily for reasons of fuel economy. Since airplane fuel will boil under favorable temperature and pressure conditions, such as are encountered at altitudes in the neighborhood of 20,000 feet, pressurization is necessary to prevent excessive loss of fuel and reduction in radius of action by vaporization of the fuel and its consequent loss through the fuel vent line. The vapor pressure of the fuel itself is used to pressurize the fuel cell. The main fuel cell pressure dump control is located on the floor in the pilot's cockpit, adjacent to the right-

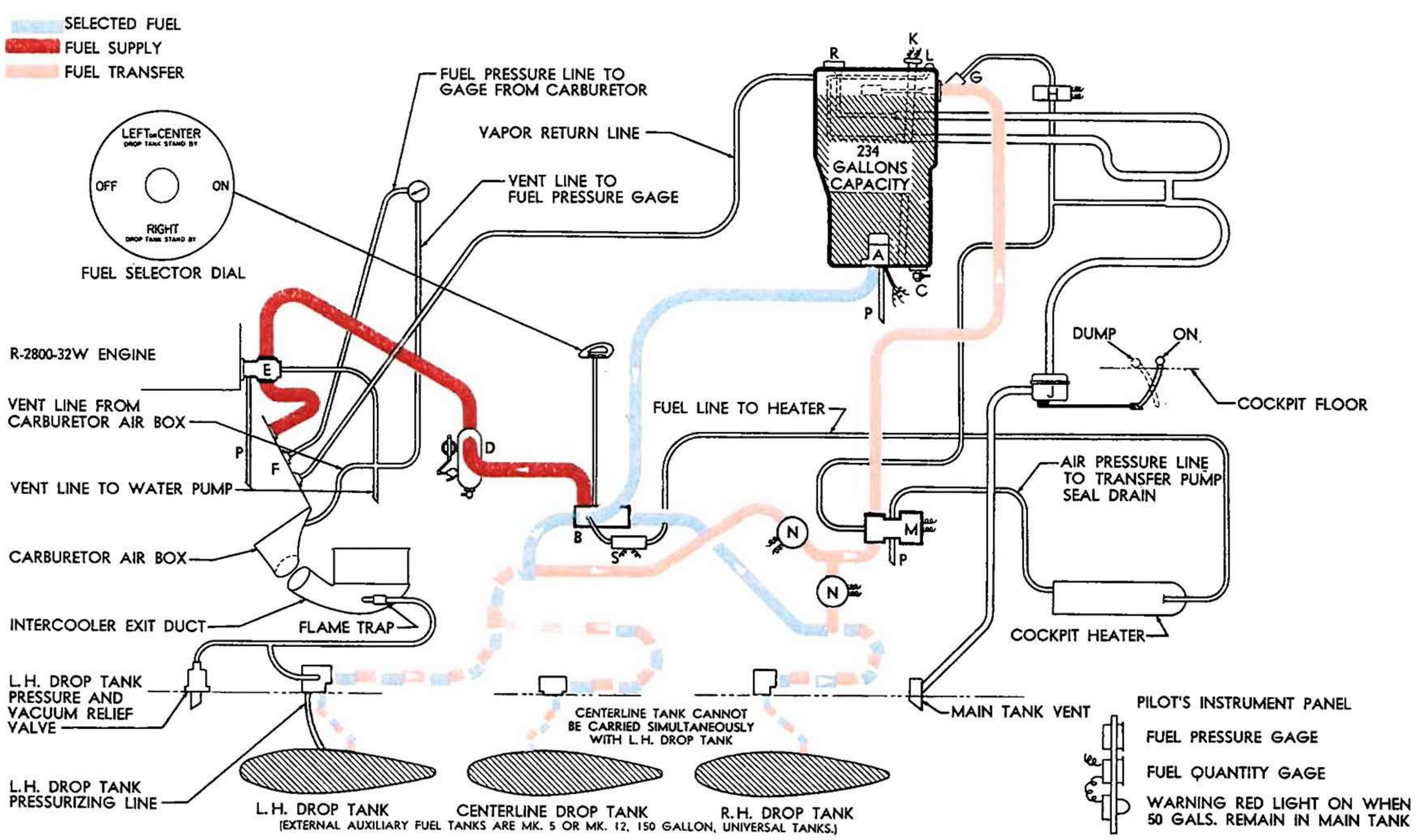
hand rudder pedal. In general, it is desirable for the pilot to dump the pressure from the main fuel cell during combat to avoid interference with the sealing characteristics of the cell.

The F4U-5 is furnished with three external stores-carrying pylons. The center-section pylons are identical to the latest type used on the F4U-4 with one exception and that is the inclusion of an auxiliary fuel tank pressurizing line on the left-hand pylon. A fuselage centerline pylon is provided for carrying loads up to 2000 pounds. This pylon was not available on the F4U-4. Mark 5 or Mark 12 external fuel tanks may be carried on pairs of pylons in the following combinations only: left and right wing pylons, or right and center pylons. Tanks cannot be carried simultaneously on the left and center pylons since to do so would have required a much more complex arrangement of valves and piping than was considered desirable.

fuel system management

With the exception of the main fuel-cell pressure-dump control described above, all fuel system controls are located on the left hand console. These controls consist of the main selector valve having "ON", "OFF", "RIGHT DROP TANK STANDBY" and LEFT OR CENTER DROP TANK STANDBY" positions, and switches for the auxiliary and fuel transfer pumps. There is nothing complex about the management of the F4U-5 fuel system if a few simple rules are observed. The first and perhaps the most important of these rules is that under normal circumstances the fuel selector valve handle should be in the "ON" position. The two standby positions on the selector valve are provided for emergency use only and should be used only in the event of failure of the fuel transfer system.

When the fuel selector valve is turned to its normal "ON" position, all fuel is supplied to the engine from the main fuel cell. With the selector in this position and the fuel transfer switch in a transfer position, the external auxiliary fuel tank being used is emptied by transferring its contents to the main cell which is kept full automatically during transfer until the auxiliary tank is empty. The fuel transfer warning light will warn the pilot when the auxiliary tank is empty. An auxiliary fuel pump is submerged in the main cell and discharges de-vaporized fuel into the main fuel line through a fuel strainer and thence to the engine-driven pump which forces the fuel at the proper pressure to the carburetor.



A. SUBMERGED AUXILIARY FUEL PUMP
B. FUEL SELECTOR VALVE
C. DEFUELING VALVE
D. FUEL STRAINER
E. ENGINE-DRIVEN FUEL PUMP
F. CARBURETOR
G. FLOAT SHUTOFF VALVE
H. TRANSFER INDICATOR PRESSURE SWITCH
J. FUEL CELL VENT VALVE
K. FUEL QUANTITY GAGE TRANSMITTER
L. VACUUM RELIEF VALVE
M. FUEL TRANSFER PUMP
N. FUEL TRANSFER SOLENOID SHUTOFF VALVES
P. SEAL DRAIN LINES (3)
R. FILLER CAP
S. HEATER SOLENOID SHUTOFF VALVES

Figure 5. Fuel System Schematic.

