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PILOT'S HANDBOOK

OF

FLIGHT OPERATING INSTRUCTIONS

FOR

XB-47

AIRPLANE

PREPARED BY BOEING AIRCRAFT COMPANY

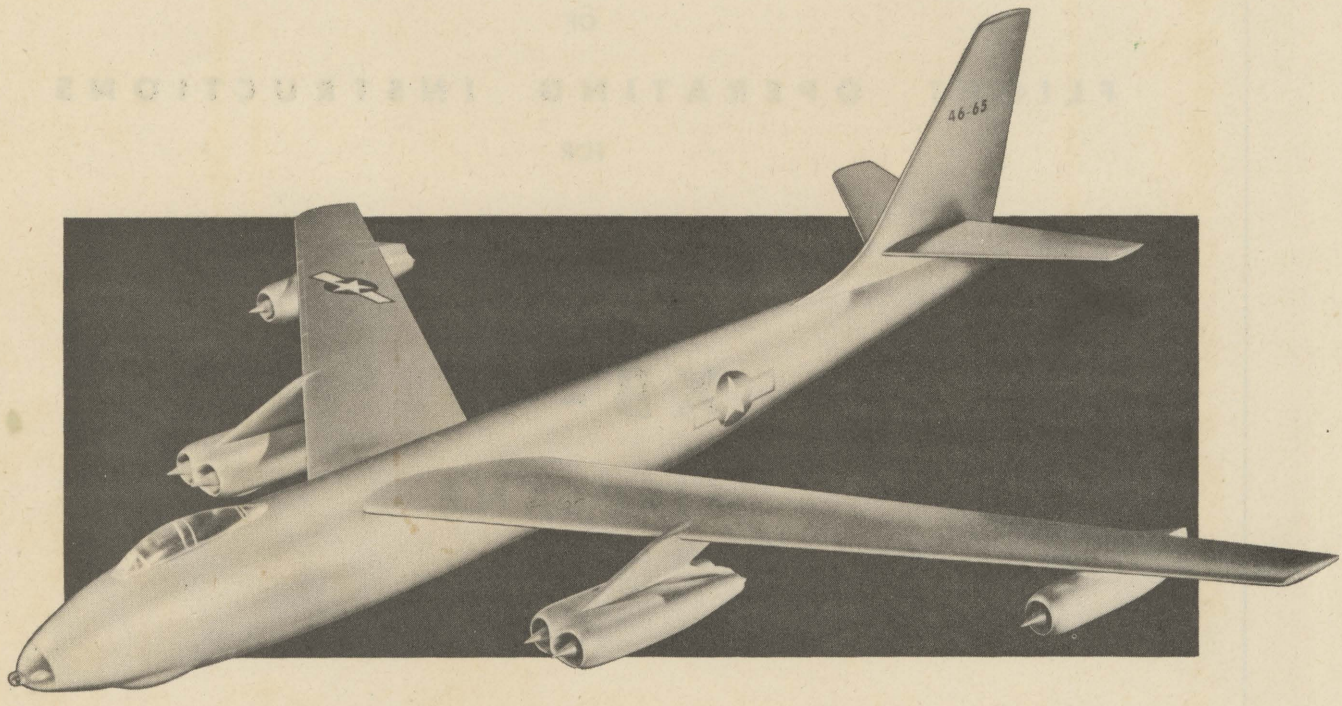
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1 OCTOBER 1947

FIRST FLIGHT 17 DECEMBER 1947
ROBERT L. ROBBINS PROJECT PILOT
SCOTT OSLER COPILOT

RESTRICTED

PREPARED BY GEORGE E. THELEN



FRONTISPIECE XB-47

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SECTION I
DESCRIPTION OF PILOTS' CONTROLS

GENERAL

The XB-47 airplane is a bombardment size jet airplane with the speed characteristics in some cases of advanced pursuit-type airplanes. The airplane's swept-back wings and empennage, are required for the designed high speed. The XB-47 embodies several features that make it a practical airplane for tactical operation. The nacelles are designed for high speed and minimize battle-damage vulnerability to the crew. The airplane has good stability and control throughout the flight range. The design gross weight of the airplane is 125,000 pounds. The normal crew consists of a pilot, copilot-gunner, and bombardier-navigator. The crew compartment in the forward part of the airplane is pressurized and has complete heating and ventilating facilities.

OVERALL DIMENSIONS.

a. Span	116 feet
b. Length	107 feet 6 inches
c. Height	27 feet 8 inches

FLIGHT CONTROLS

SURFACE CONTROLS. The elevators, ailerons, rudder, trim tabs, and flap controls are conventional in operation. In addition to these surfaces, slats and "flaperons" are installed. The rudder, elevator, ailerons, and flaperons are hydraulically boosted.

CONTROL-SURFACE LOCK. A control-surface lock is on the pilot's control stand. When in the "LOCK" position the ailerons and rudder are locked in neutral, the elevators are locked in the down position, and the throttles cannot be opened to a position greater than 5000 RPM. The lock lever must be moved out of a notched position before it can be moved to the "UNLOCK" position. See "Pilot's Station" page 1-12.

TRIM-TAB CONTROLS. The rudder, elevator, and aileron trim-tab controls are on both the pilot's and copilot's control stands. The controls are conventional in operation, however, the elevator trim-tab control operates the right elevator trim tab only. The left elevator trim tab is automatically operated by the wing flaps to maintain trim.

SURFACE CONTROL DISCONNECT. The pilot's or copilot's control column can be disconnected to give adequate clearance for emergency bailout. Either the pilot's or copilot's control column can be disconnected by raising the corresponding spring-loaded levers. These levers are on a horizontal connecting bar on the right side of the pilot's and copilot's seat. When released the control column pivots forward and has a stowage position. A knurled knob aft of each lever on the connecting bar is used for control-column reach adjustment. Automatic engaging of the control columns is accomplished by moving the columns aft from their stowed position.

RUDDER-PEDAL ADJUSTMENT CONTROL. The rudder pedals can be adjusted for either the pilot's or copilot's reach by a pull button on the pilot's and copilot's control stands. When the button is pulled up, the pedals spring to the aft position. When the pedals are moved to the desired neutral position, the button is pushed down.

SURFACE CONTROL BOOSTER SYSTEM. The surface controls are operated normally with boosters on, but in emergency they can be operated with boosters off with reasonable control forces. All booster operated control surfaces are aerodynamically balanced and are irreversible. This is necessary for high speed airplanes for ease of manuevering and to prevent compressibility and buffeting and gives the pilot positive control. The hydraulic system for the surface control boosters is a separate system from the main and emergency hydraulic system. Two electric pumps, one for elevator and rudder boost unit and one for aileron and flaperon boost units, supply hydraulic pressure. The booster system is normally on and is controlled by the surface-control lock. When the surface controls are locked the booster system is automatically shutoff. Individual "ON-OFF" breaker switches, for left aileron, rudder, elevator, and right aileron are for emergency use only to disconnect a malfunctioning booster. Four red warning lights aft of the breaker switches at the base of the pilot's control stand indicate a loss of booster pressure. See page 1-12.

WING FLAPS. The wing flaps are designed to operate with a minimum of pilot attention in a manner suitable to the airplane's accelerating and decelerating characteristics on take-off and landing. The wing flaps are operated by two electric motors geared through a differential in such a way to give emergency control with either motor. Both motors are energized during flap extension but only one of the two motors is used for retraction. The slow retraction speed allows the airplane time to accelerate and avoid stalling due to premature retraction. The wing flaps operate the left elevator trim tab and also the slats.

CAUTION

Park the airplane with flaps up. If the airplane is parked with the flaps down, the aileron boosts must be turned on and the surface-control lock must be unlocked before flap retraction is attempted.

WING-FLAP NORMAL CONTROLS. The flaps are controlled normally by levers on the pilot's and copilot's control stands. The handle on each lever is in the shape of a minature airfoil to facilitate easy recognition. The pilot's wing flap lever quadrant is notched for the three positions, "UP-OFF-DOWN." The copilot's lever quadrant is smooth without notches, but the positions are plainly marked. The pilot's and copilot's wing flap levers are interconnected. Movement of the copilot's lever will release the pilot's lever from its notched position and move it to the corresponding position of the copilot's lever. The levers are spring-loaded to the "OFF" position to prevent creeping, if the pilot's lever is not in a notched position. The wing flaps should always be lowered below 200 MPH. A pressure switch operated by ram air pressure automatically extends the wing flaps 20% and the wing slats 80% when the airspeed is 200 MPH or below. When the pressure switch lowers the flaps automatically the wing-flap levers are inoperative in the "UP" position until the airspeed is above 200 MPH. After take-off and the flaps are to be retracted, the flaps will only retract up to the 20% extended position until the airspeed is above 200 MPH. A guarded, wing-flap cutoff switch is on the pilot's switch panel and has two positions, "MANUAL" and "AUTOMATIC." This switch, normally in the "AUTOMATIC" position, allows the pilot to inactivate the pressure switch at will. See "Pilot's Switch Panel" page 1-14.

WING-FLAP POSITION INDICATORS. The wing-flap position indicators are on both the pilot's and copilot's instrument panels. A warning horn sounds if the flaps are not positioned fully down for take-off when the throttles are opened to 5000 RPM.

WING-FLAP EMERGENCY CONTROLS. Two guarded switches on the copilot's instrument panel are used for wing-flap emergency operation. The switches control a hot wire system bypassing all limit and safety switches and control lever switches. The switches have three positions "UP-OFF-DOWN," and are spring-loaded to the "OFF" position. When either switch is placed in "DOWN" both motors can operate or if one is inoperative the other will operate the flaps. When flap retraction is desired one of the two switches will be used in emergency. If one fails to operate the flaps, the other switch must be moved. See "Copilot's Instrument Panel", page 1-16.