FUEL SYSTEM MANAGEMENT DIAGRAM

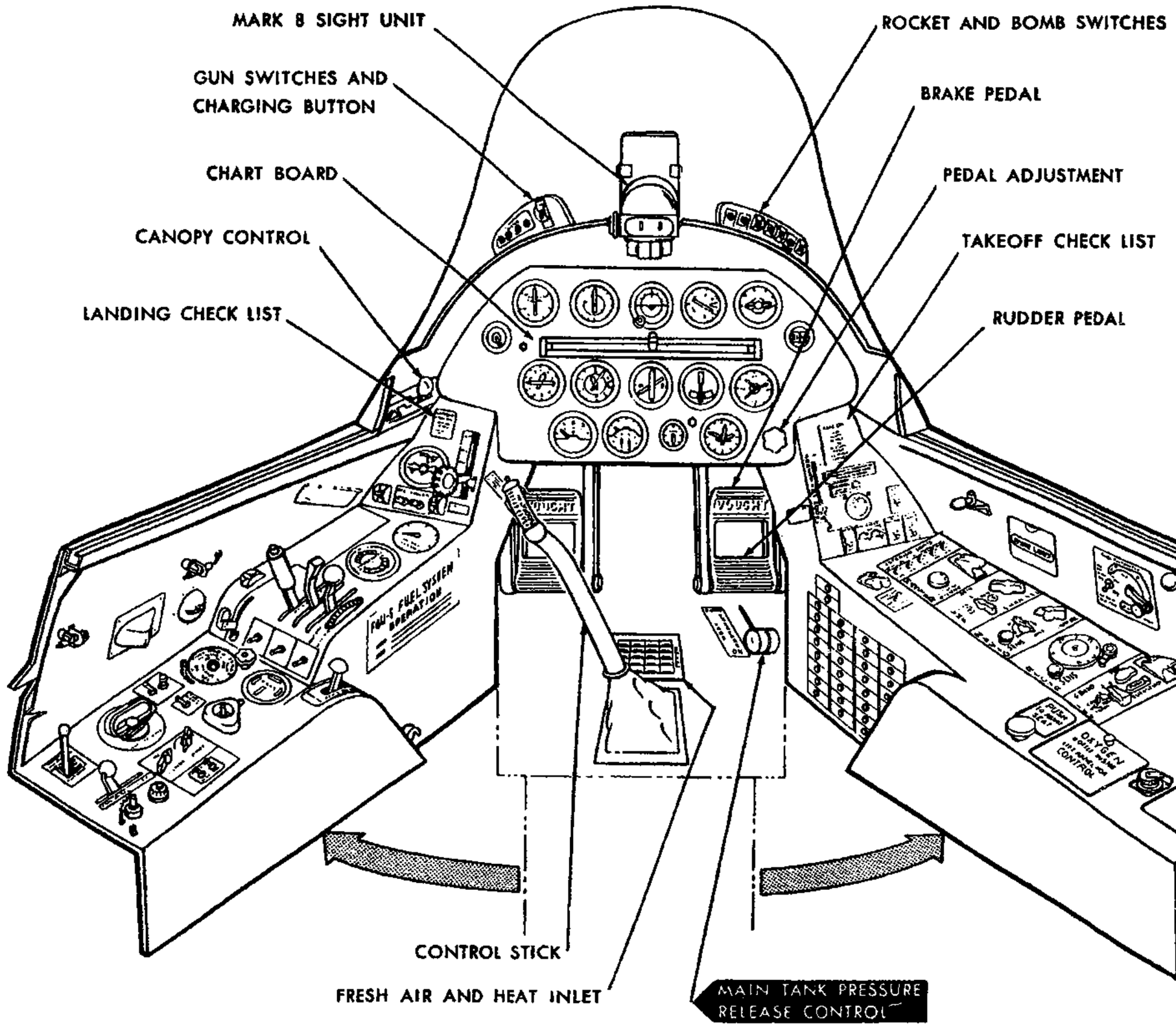
When the pilot has once turned on the fuel transfer system by selecting the proper tank with the three-way toggle switch, he need no longer concern himself with the transfer of fuel. Fuel from the selected external tank will be transferred to the main fuel cell until either the tank is dry or the main fuel cell is full. In the first instance the warning light will flash to warn the pilot that the tank is dry in which case he may either switch to the other external fuel tank, if another is carried, or he may turn the switch "OFF". The main fuel cell cannot be over-filled because of the action of a float-type valve within the main fuel cell which will automatically shut off fuel from the external fuel tank when the fuel in the main tank has reached the proper level. It should be noted, however, that the fuel transfer warning light will not indicate an empty auxiliary tank when the system is being operated with the fuel selector valve in a "standby" position.

cockpit

The secret ambition of every airplane designer is to provide living room comfort in a gadget-crowded fighter cockpit. The F4U-5 cockpit does not quite provide living-room comfort, but Chance-Vought has designed into it every known convenience to increase pilot comfort and effectiveness.

It was not always possible to design a comfortable airplane cockpit. Until quite recently very little was known about what constituted long-range comfort. It is now generally acknowledged that the factors that contribute to discomfort are lack of vision, poor arrangement of instruments and controls, uncomfortable seating, a crowded condition of the cockpit, and an excess amount of manual exertion required to fly or "fight ship." In addition to this there is the matter of improper fit of clothing and personal gear including parachute, shoulder harness, etc. What to do about these conditions was not always readily apparent; but from incessant research and study by service activities and private industry have come improvements in instruments, seating, and methods of control which contribute to make possible a reasonable semblance of comfort.

The F4U-5 cockpit has been designed to minimize flight fatigue in three ways: (1) by seating the pilot as comfortably as possible; (2) by relieving him



COCKPIT — FORWARD

of much operating detail through the incorporation of automatic controls; (3) by designing controls for easy manipulation and arranging them in logical groupings and locations.

Access to the cockpit has been simplified by the incorporation of a telescoping step on the right side of the fuselage. This step is below the folding step which is common to both F4U-4 and F4U-5 airplanes. Both steps are now cable-connected to the tail wheel and are automatically raised and lowered with the tail wheel. In addition, both steps may be closed and opened by deck personnel.

pilot's seat

The F4U-5 seat is a one-piece magnesium alloy bucket-seat with a high form-fitting back. The seat is adjustable through a vertical movement of 7 inches, 3-1/2 inches up and down from the neutral position. As the seat moves upward through its full vertical adjustment of 7 inches, it moves forward one inch. Seat adjustment is accomplished by depressing a knob on the right hand console adjacent to the seat.

The seat has a comfortable back-tilt of 17° with a back-resting angle of 101° between the bucket and the back. These angles do not change throughout the vertical adjustment of the seat. Maximum comfort can be insured by always using the SP-1 seat-pad and the BP-1 back pad on the parachute. These are aluminum pans covered with a thick layer of sponge rubber. They were developed by the Bureau of Aeronautics to improve comfort and reduce fatigue by offering positive, well-padded support to the seat and the small of the back.

As an added item of comfort, folding arm-rests have been installed on the seat. These can be folded down into place or flipped up out of the way easily when desired. It will be noted that the right hand arm-rest is toed inboard slightly. This was done in order to accommodate the pilot's right elbow when he is holding the stick in neutral.

The F4U-5 pilot's seat was designed to accommodate a seat-type parachute with quick-fit harness, PK-1 parakit, and the SP-1 seat pad. This gear stacks up to a height of approximately 10-1/2 inches. If the PK-1 parakit is not used, as may be the case during an over-land ferry flight, the ferrying pan with which each airplane is provided should be used in its stead in order to maintain the constant height of pack for which the seat was designed.

It was noted above that the seat moves forward one inch as it moves upward 7 inches. Although this is a logical seat movement, it is contrary to that of most seats in current use, consequently, it may be expected that some familiarization will be necessary. The pilot should try to bear this fact in mind when adjusting the seat so that, to as great an extent as possible, he may relieve the load on the back of the seat as he moves upward.

overturn headroom

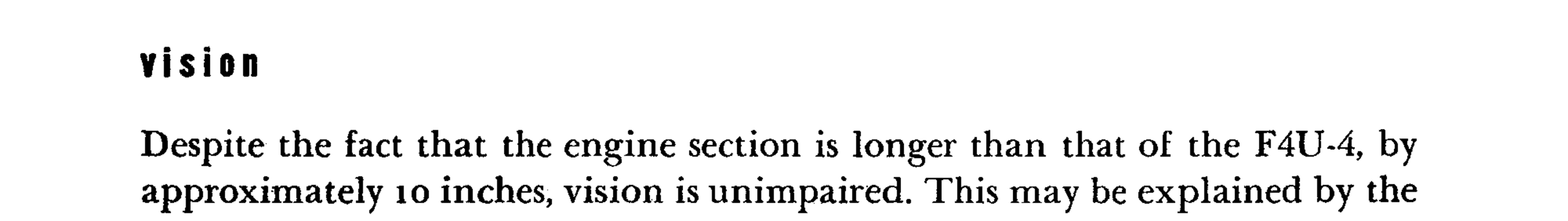
The F4U-5 has the roomiest cockpit of any airplane in the Corsair series. The canopy is similar to that used in the late F4U-4 airplanes (incorporated under MCR-168) and provides ample headroom for all pilots when properly seated at gunsight eye-level. The overturn line has been raised approximately 2 inches by the incorporation of a casting on the turtledeck below the sheet metal fairing.

leg-room

To permit the pilot to extend his legs and thus avoid muscle-cramping on long flights, the space between rudder pedals has been left open; no sub-instrument panel is used. Effective cockpit width is increased by the elimination of the hand hydraulic pump. In addition, the rudder pedals are the fold-down type which expose padded leg-rests on which the pilot may rest the calves of his legs. This feature was retained in the F4U-5 since it met with so much favor in F4U-4 airplanes. The rudder pedals themselves have a 6-inch fore and aft adjustment and are adjusted in unison by a single knob in the lower right corner of the instrument panel. A simple detent holds the knob and consequently the pedals in whichever position they are adjusted. Pulling the knob aft about 1/4″ releases the detent so that the knob may be turned.

vision

Despite the fact that the engine section is longer than that of the F4U-4, by approximately 10 inches, vision is unimpaired. This may be explained by the fact that the engine thrust-line has been tilted downwards 3° at the nose to improve longitudinal stability and trim. The upper engine cowl line was refaired to take advantage of this drooped engine with the result that F4U-5 vision is the same as in the F4U-4B, approximately 123 mils lead.