WING SLATS. The wing slats, along the leading edge of the wing, provide a smooth airflow over the wing at low airspeeds to give good stalling characteristics The wing slats are operated automatically by wing-flap movement. They extend when the flaps extend and retract in the same manner.

FLAPERONS. The "flaperon" is actually a slotted flap acting as an aileron. Flaperon action gives positive lateral control well into a stall, and in this respect will give better control than in past airplanes. The flaperons are the outboard portions of the flaps and operate with the flaps. When the flaps are extended, the flaperons will rotate upward with aileron upward movement to aid in lateral control.

AUTOMATIC PILOT. An E-6-type autopilot is used in the XB-47 airplane. The control panel is on the pilot's instrument panel. The control panel has an automatic-recovery button; turn-control knob; cruise-bomb knob; two green indicator lights; an "OFF-ON" power switch; elevator, aileron, and rudder trim knobs; and a formation-stick control knob. An autopilot release button is on each control wheel. Two formation sticks, one for the pilot and one for the copilot are on the left sidewall. They are on pivots to allow out-of-the-way stowage when not in use.

AUTOPILOT TRIM KNOBS. The control-surface trim knobs are used for making autopilot trim corrections. The elevator trim knob is also used to climb or dive.

AUTOPILOT CRUISE-BOMB KNOB. This knob controls the sensitivity and response rate of the autopilot. The "CRUISE" position has low sensitivity and rate of response giving a loose type of flight. The "BOMB" position has a high sensitivity and rapid response rate which gives a very accurate type of flight.

AUTOPILOT TURN-CONTROL KNOB. This knob is used to turn right or left when not using the formation sticks. The airplane will start to turn as soon as the knob leaves the detent in the neutral position. The rate of turn increases as the knob is turned.

FORMATION STICKS. These sticks allow one-hand operation of all flight controls through the autopilot. The trigger-type switch on the formation stick is a microphone switch. The push button on top of the formation stick is a control-transfer switch. The pilot's formation stick has primary control.

AUTOPILOT FORMATION-STICK CONTROL. This control knob has the following positions: "ON SERVO ONLY-OFF-ON-ON ELEV ONLY." In the "ON" position, the formation stick operates as a turn control. When the knob is "ON ELEV ONLY," the formation stick controls the elevators only, while the bombardier or radar operator controls the airplane's direction. The formation stick functions as a manual flight control, when the control knob is "ON SERVO ONLY."

AUTOPILOT AUTO-RECOVERY BUTTON. This spring-loaded push button automatically returns the airplane to a level flight condition with a preset safe cruising speed regardless of the airplane's attitude at the time of button actuation. The push button disconnects the normal autopilot circuit and connects the preset circuit. To resume normal flight the autopilot must be released and re-engaged after the auto-recovery action has served its purpose.

AUTOPILOT INDICATOR LIGHTS. Two green lights, between the "OFF-ON" switch and the "ENGAGE" button, indicate by intermittent illumination when the power switch is "ON" and by steady illumination when the autopilot is engaged.

POWER PLANT

The XB-47 airplane is powered by six General Electric, J-35-GE (TG-180-) series, turbo-jet engines. Two engines are located in each inboard nacelle and one engine is in each outboard nacelle near the wing tips.

CAUTION

When operating jet engines, be sure the exhaust blast area is clear. Operating personnel must remember the intake and exhaust areas are dangerous.

THROTTLES. The throttles are the only engine controls in the airplane. Six individual throttles, one for each engine, a master throttle, and a throttle lock (brake) are on the pilot's control stand. The copilot has a master throttle only. Each of the six engine throttles on the pilot's control stand are latched when in the cutoff position. A latch release at the base of each throttle is pressed to move the throttle forward. When the master throttle is moved toward "OPEN," all six throttles move forward. When the master throttle is retarded a stop is encountered at the 4000 RPM position. For further power reduction, the master throttle is lifted up and when moved aft to "IDLE," the short throttles for engines No. 1, 2, 5, and 6 are moved to the "IDLE" position but the long throttles for engines No. 3 and 4 stay at the 4000 RPM position to provide generator voltage. The throttles for engine No. 3 and 4 must be individually lifted up to move aft. The copilot's master throttle duplicates the motion of the pilot's master throttle above the 4000 RPM position but has no control below 4000 RPM unless the pilot has lifted his master throttle to clear the stop. See "Pilot's Station" page 1-12.

Each throttle, when opened, accomplishes the following functions required for engine starting: The engine stopcock, the engine-fuel fire valve, the engine oil and hydraulic shutoff valves (if closed), and the corresponding engine's fuel tank valve and manifold valve (if selected) are opened, the corresponding fuel tank's booster pumps are turned on, and the ignition circuit is completed. When the throttle is closed, all the fuel valves, booster pumps, and engine stopcock are closed and the ignition circuit is broken.

THROTTLE LOCK. The throttle lock is on the pilot's control stand inboard of the throttles and is used to provide varying amounts of friction for the throttles.

ENGINE INSTRUMENTS. The engine tachometers are on the pilot's and copilot's instrument panels and are of the dual indicating type. They are calibrated in percent RPM. The exhaust-temperature indicators are also dual indicating and are near the tachometers on both instrument panels. The engine bearing-temperature indicators are dual indicating and are on the pilot's instrument panel only. A bearing-temperature selector switch is near the temperature indicators and has five positions, "OFF-1-2-3-4." When the selector is moved to "1" the temperature

for the front bearings on all six engines is indicated. The "2" and "3" positions are for the middle bearings and the "4" position is for the rear bearing in each engine.

IGNITION. The XB-47 uses 115-volt alternating current for the ignition system and is supplied by the ignition inverter in the regulated alternating current system. Of the eight combustion chambers in each engine, only the No. 3 and No. 7 combustion chambers have spark plugs. The electrical ignition system is only used for initial starting of the engines and during take-off and landing. Ignition for the other six chambers and for normal operation is accomplished by burning fuel spreading from one combustion chamber to another through crossover tubes.

IGNITION CONTROLS. Six individual, four-position "OFF-1-2-BOTH" ignition switches are on the pilot's inclined switch panel. A master ignition switch is on the pilot's sidewall panel aft of the six ignition switches. The ignition circuit is completed only when the battery switch is "ON," the master switch is "ON," the selected engine's ignition switch on "BOTH" and engine's throttle opened to at least the "IDLE" position. See "Pilot's Station", page 1-12.

FUEL SYSTEM

The XB-47 airplane has a manifold fuel system arranged as shown on the "Fuel System Flow Diagram" on page 1-17 . The system supplies a continuous flow to each engine from its normal tank.

There are three main fuselage tanks, the forward main tank, center main tank and rear main tank. The normal capacities of these tanks total 6,600 gallons of fuel. The overload capacities total 7,680 gallons. Space and structural provisions are provided for the addition of three auxiliary tanks and six bomb bay tanks.

The fuel system is arranged so that two opposite engines receive fuel through separate lines from one tank. The forward main tank supplies engines No.1and No. 6, the center main tank supplies engines No. 2 and No. 5, and the rear main tank supplies engines No. 3 and No. 4.

FUEL SELECTOR CONTROLS. Six flow-marked selector knobs are on the fuel panel on the pilot's sidewall. By positioning these selectors the following combinations can be obtained;

1. Tank to Engine
2. Tank and Manifold to Engine
3. Manifold to Engine

The fuel selectors operate in conjunction with the throttles to control the fuel-valves and booster pumps. In the "TANK TO ENGINE" position, the manifold valve is inoperative and the throttle controls the tank valve, engine-fire valve and booster pumps. In the "TANK AND MANIFOLD TO ENGINE" position, the throttle controls only the engine-fire valve while the tank valve and manifold valve remain open and the booster pumps operating. In the "MANIFOLD TO ENGINE" position, the throttle only controls the engine-fire valve while the manifold valve remains open, the tank valve is closed and the booster pumps are turned off. The auxiliary tanks' and bomb bay tanks' valves and booster pumps are controlled by separate "ON-OFF" switches on the fuel panel. See pages 1-12, 1-17, and 2-10.

FUEL BOOSTER PUMPS. There are four booster pumps in the forward main tank, four booster pumps in the center main tank, and two booster pumps in the rear main tank. The booster pumps are located in a manner to supply fuel continuously even during extreme attitudes of the airplane. The booster pumps in the main tanks operate continuously when the throttles are open except when the tank valve is closed.

FUEL BOOSTER-PUMP WARNING LIGHTS. A red warning light for each booster pump is on the fuel panel and glows when the booster-pump pressure is below 2 1/2 PSI.

FUEL SYSTEM INDICATORS. The fuel quantity indicators for the main tanks are on the fuel panel and are calibrated in pounds of fuel. The fuel pressure indicators are on the pilot's instrument panel and are of the dual indicating type.

EMERGENCY FUEL SYSTEM. An emergency fuel system is incorporated to supply fuel from the engine supply lines directly to the engine. The system consists of six electric fuel pumps, one for each engine; and four emergency shutoff valves, one on each inboard engine. An "OFF-ON" emergency system switch on the fuel panel turns on all six emergency pumps and opens all six emergency valves simultaneously when the master throttle is opened beyond the 7000 RPM position and the landing gear is extended.

NOTE

The emergency system is used on take-off only and is limited to ten minutes continuous duty.