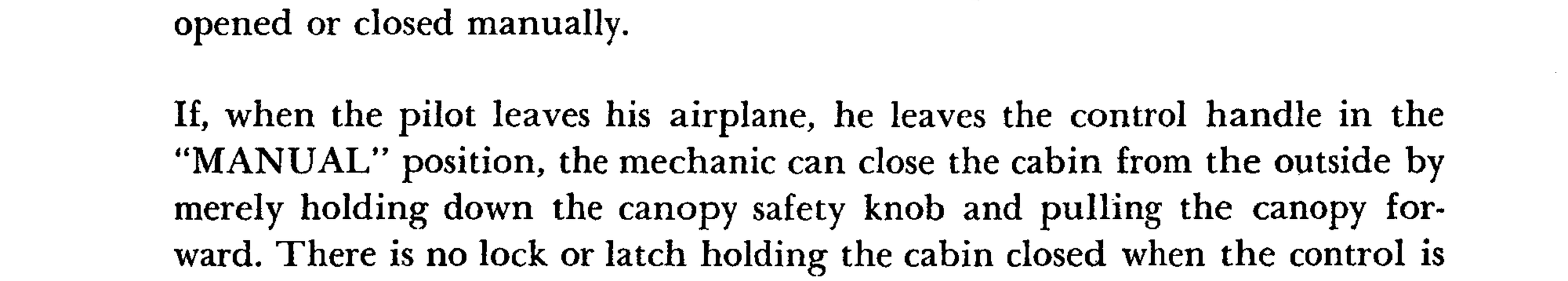
canopy control

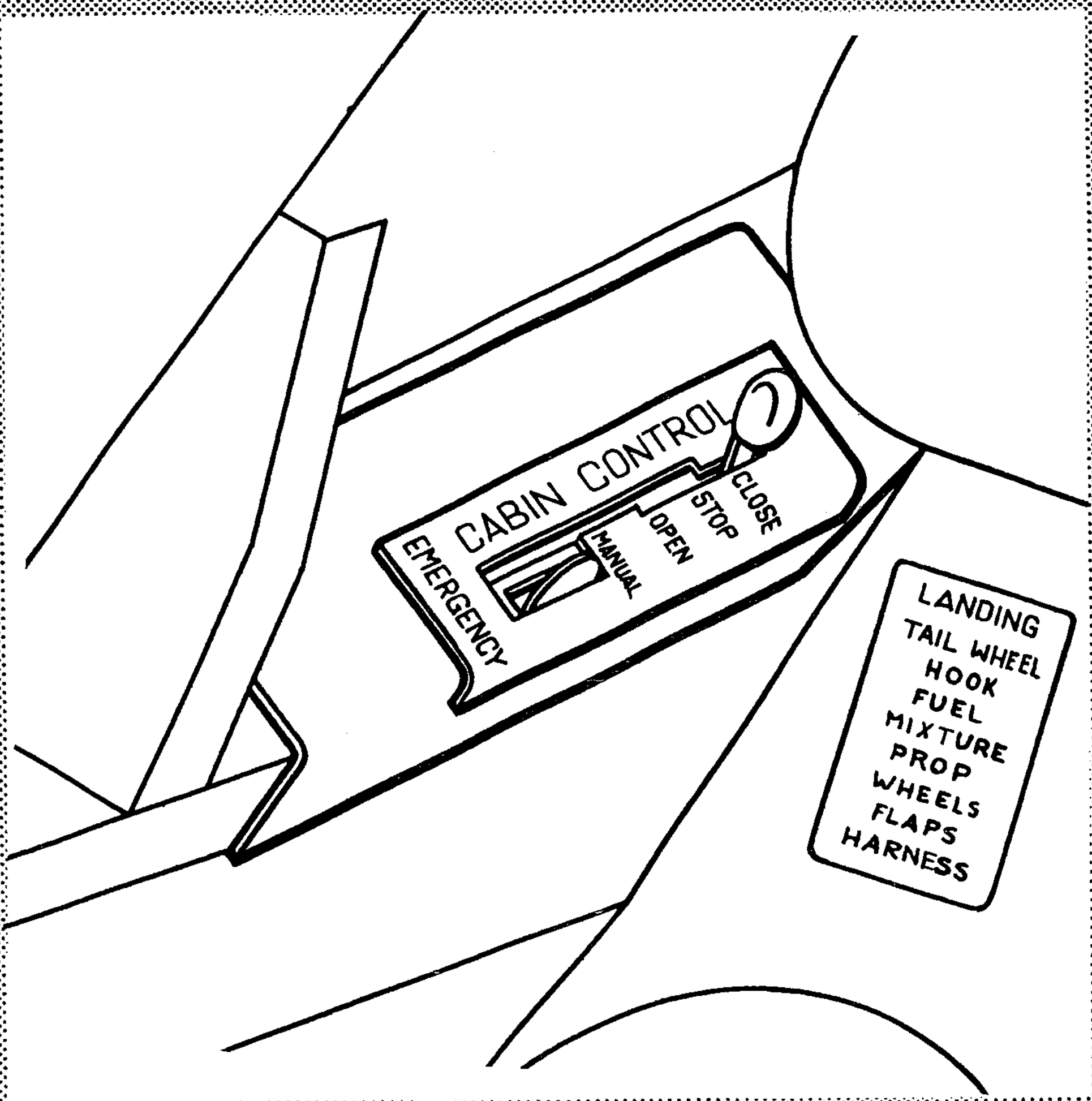
The pilot's canopy is normally opened and closed hydraulically. Under emergency conditions, when hydraulic power is not available, the canopy can be opened rapidly by means of a compressed air system. The canopy is locked in the fully open and closed positions by hydraulic pressure, and in any intermediate position by hydraulic fluid locked in the actuating cylinder.

The safety lock in the right hand track engages at all times when the canopy is in the fully open position. The lock is released automatically when the canopy is closed hydraulically. It must be released manually, however, by holding down the knob on the right side of the cockpit when the canopy is pushed closed by hand.

The canopy control handle is located at the forward end of the left hand side of the cockpit. The handle has five positions, reading from front to rear: "CLOSED", "STOP", "OPEN", "MANUAL", AND "EMERGENCY". The canopy is moved hydraulically to its full open or closed position by placing the control handle in either the "OPEN" or "CLOSED" position and leaving it there. The canopy is then held in the selected position by hydraulic pressure. The canopy is moved into intermediate positions by placing the handle in the "OPEN" or "CLOSE" position until the canopy reaches the desired position and then returning the handle to the "STOP" position and leaving it there. With the handle in the "MANUAL" position, the canopy can be opened or closed manually.

If, when the pilot leaves his airplane, he leaves the control handle in the "MANUAL" position, the mechanic can close the cabin from the outside by merely holding down the canopy safety knob and pulling the canopy forward. There is no lock or latch holding the cabin closed when the control is in the MANUAL position, however, the configuration of the tracks is such that the cabin will not roll open. An external manual release on the right side of the airplane below the windshield permits positioning of the cabin control handle in the MANUAL position for removal of a casualty.





PILOT'S CANOPY CONTROL

canopy emergency operation

At the request of the Bureau no provision has been made in the F4U-5 for jettisoning the canopy, instead a compressed air canopy emergency opening system has been provided. Compressed air is admitted to the hydraulic actuating strut in the same manner that is employed for emergency landing gear operation — action is rapid, the canopy will open in 3 seconds or less when the control handle is pulled aft past the thumb latch in the cockpit. The canopy air-bottle and pressure gage are readily accessible for inspection and refilling through the radio compartment access door.

instruments and secondary controls

The arrangement of instruments has been changed somewhat in keeping with changing concepts of instrument arrangements as well as to accommodate new type instruments and the sliding chartboard located below the top row of flight instruments. With the P-3 master direction indicator replacing the directional gyro and the more conventional remote indicating compass indicator, it has been possible to knit together more closely the six primary flight instruments. The F4U-5 employs a pitot tube and static vent for air speed measurement. The airspeed indicator is or will shortly be of the type that indicates maximum permissible airspeed for any given pressure altitude.