When the emergency system is used during take-off, the landing gear upon retracting will not shutoff the system until the switch is turned off. However, when the gear is retracted and the emergency fuel switch is turned on, the system will remain inoperative.

OIL SYSTEM

Each engine has an independent oil system.

OIL SHUTOFF VALVES. An oil shutoff valve at the base of each oil tank is closed when the throttle is closed and the fire shutoff button is pressed. On engines No. 3 and 4 the hydraulic-oil shutoff valves also operate with the engine oil valves. If the valves are closed, the throttle will open the valves, when it is advanced.

OIL SYSTEM INDICATORS. Dual-indicating oil pressure and oil temperature indicators are on the pilot's instrument panel. Dual-indicating oil temperature indicators are on the copilot's instrument panel. See pages 1-13 and 1-16.

ELECTRICAL SYSTEM

The 28-volt direct current system is supplied power by six engine-driven starter-generators, one on each engine; two 12-volt batteries, wired in series to provide 24 volts, are in the aft part of the forward wheel well.

STARTER-GENERATOR CONTROLS. Six starter switches one for each engine motorize the generators for starting the engines and are on the pilot's switch panel. They have two positions "OFF" and "ON" and are spring-loaded to the "OFF" position. A starter cutoff switch is near the starter switches and will break the starter circuit on all six engines simultaneously. When the starter switch is momentarily moved to "ON," the starter is engaged and remains so until the automatic starting system releases it. If the occasion arises when it is desired to interrupt a start, the starter-cutoff switch provides the only means of stopping the starter. The six generator switches are on the copilot's instrument panel and have two positions "OFF" and "ON." See pages 1-14 and 1-16.

BATTERY SWITCH. The battery switch is on the pilot's switch panel and has "ON-OFF" positions. See page 1-14.

LOADMETERS. Six loadmeters above the generator switches on the copilot's instrument panel indicate direct current power equalization. See page 1-16.

VOLTAGE RHEOSTATS. Six voltage adjustment rheostats are on the copilot's instrument panel under a cover and are used to adjust generator voltage.

INVERTERS. There are three inverters that supply regulated alternating current. These consist of a main inverter under the pilot's floor, a spare inverter in the aft part of the forward radar compartment, and an ignition inverter also under the pilot's floor. The main inverter supplies power for the autopilot, fuel and oil quantity indicators, flight gyros, gyrosyn compass and empennage anti-icing. The ignition inverter supplies power for all six engines and is normally in use only during starting, take-off and landings. The spare inverter, through automatic changeover relays, will assume the load of either the main or ignition inverters in case of either one failing. In case of failure of both main and ignition inverters the spare inverter will assume the main inverter's load only, leaving the ignition inoperative.

INVERTER CONTROLS. The main and spare inverters are controlled by a three-position "MAIN INVERTER-OFF-SPARE INVERTER" switch on the copilot's instrument panel. The "SPARE INVERTER" position is used if the automatic changeover relay should fail. The ignition inverter is controlled by the master ignition switch on the forward end of the pilot's fuel panel and has two positions "ON" and "OFF." An ignition inverter test switch is next to the main and spare inverter switch on the copilot's instrument panel and is spring-loaded to the "OFF" position.

ALTERNATORS. Two engine-driven alternators supply unregulated alternating current power for the windshield deicing and for the engine oil heaters on air-

plane AAF46-65 only. The main alternator is on engine No. 1 and the spare alternator is on engine No. 6. Normally the main alternator is used and the spare is held in reserve.

ALTERNATOR CONTROLS. A three position, "SPARE-MAIN-EXTERNAL POWER" selector switch controls the alternators and is on the copilot's instrument panel. In case of main alternator failure the selector switch must be moved to "SPARE" as there is no automatic changeover relay. See page 1-16.

VOLTMETERS. The direct-current voltmeter and a seven-position voltmeter selector are on the forward end of the copilot's control stand. The selector positions are for the six generators, the electrical bus bar, and an "OFF" position The regulated alternating current voltmeter and a three position, "MAIN INVERTER VOLTAGE-OFF-IGNITION INVERTER VOLTAGE," selector switch is near the direct current voltmeter on the copilot's control stand. The unregulated alternating current voltmeter and a three position, "SPARE-MAIN-EXT. POWER,"selector switch are on the copilot's instrument panel. See page 1-16.

WARNING LIGHTS. Six warning lights on the copilot's instrument panel above the loadmeters indicate generator overvoltage. Three warning lights near the regulated alternating-current inverter switch indicate main inverter failure, both main and spare inverter failure, and ignition inverter failure. A warning light near the unregulated alternating-current inverter indicates when the power is off.

EXTERNAL POWER RECEPTACLES. There is a double external power receptacle in the lower aft end of the front-wheel well. One terminal is for direct current and the other terminal is for unregulated alternating current.

CIRCUIT BREAKERS. Push-to-reset type circuit breakers for each circuit are on the copilot's sidewall panels. There are two direct-current circuit breaker panels aft of the copilot's control stand and the regulated and unregulated alternating-current circuit breaker panels above the control stand. See page 1-15.

EMERGENCY ALARM. The emergency alarm is controlled by an "ON-OFF" switch on the pilot's switch panel.

HYDRAULIC SYSTEM

There are two hydraulic systems exclusive of the surface control booster system. These two systems, the main and emergency systems operate the main wheel brakes, front wheel steering, and the canopy. The two systems are separated by a normally-closed manual interconnect valve which is used to bleed the system. Shuttle valves between the main and emergency systems allow the system with the highest pressure to operate the brakes, steering or canopy. When the landing gear is retracted as in flight, the hydraulic system can be bled to reduce the hazard of fire or combat damage. This is accomplished by using the manual by-pass switch on the hydraulic panel. The switch has two positions "OPEN" and "CLOSED." When the switch is moved to "OPEN" the pressure is bled back to the reservoirs upon landing gear retraction, and if moved to "CLOSE," pressure is again built up. If the switch is inadvertently left "OPEN," the gear-actuated valve will allow pressure to build up upon gear extension.

MAIN HYDRAULIC SYSTEM. The main system is supplied from a 4 1/2 gallon reservoir in the aft end of the front wheel-well. The main system has two accumulators, one for the system and one for the brakes, to maintain pressure at 3200 PSI produced by an engine-driven pump on each inboard engine in the inboard nacelles. A hydraulic shutoff valve for each pump is closed when the throttle on the inboard engine is closed and the fire cutoff button is pushed.

EMERGENCY HYDRAULIC SYSTEM. The emergency system is supplied from a 1 3/4 gallon reservoir near the main system reservoir. The emergency system also has two accumulators, one for the system and the other for the brakes, to maintain a pressure of 3200 PSI produced by an electric pump. The emergency pump is controlled by a three-position, "AUTO-OFF-ON" switch on the copilot's hydraulic panel.

HYDRAULIC-RESERVOIR PRESSURE SWITCH. An "OFF-ON" switch on the copilot's hydraulic panel controls the air pump that is used to produce an air pressure of 10 PSI for both the main and emergency reservoirs.

HYDRAULIC SYSTEM INDICATORS AND WARNING LIGHTS. Two pressure indicators for the main system and main brakes and two pressure indicators for the emergency system and emergency brakes are on the copilot's hydraulic panel. Two main system hydraulic-pump warning lights, one for each pump, indicate when a pump is not operating. These are above the main system pressure indicators. A warning light above the emergency system indicators warns of a loss of emergency pressure. A hy-

draulic quantity indicator for the main reservoir is on the copilot's sidewall panel forward of the hydraulic panel.

LANDING GEAR

The electrically-operated, bicycle-type main landing gear consists of dual-wheel front gear, which is steerable, and dual-wheel rear gear. The outrigger landing gear consists of a single wheel on each side of the airplane. The main gears retract into the fuselage and the outrigger gears retract into the inboard nacelles. Two electric motors geared through a differential are used on each main gear. Both motors are energized during retraction but only one motor is used for extension. The outrigger gears are operated by one motor on each gear.

It is important to note that the main landing gear shock struts are extended the correct amount, since the airplane has a normal take-off attitude. This attitude is necessary because of the bicycle-type main gears. The correct measurement between the front-gear torsion link centers is 14.60 inches and between the rear-gear torsion link centers is 13.25 inches.

LANDING GEAR NORMAL CONTROLS. The landing gear can be operated normally by levers on the pilot's and copilot's control stands. The handle on each lever is in the shape of minature wheels to facilitate easy recognition. The pilot's landing gear lever quadrant is notched for the three positions, "UP-OFF-DOWN." The copilot's lever quadrant is smooth without notches but the three positions are plainly marked. The pilot's and copilot's landing gear levers are interconnected. Movement of the copilot's lever will release the pilot's lever from its notched position and move it to the corresponding position of the copilot's lever. The levers are spring loaded to "OFF" to prevent creeping if the pilot's lever is not in a notched position. The landing gears are protected from ground retraction by safety switches on the gears which break the electrical circuit until the airplane leaves the ground. See pages 1-12 and 1-15.

LANDING GEAR WARNING SIGNALS. There are four sets of warning lights and a warning horn for indication of landing gear position. Two sets of warning lights consist of one red light and four green lights each. One of these sets is on the pilot's instrument panel and the other in on the gunner's panel above the table aft of the copilot's position. The red lights indicate when the landing gear is not down and locked. The green lights indicate when each of the four gears are down and locked. The other two sets of warning lights consist of one red and four amber lights. One of these sets is on the forward end of the copilot's control stand and the other set is on the landing gear emergency retraction panel in the aft part of the passageway. The red lights of these latter sets indicate when the landing gear is not up and locked and the four amber lights indicate when each of the gears are up and locked. The landing gear warning horn behind the pilot's seat sounds continuously when any throttle is retarded to the 6000 RPM position or below and the landing gear is up. The horn can be shutoff by a manual lever, spring-loaded to the on position, on the pilot's control stand below the elevator trim control. Knee or leg pressure will hold the lever in the shutoff position.