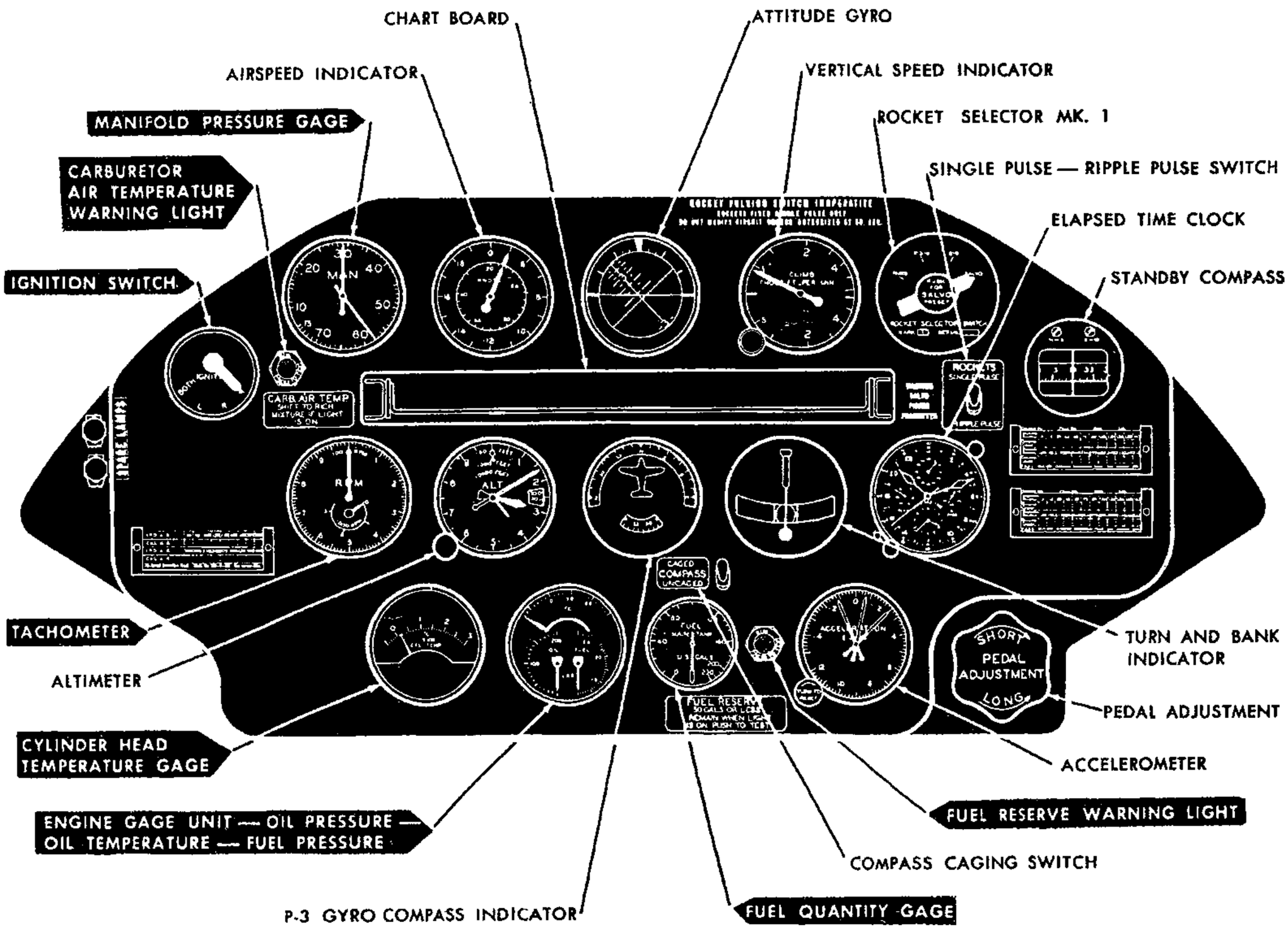
compass

Directional indication is provided in the F4U-5 by the P-3 gyro flux gate compass, a remote indicating gyro-stabilized earth inductor compass system. By locating the compass elements in a transmitting unit which can be mounted at a distance from magnetic and electric interference, the effect of these disturbances is minimized. By stabilizing the compass element beneath a gyro, the unit is maintained in a horizontal position at all times. Erratic compass behavior during turns, climbs, and dives is overcome by these means and all tendency of the compass to oscillate in rough air is prevented.

The gyro assembly is designed to allow the gyro 110° of freedom in bank and 70° in climb or dive. Maneuvers exceeding these limits will cause the gyro to be forced from its vertical position.

To prevent damage when not in use, the gyro should be caged when power to the system is off and during maneuvers which are likely to exceed 70° in pitch or 110° in bank.

The caging mechanism also affords a means of quickly erecting the gyro from positions greatly off the vertical. By caging and then uncaging it, the gyro will at once be brought to an approximately vertical attitude and released in that position. This process should be adopted after returning to normal flight if the gyro is forced from the vertical while in the uncaged position as a result of maneuvers exceeding maximum tolerances in pitch or bank or if the gyro should have tumbled for any other reason.



chartboard

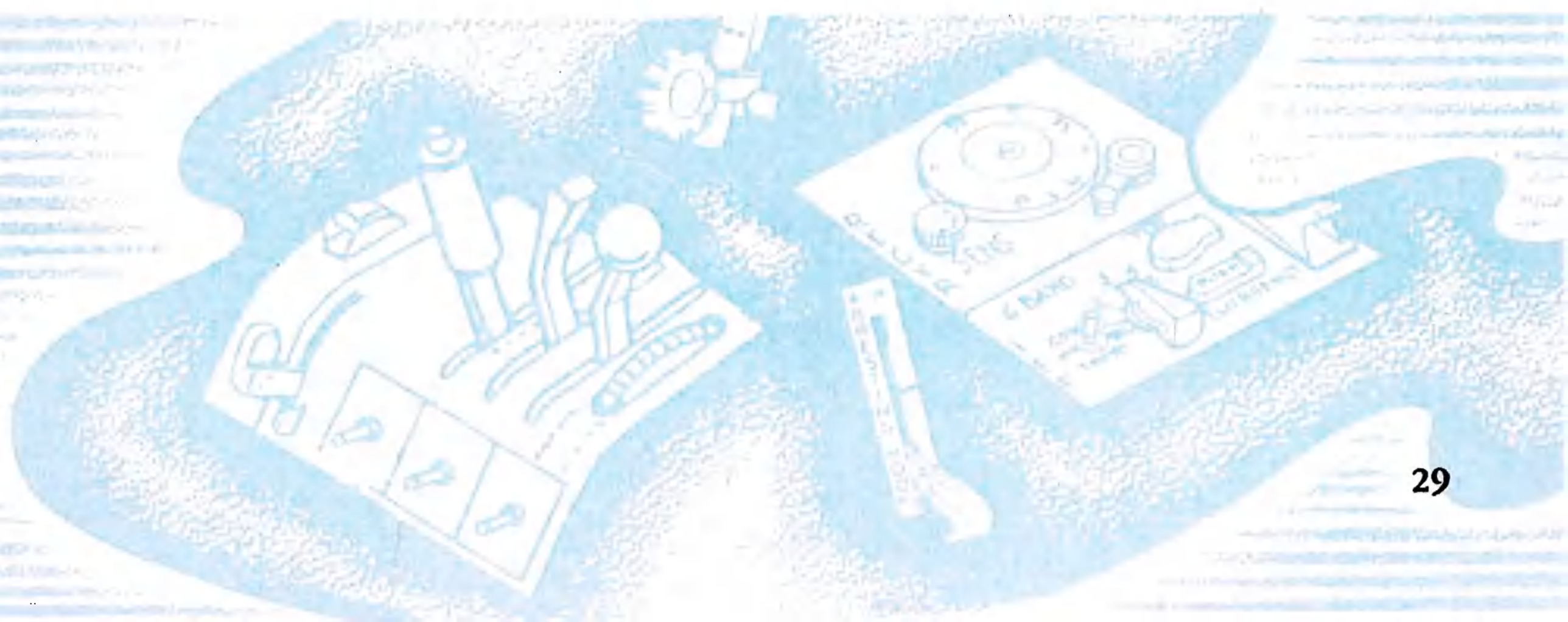
The F4U-5 is provided with a Mark 6a chartboard. With the pilot's convenience uppermost in mind, the chartboard has been stowed in a sliding tray which passes through a slot in the instrument board. By simply raising the catapult latch which protrudes beyond the edge of the tray, the chartboard may be pulled aft into the ready position. The chartboard is stowed with a vigorous push and the catapult latch automatically retains it in the stowed position. The installation is rugged and needs no babying. Four small spring clips, protruding through the plastic chartboard, retain it in the tray. The chartboard may be readily removed for briefing by pushing upward on it through the large hole in the bottom of the tray.