NOTE

The landing gear warning horn is also used for wing flap warning and cabin pressure warning.

LANDING GEAR EMERGENCY CONTROLS. The manual controls, used for extending the landing gear, are aft and to the left of the copilot's normal position. The controls consist of a ratchet lever and four individual selector levers, one for each landing gear and are shown on page 1-18. The ratchet lever is stowed in a down position and held by a clasp. The selectors are normally positioned in the "DISENGAGE" notch. Only one selector is to be in use at one time. The ratchet handle, when oscillated, unlocks the landing gear and allows the gear to lower by gravity. See "Landing Gear Emergency Extension Controls", page 1-18.

The emergency retraction controls for the landing gear consist of two duplicate sets of guarded switches. Fach set consists of four switches, one for each gear, and are beneath a hinged cover. One set is on the forward end of the copilot's control stand and the other set is on the landing gear emergency panel at the aft end of the passageway. A third guarded switch is on the pilot's control stand below the normal control. This switch is used to retract all gears in an emergency both in the air or on the ground. These switches control a hot wire system by-passing all limit and safety switches and control lever switches. The switches will operate either one of the two motors on each main gear and the outrigger motors. See "Copilot's Instrument Panel", page 1-16.

CAUTION

When operating the emergency retraction switches, care must be used so as to not overrun the motors. Check gear up position with the amber lights.

LANDING-GEAR GROUND SAFETY LOCKS. There are two types of ground safety locks used on this airplane to prevent accidental collapse of the landing gear. Both main gears use a pin-type lock that prevents the actuating screw from turning. These pins are insetted in a receptacle and latched at the lower end of the gear actuating screw. The outrigger gears use a stiff-knee type lock that is installed on the forward side of the strut. Red warning streamers are attached to each of the locks.

BRAKES. The brakes are on both wheels of each main gear. Either pilot can operate the hydraulic brakes by downward pressure on any one of the rudder pedals. Because of the bicycle-type landing gear, no differential braking is required. If the main hydraulic pressure fails the emergency pressure is applied to the brakes by further downward movement on the rudder pedal. The parking brake handle is on the pilot's instrument panel. See "Pilot's Instrument and Switch Panels", page 1-13.

FRONT-WHEEL STEERING. Steering is accomplished hydraulically by moving the rudder pedals in the desired direction. A steering ratio-selector is on the pilot's control stand and has three positions, "TAXI," "TAKE-OFF AND LANDING," and "TOWING." In the "TAXI" position the front-wheels can be turned 60 degrees either side of the airplane's centerline, and in the "TAKE-OFF AND LANDING" position, the front wheels are held to 7 degrees either side of the centerline with reduced sensitivity. The "TOWING" position disconnects the steering control and allows the wheels to castor. Hydraulic pressure to the steering controls is automatically relieved as soon as the weight is off of the front gear. The gear automatically centers for retraction.

INSTRUMENTS

ALTERNATING-CURRENT INSTRUMENTS. The flight gyros, tachometers, fuel quantity, oil quantity and hydraulic oil quantity indicators are operated by alternating current.

DIRECT-CURRENT INSTRUMENTS. The direct-current operated instruments include the turn and bank, exhaust temperature, bearing temperature, wing-flap position and outside-air temperature indicators.

PITOT-STATIC INSTRUMENTS. The airspeed, rate of climb, and altimeters on both pilot's and copilot's instrument panels are operated by the pitot-static system. The left pitot tube operates the pilot's instruments and the right pitot tube operates the copilot's instruments.

DIRECT-PRESSURE INSTRUMENTS. The fuel and oil pressure indicators are operated by direct pressure.

ENGINE-FIRE DETECTION SYSTEM

The engine-fire detection system consists of six red warning lights and a fire shutoff button near the lights on the pilot's instrument panel and a five position, "A-B-OFF-C-D" test selector switch on the pilot's sidewall above the switch panel. When an engine fire is indicated the throttle, when closed, will shutoff the fuel valves, engine stopcock, ignition and booster pumps. When the fire shutoff button is pushed the oil valves and hydraulic oil valves will close. The throttles, when advanced, will open the oil valves. See page 1-13.