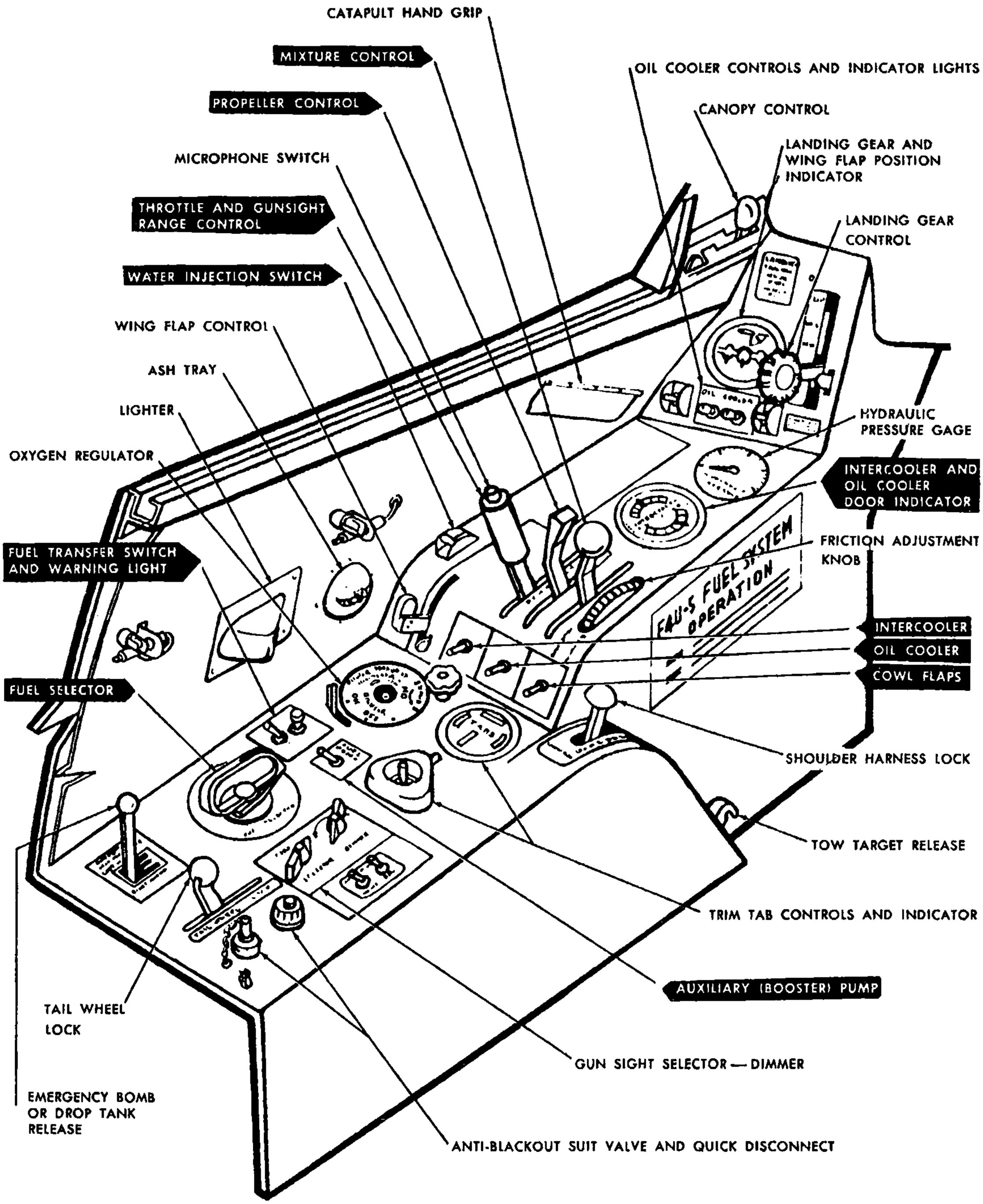
console installations

Further progress in the evolution of the ideal fighter cockpit is exemplified by the console installations in the F4U-5 cockpit. Smoothly integrated and uncluttered in appearance, this equipment should contribute much to the pilot's peace of mind and effectiveness.

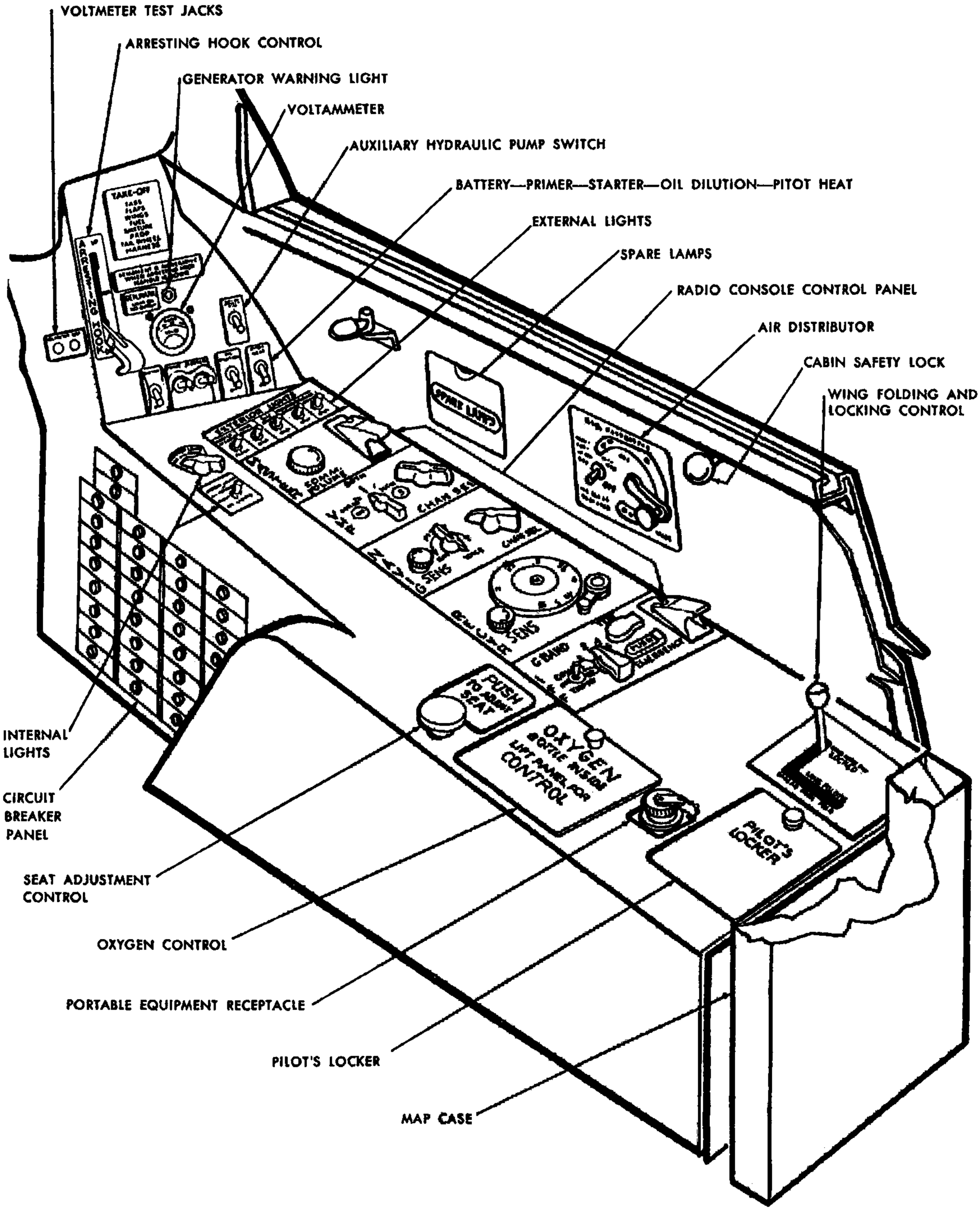
In some instances the equipment used as well as the arrangement of equipment on the consoles differs from that in the F4U-4. For example, it will be noted that the wing-fold control is now on the right hand console whereas in the F4U-4 it was on the left hand side. Similarly with the arresting hook control, which has also been transferred to the right hand side of the airplane. All arrangements closely follow the recommendations of the Navy Cockpit Panel. Wherever possible, controls and related indicators are adjacent to each other and the consoles themselves are closer to the pilot's hand than ever before. Simplicity of control is the keynote in the F4U-5 cockpit.

A single handle suffices for the manual pylon release control despite the fact that the airplane is now furnished with three pylons. Notwithstanding this, the external store carried on each of the three pylons is still individually jettisoned by selection of the appropriate slot in the control panel. Emergency operation of landing gear, wing flaps, and the pilot's canopy enclosure are all accomplished by use of the same handle which is used for normal actuation. In each of the instances mentioned, the emergency operation is brought about by extended movement of the control beyond the last normal position in the control quadrant; for example, emergency extension of the landing gear requires movement of the control beyond the full down position. Inadvertent emergency operation is in each case prevented by the installation of an adequate guard or thumb latch.





COCKPIT — LEFT SIDE



COCKPIT — RIGHT SIDE

landing gear operation

Incidentally, with regard to landing gear emergency operation, the CO_2 system has been abandoned in favor of compressed air which permits the use of a pressure gage for visual inspection of air bottle pressure and eliminates the necessity for removal of the bottle for weighing purposes. Refilling the air bottle after use is also readily accomplished without removal of the bottle from the left wheel well.

While on the subject of the landing gear, it may be mentioned that a mechanical safety down-lock has been provided in the F4U-5, which, it is felt, will effectively prevent inadvertent landing gear retraction on the ground. This down-lock is located on and operates from the landing gear lock-links and has no effect whatsoever on the positioning of the cockpit control handle. In its operation this mechanical lock prevents retraction of the landing gear until the oleo struts have been extended to within one inch of their fully extended length.

It might be well at this point to extend a word of caution with regard to landing gear operation. Pilots finding that the mechanical safety down-lock effectively prevents landing gear retraction while on the ground might be tempted to utilize it in making "jump" take-offs, an operation in which the control handle is moved to the "UP" position while taxiing so that the gear is quickly retracted as soon as the wheels leave the deck. The design of the lock is such that this obviously risky maneuver is prevented. If the landing gear control handle is placed in the "UP" position while the aircraft is still on the ground, the retracting mechanism will be blocked so that it will be necessary to repeat the operation by first moving the handle to the "DOWN" position and then to the "UP" position. Attempts to short-cut the normal procedure are definitely not recommended.

By utilizing an electrical landing gear and flap position indicator in the F4U-5 it has been possible to locate the actuating micro-switch on the landing gear in such a manner that the indicator not only indicates landing gear "down" but also indicates landing gear "down and locked". Heretofore this has not been possible because of the fact that mechanical indicators have been employed.

other controls

Chance Vought's philosophy with regard to the pilot's convenience and comfort is further typified by a number of other installations in the cockpit. The anti-blackout suit valve and receptacle, and the shoulder harness lock lever, both essential for the pilot's safety are near at hand and easy to reach. A completely integrated power plant control unit includes the throttle, propeller and mixture control levers, master water injection switch, cooling flap switches and indicator, and immediately adjacent to these the fuel transfer and auxiliary pump switches.

trim tabs

Another first in Corsair design is the electrical trim tab control conveniently close to the pilot's left hand. The controller unit and associated indicator provide an effort and space-conserving means of quickly and accurately positioning the trim tabs. As usual, trim tab areas and maximum deflections have been designed so that tab forces with the tabs in either extreme position may be readily over-powered during take-off operations by use of the normal controls.

In addition to electrical trim tab actuation, the rudder and elevator tabs incorporate a spring mechanism by means of which these trim tabs are automatically deflected to assist in control operation when air loads reach certain high values. Consequently, it will be found that changes in rudder and elevator forces with changes in speed, stick forces required during dive recovery, and forces required during high speed maneuvering will be conveniently reduced. By the same token, the introduction of the spring tabs will aid in spin recovery. No spring tab installation has been provided for the aileron tab which retains its linked balance tabs in addition to the electrically operated trim tab.

oxygen system

The F4U-5 is one of the first airplanes to be equipped with the composite console-mounting type of oxygen regulator. This regulator combines in a single unit the regulator, pressure gage, and flow indicator.

(Note: This new type regulator may not be installed in early F4U-5 airplanes in view of its unavailability; however, provisions have been made to install it retroactively as soon as the government-furnished equipment required becomes available.)

The oxygen breathing hose is conveniently stowed in a compartment under the pilot's seat. The method of stowage is such that the hose is practically self-retracting. The oxygen bottle has been placed in a convenient location under the right hand console. Access to the valve may be had by opening a small panel in the console and reaching within. The bottle need not be removed from the airplane for refilling. Provisions have been made so that it may be filled from a central supply while remaining in the airplane.

arresting gear

Located on the forward inclined portion of the right hand console is the arresting gear control. To facilitate identification, the control knob is in the form of an arresting hook head. Unlike other airplanes in the Corsair series, the F4U-5 arresting hook is not hydraulically operated. Instead the installation, which is of the mechanically latched-up type, depends on the tail wheel for retraction. The interconnection between the arresting gear and the tail wheel is such that when the arresting gear handle is placed in the "DOWN" position, the mechanical latch is unlocked permitting the arresting hook to extend, but only after the tail wheel has been extended. When the airplane is clear of the deck gear, the hook man manually raises the arresting hook to the "park" position. In this position the arresting hook clears the deck by approximately 12 inches. Upon subsequent take-off and landing gear retraction, the arresting hook is also retracted with the tail wheel; however, it will be retained in the "UP" position when the tail wheel is extended only if the hook control in the cockpit is first placed in "UP".

In the event of a carrier wave-off if the landing gear is retracted, the arresting hook is automatically retracted regardless of the position of the hook handle. However, the hook will again extend when the landing gear is subsequently extended unless in the meantime the arresting hook handle has been placed in the "UP" position.

check-off lists

The F4U-5 is furnished with illuminated landing and take-off check-off lists. The landing list on the left hand side and the take-off list on the right hand side are illuminated when the interior lights switch is positioned in the "ALL LIGHTS" position.

wing folding

Wing folding has also been improved in the F4U-5. It is now possible to spread or fold the wings in 20 seconds or less in winds up to 50 knots from any direction, up to 45° from ahead. The wing folding control is also new. Located on the right hand side of the cockpit toward the aft end of the console, it is comprised of a single lever which performs the fold, spread, and locking operations. When spreading the wings, the handle is moved forward to "SPREAD" and outboard to "WING HINGE PIN LOCKED". During this operation it is not necessary to depress the button atop the lever. However, when folding the wings by moving the handle inboard and aft, it is necessary to hold the button depressed until each of two stops is passed. The indicator flags located in the valley of the center section denoting that the wings are fully spread and locked are the same as those used in the F4U-4 airplane.

wing flap control

The wing flap control lever is mounted on the power control quadrant outboard of the cooling flap switches. The control is furnished with click detents at each ten degrees of flap movement from full "up" to full "down" which is 50°. As mentioned elsewhere, extended operation of the normal control handle, which is possible by movement of the thumb latch, provides for emergency extension of the wing flaps. This emergency extension is brought about by introducing into the flap actuating cylinder a reserve supply of hydraulic oil by use of an electrically driven auxiliary hydraulic pump. The act of placing the control handle in the "EMERGENCY" position automatically seals off the entire hydraulic system, with the exception of the wing flap circuit, so that the reserve supply of oil is made available for wing flap extension only. At the same time, the auxiliary hydraulic pump is started.

auxiliary hydraulic pump

The electrically driven auxiliary hydraulic pump may be used in the same manner in which the hand-operated hydraulic pump was used in previous models of the Corsair. When it is desired to use this pump for so-called normal operation, the switch on the right hand console outboard of the voltammeter is employed. Typical operations for which this pump might be used are folding and spreading of the wings prior to starting the engine, operation of gun chargers, cooling flap and wing flap operation, and landing gear operation when the airplane is supported on jacks or from a hoist. When the auxiliary hydraulic pump is to be used extensively, it is well to plug in an external source of electrical power to avoid excessive battery drain. Operations performed with the auxiliary hydraulic pump will, of course, take much longer than when performed with the engine driven pump by reason of the smaller capacity of the former.

armament and armor protection

The F4U-5 is powerfully armed with four M-3 (T-31) 20mm guns — two in each outer panel. A total of 924 rounds of ammunition is provided for the four guns. Gun charging is accomplished by an electro-hydraulic charging system and what is equivalent to "push-button" control. The gun control switches are located in the left hand armament switch box which is mounted on the windshield cowling. When landing aboard a carrier, the pilot should safety his guns by moving the charging switch to the "SAFE" position and moving the master armament switch to the "OFF" position. However, should he forget to do this, his oversight will automatically be corrected by the act of placing the arresting hook control in the "DOWN" position. The master armament switch, which is really a combination switch and circuit breaker, will be tripped and returned to the "OFF" position and the guns will be charged and left in the "SAFE" position.

Guns are heated by thermostatically-controlled electrical heating pads affixed to each gun. These are set to operate at 70° ± 5°F and require no attention from the pilot.

fire control system

The F4U-5 will be the first airplane to be completely equipped with a lead-computing gunsight that includes rocket aiming provisions to aid the pilot in gunnery and rocket firing problems. This system is known as the Mark 6 Mod. 0 gunfire control system. It is an improvement over the Mark 23 gunsight. Controls for this gunfire control installation consist of a ranging throttle grip and a series of switches on a panel on the left hand console. (Note: Early F4U-5 airplanes may be delivered without the twist grip ranging control installed due to the unavailability of this and certain other items of government-furnished equipment. However, this equipment will be retroactively installed as soon as it is available.)

When the system is aligned for use of the gunsight, the equipment operates as a gyroscopic lead-computing sight of the reflector type for aiming the fixed guns of the aircraft. During an attack on an aerial target, the system computes and indicates to the pilot the lead which must be allowed to compensate for the relative motion of the target and the time of flight of the bullet. With the system controls set for fixed-gun use, the flight line is automatically corrected for trajectory errors that occur with altitude changes and for sighting errors due to the operating temperature of the sight unit.

When the system controls are set for the use of equipment as a rocket sight, the system will provide the pilot with a sight line which is corrected for wind and target motion, angle of attack, launcher angle, and sight parallax. The system permits the pilot to select the high dive angle (35° and above) or a low dive angle (35° and below) as best suited for the mission. The rocket circuits of the system are designed for air-to-ground operations, using 5-inch high velocity aircraft rockets (HVAR). The pilot is required to maneuver the aircraft so that the reticle image remains on the target and in doing so causes the system to compute a straight line which in effect follows the trajectory path of the rocket. After uncaging the gyro, 4 seconds are required for the system to compute the correct sight line. Since the sight line in effect follows the trajectory path of a rocket and the flight path of the airplane follows the same path, a rocket released will hit the target.

external stores

F4U-4's were equipped with two external stores carrying pylons. The F4U-5

has, in addition to these two pylons, a centerline pylon. All three pylons may be simply and rapidly removed by the ground crew. Employing these external stores-carrying pylons, the F4U-5 may perform a wide variety of missions. The wing pylons are capable of carrying loads up to and including 1600 lbs. and the centerline pylon may carry as high as 2000 lbs. Bombs, drop tanks, and the 11.75" aircraft rocket are among the external stores which may be carried on these pylons. All stores that are carried on the three external pylons are released from the airplane by depressing the bomb button atop the control stick after activating the appropriate control switches in the right hand armament switch box on the windshield cowl. In addition to electrical release, each of the stores carried on the external pylon may be released mechanically in the safe condition by use of the manual control lever located at the aft end of the left hand console.

As noted on one of the preceding pages, the F4U-5 may be catapulted with practically any load that can be installed. However, catapulting with napalm bombs, that is, Mark 5 or Mark 12 drop tanks having fins, is considered inadvisable due to the lack of adequate ground clearance. Collapsible fins of Chance Vought design may be purchased to overcome this condition if it should be necessary to fly with napalm bombs from aboard carriers.

rockets

The F4U-5 is equipped to carry eight 3.5" or 5" HVAR, four under each outer panel. It is intended that rockets shall be carried on the Mark 9 Mod. 3 launcher only, in order that adverse rocket blast effects shall not be encountered. Although a selector switch has been provided in the cockpit to permit selection between "single pulse" and "ripple pulse" firing, this switch has been made inoperative at the request of the Bureau and all firing is done under "single pulse", either singly or in pairs as selected by the pilot on the rocket selector switch. Salvo firing is prohibited at all times.

armor

Armor protection in the F4U-5 is practically the same as that provided in the F4U-4. The pilot's head armor is 5/16 thick homogeneous steel whereas the back armor plate is 1/2" thick aluminum alloy. The usual bullet-resisting glass has been provided in the windshield. Structural provisions for supporting armor-plating to protect the lower 90° of the engine and accessory compartments have been made in all airplanes; however, the airplanes will be delivered without armor installed.

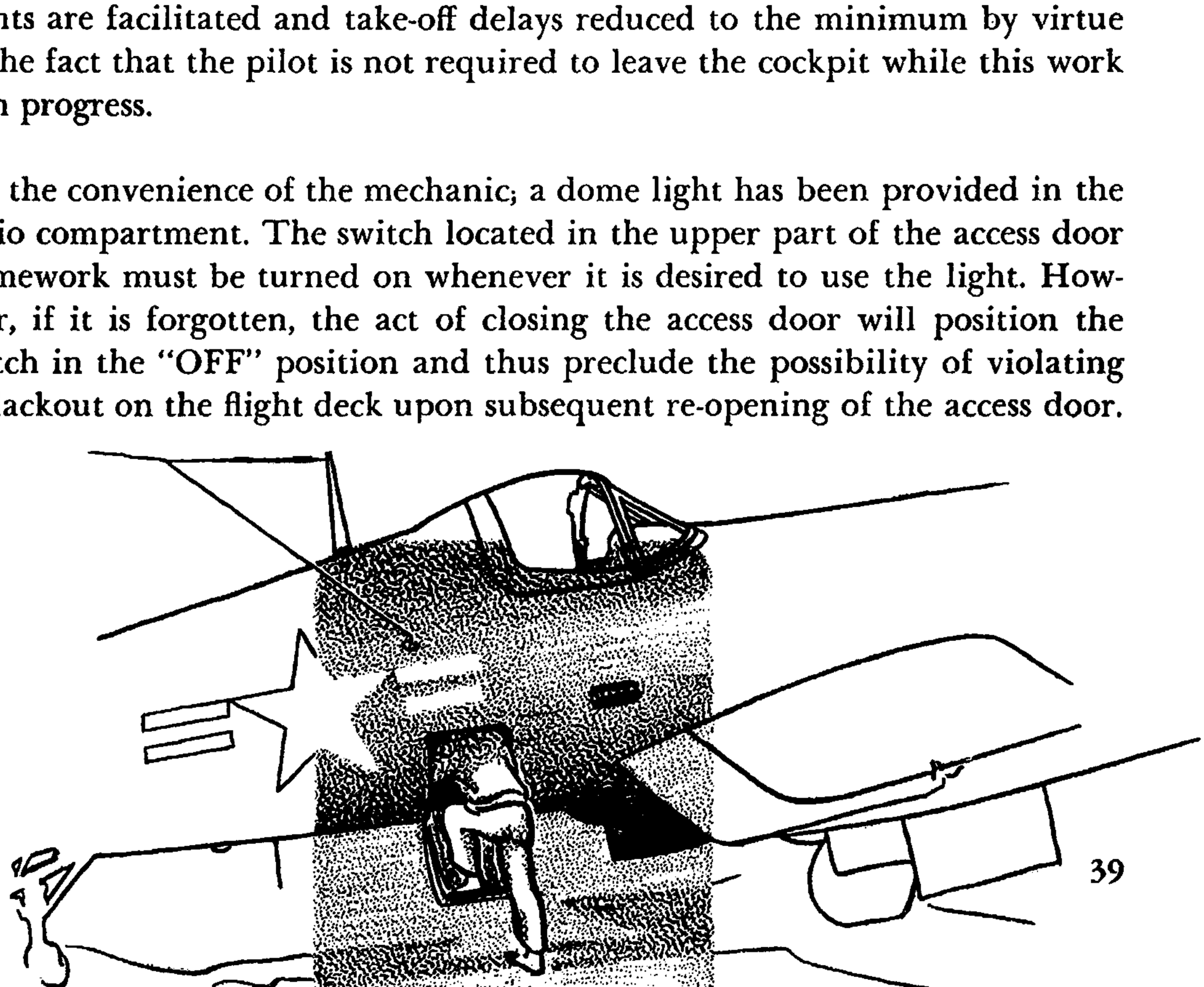
communication and associated electronic equipment

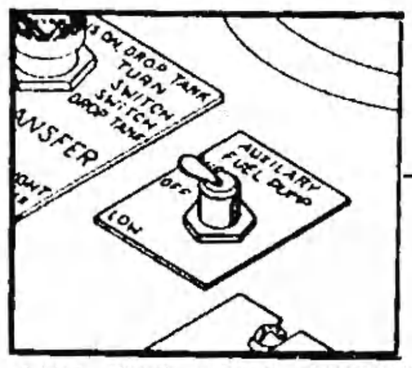
The F4U-5 is equipped with the following communication and identification equipment.

TYPE	DESIGNATION	USE	REMARKS
VHF	AN/ARC—1	2-WAY VOICE COMMUNICATION	FREQUENCY RANGE 100 TO 156 MEGACYCLES
RANGE RECEIVER	AN/ARC—5	LOW FREQUENCY RANGE RECEPTION	FREQUENCY RANGE 190 TO 500 KC.
NAVIGATION EQUIPMENT	AN/ARR—2A	NAVIGATION RECEIVER	FREQUENCY RANGE 234 TO 258 MEGACYCLES
IFF	AN/APX—1	IDENTIFICATION	

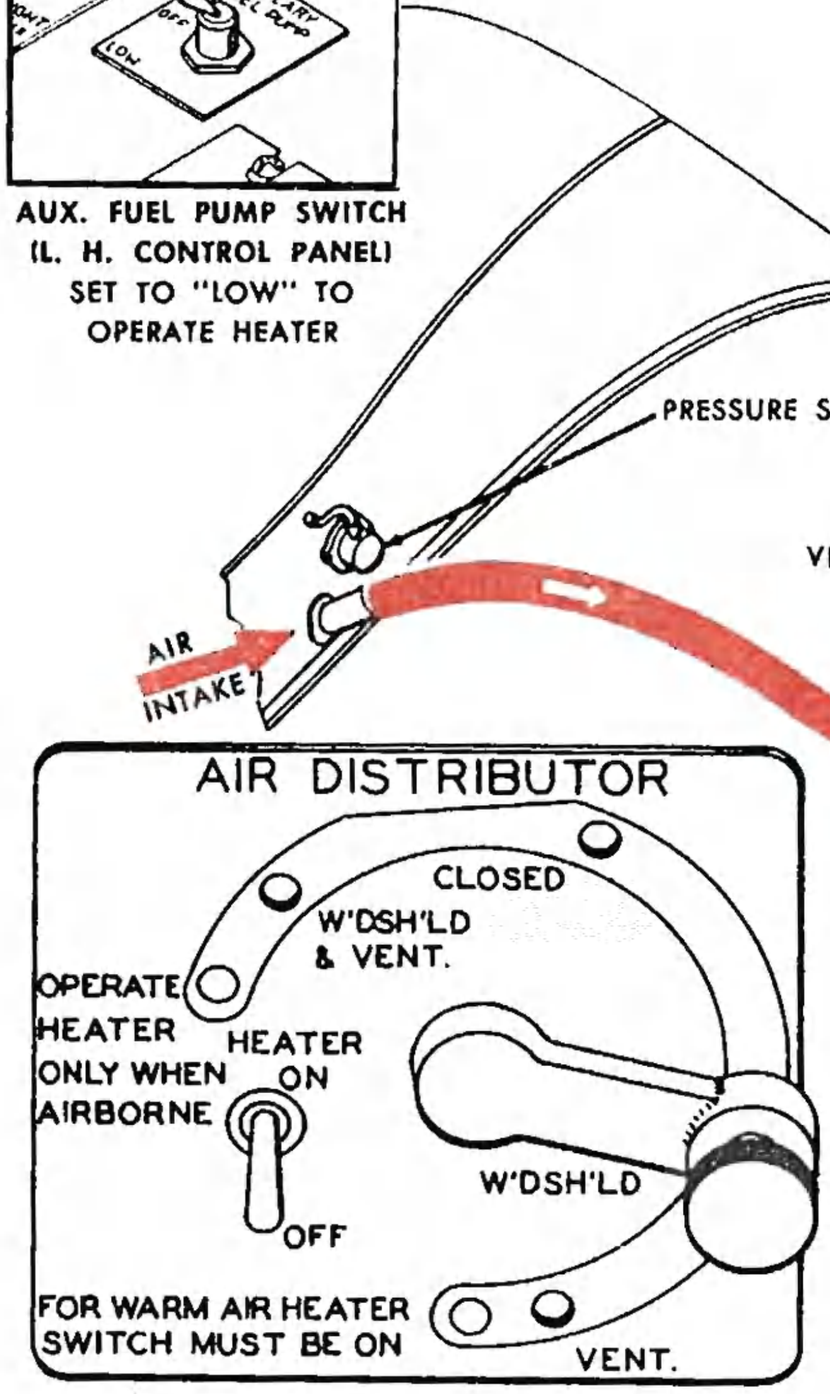
Radio equipment is housed in a compartment, aft of the cockpit, where the various pieces of equipment are stacked in orderly fashion on Metalite shelves. Entrance to this compartment is obtained through a large door in the right hand side of the airplane. Last minute adjustments and replacements are facilitated and take-off delays reduced to the minimum by virtue of the fact that the pilot is not required to leave the cockpit while this work is in progress.

For the convenience of the mechanic; a dome light has been provided in the radio compartment. The switch located in the upper part of the access door framework must be turned on whenever it is desired to use the light. However, if it is forgotten, the act of closing the access door will position the switch in the "OFF" position and thus preclude the possibility of violating a blackout on the flight deck upon subsequent re-opening of the access door.





AUX. FUEL PUMP SWITCH
(L. H. CONTROL PANEL)
SET TO "LOW" TO
OPERATE HEATER



heating, ventilating, and defogging

The F4U-5 is provided with an integrated heating, ventilating, and defogging system. Heat is provided by a 50,000 BTU Janitrol heater located aft of the pilot's cockpit. Fresh air is taken in through a leading edge duct opening passed through the heater and emitted into the cockpit through a floor grille just forward of the control stick. This grille is provided with two treadle wheels. The right hand wheel controls the quantity of air entering the cockpit and the left hand wheel controls the deflector angle making it possible to aim the stream of incoming air at any part of the pilot's face or body or to deflect it forward of the instrument panel. The air distributor control and heater switch are located on a small panel recessed in the right hand cockpit liner. By properly positioning this handle, it is possible to direct air, cold or heated, to the

windshield and floor grille, to the floor grille alone or to the windshield alone, or to shut off the supply of air entirely.

To start the heater in operation, regardless of the position of the air distributor handle, it is necessary to close the switch on the air distributor panel and place auxiliary fuel pump switch on "LOW". Since the heater requires ram air for operation, the system has been so arranged that the heater will not start until the airplane is airborne. However, no harm will be done if a pilot, forgetting this, closes his heater switch while on the deck.

general improvements and conveniences

The F4U-5 hydraulic system pressure is 1500 p.s.i. compared with a nominal 1000 p.s.i. in the F4U-4. A variable displacement engine-driven pump permits the elimination of the accumulator and unloader valve which were employed in the F4U-4. Practically all hydraulic cylinders incorporate leather back-up rings to prolong packing life and minimize leaks. Most of the struts incorporate in one piece the cylinder barrel and the upper end cap. The lower cap is of the clamp type rather than the threaded type. This helps to minimize the possibility of eccentricities due to the presence of incorrectly cut threads. As mentioned previously, the hand hydraulic pump has been replaced by an electric motor driven auxiliary pump.

For the comfort and convenience of the pilot, a pop-out type cigarette lighter and an ash tray have been provided in the left hand cockpit liner.

The F4U-5 baggage compartment is more or less identical to that in the F4U-4. However, access to the baggage compartment is greatly improved by virtue of the fact that the F4U-5 incorporates a large size access door in the right hand side of the fuselage making it possible to stand inside the fuselage while stowing or extracting baggage from the compartment. The door is opened without tools by pressing four quick-opening latches.

the night fighter (F4U-5N)

The F4U-5N is equipped with the AN/APS-19 search radar installation. The scanner and the receiver-transmitter are housed in an underslung nacelle on the right hand outer panel, while all other equipment connected with the search radar is installed within the fuselage on Metalite shelves in the radio compartment. The airplane is also equipped with the AN/APN-1 radio altimeter, the APX-2 IFF, and a second ARC-1 VHF installation which is used in connection with the ARC-28 relay system.

The F4U-5N is equipped with the all-electric Eclipse-Pioneer P-1 automatic pilot installation. Complete control of this automatic pilot is obtained by use of the controller located on the right hand console at a convenient height. The automatic pilot is coupled into the control system simply by the flick of a switch and pressure on a knob. Disconnecting the automatic pilot from the system is no more complicated; however, it is good to know that the automatic pilot may be manually overpowered by the human pilot with the normal airplane controls. Obviously, in the event of failure of the automatic pilot to disengage from the airplane controls by normal procedures, it would be unreasonable to expect the human pilot to fight the controls for an extended period of time. Therefore, a manual declutching control has been provided on the inboard side of the left hand console. A pull of approximately 25 lbs. on the upper end of this control lever will break the safety wire which secures the lever in the forward position and will positively disconnect each of the three servo motors in succession. When the handle is released, it springs forward out of the way. Upon return to base, a member of the ground crew should manually re-engage each of the three servo motors with its disconnecting clutch and re-safety-wire the control handle in its forward position, after the difficulty has been corrected.

Some rearrangement of the instrument panel was necessary in the F4U-5N; first, to accommodate the radar viewing scope at the upper center of the panel, and secondly, because the requirements of night fighter pilots are somewhat different from those of day fighters. Additional instruments which will be found on the panel are the AN/APN-1 radio altimeter and altitude limit switch. The compass, attitude gyro, and turn and bank indicator have

been replaced with components of the P-1 automatic pilot; the master direction indicator, which is externally the same as the P-3 compass, replaces this instrument whereas a gyro-horizon replaces the attitude gyro. The armament installation of the F4U-5N is substantially the same as that in the F4U-5 with one or two small exceptions. First, the Mark 6 fire control system employed in the F4U-5 has been replaced with a Mark 20 illuminated sight. This sight is basically the same as the Mark 8 sight used in the F4U-4 except that an additional night fighter reticle has been provided. This is not a lead-computing sight. Secondly, to provide a suitable means for an assessable photographic flight record in night fighter gunnery training, each F4U-5N has been provided with an installation that includes three trihedral prism retro-reflectors appropriately disposed about the airplane and a compact light source encircling the gun camera lens. A firing run is recorded photographically by simultaneous operation of the light source and the gun camera. In the F4U-5N, the trihedral prisms are located one each on the upper surface of the wing tips and one on the tail cone. The method employed in the assessment of results of night fighter camera gunnery is described in detail in Navy restricted publication NAVAER 10-1-528.

To insure clarity of gun-sighting vision at night, the F4U-5N is furnished with a windshield degreasing system installation making it possible to spray degreasing fluid over the bullet-resisting glass in the windshield. The system includes a small electrically driven pump and a reservoir containing .8 gallons of degreasing fluid. The pilot's control for this degreasing installation is a push-button switch located just below the windshield cowling. So long as pressure is maintained on the button, the pump will continue to force degreasing fluid through the perforated tube which runs parallel to the bullet-proof glass on the windshield.

the photo-reconnaissance airplane (F4U-5P)

The F4U-5P is unique among single-placed photo-reconnaissance airplanes in that it includes a camera mount that is electrically rotated and remotely controlled from the cockpit by the pilot. Through knowledge obtained during the engineering of the F4U-4P and through informal discussions with various cognizant Navy personnel, Chance Vought gained an appreciation of the problems connected with Naval aerial photography. One of the more pressing needs, it appeared, was for a camera installation that would permit the pilot of a single placed photo-reconnaissance airplane to choose at will the direction of his approach on the target. This is conventionally accomplished by carrying a multiple camera installation with cameras pointing out the bottom and the port and starboard sides. Obviously such an installation is unnecessarily heavy and cumbersome.

The F4U-5P provides for three alternate camera installations, the K 17-12″, the K 17-24″, and the K 18-24″ in a universal mount electrically rotatable and remotely controlled from the pilot's cockpit through a series of 5 push buttons, one for each of the 5 positions that may be preselected by the pilot. These positions are 3° and 15° down from the horizontal on port and starboard sides, and vertical. The camera will automatically stop and lock opposite the fuselage opening in the position selected. By this means the pilot may defer his decision as to the direction of approach until he has determined the conditions prevailing over the target area. It is reasonable to assume that this arrangement should prove economical of personnel and equipment when the target is in hostile territory. Operation of the camera vision doors is also electrically actuated, a flick of the switch being all that is necessary to open all three doors simultaneously. Indicator lights on the camera console indicate when the camera is in position and when each of the three doors is fully open. The government-furnished type B3B intervalometer is mounted on the windshield cowling to the right of, and immediately adjacent to, the gunsight.

conclusion

The qualities required in the ideal naval airplane are:

High speed at any altitude — High rate of climb — Good maneuverability without sacrifice of stability — Long range and great endurance

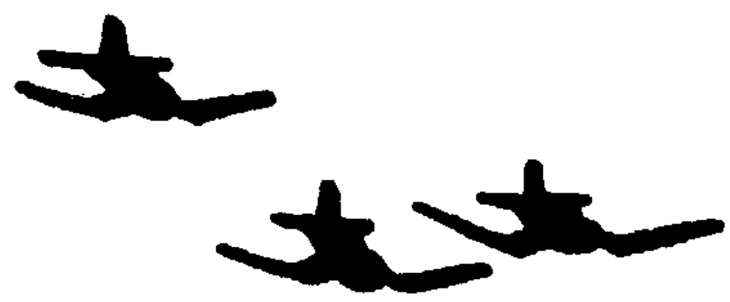
Such an airplane must be:

Well-armed — Rugged — Dependable — Easy to fly

And last, but by no means least important, the ideal naval airplane must have a wide range of adaptability.

The F4U-5 CORSAIR possesses all these qualities in generous measure. As fighter, bomber, photo-reconnaissance airplane, and night-fighter, the performance and versatility of the F4U-5 is unsurpassed by any carrier-based airplane in service today.

The power and stamina of the earlier CORSAIRS is a matter of record. The F4U-5 no less than its distinguished predecessors reflects the sound engineering, manufacturing and service policies of Chance Vought Aircraft.



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STRATFORD, CONNECTICUT • MARCH, 1948


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