ASSISTED TAKE-OFF "ATO"

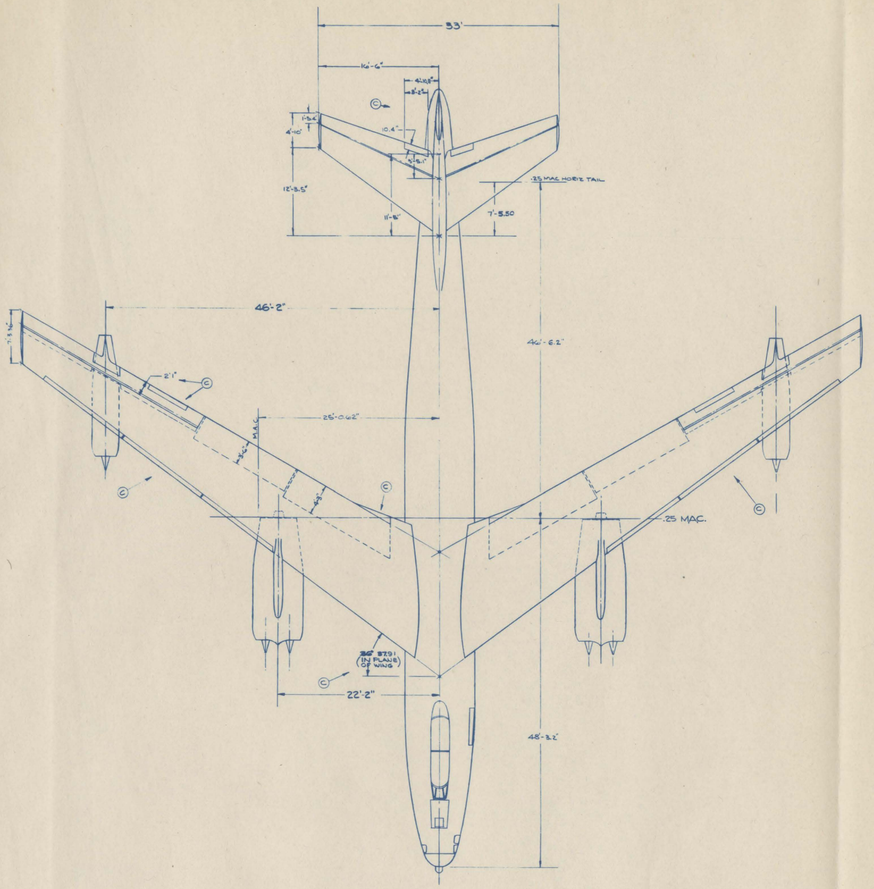
A total of eighteen jet-rocket motors are installed on the airplane to provide additional thrust for take-off. There are nine motors on each side of the airplane arranged in three banks of three each near the aft part of the fuselage. Each rocket provides 900 pounds of thrust or a total of 16000 pounds for all eighteen motors. The motors are recessed in the fuselage and mounted at an angle to clear the structure.

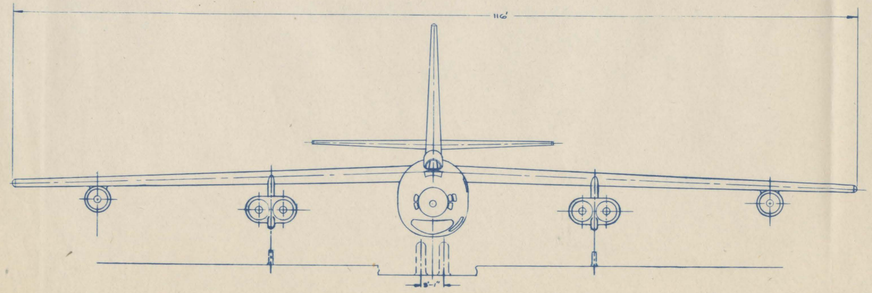
ATO CONTROLS. The controls for ATO operation are on the right forward side of the pilot's sidewall near the instrument panel. These controls consist of a guarded, two-position "START ATO-OFF" switch, a three-position selector switch and a warning light to indicate ATO arming. See "Pilot's Instrument and Switch Panels", page 1-13.

MISCELLANEOUS

CANOPY RELEASE CONTROLS. The canopy can be released hydraulically by a lever control on the base of the pilot's control stand. The lever has three positions, "CLOSE-OFF-OPEN." In an emergency the canopy is released by a pull handle on either the pilot's or copilot's instrument panel. The pull handles release the air pressure in the emergency cylinder because hydraulic pressure will not be available in combat flight. An external pull handle can be used to release the canopy on the ground. The hatch over the navigator's station is released in an emergency by a lever on the left forward side of the hatch.

SEAT EJECTION CONTROLS. The ejection controls are on each of the pilot's, copilot's, and navigator's seats. The control consists of a knurled knob at the forward end of the seat's right arm rest. The knob, when unscrewed, extends forward and when pulled upward, fires the .37 mm shell which powers the catapult device. The canopy has to be released prior to ejection in order to arm the firing mechanism in the catapult.





WING

WING AREA (TRUE GROSS)		1428.60 FT.
INCIDENCE ROOT		2°45'
INCIDENCE TIP		2°45'
DIHEDRAL		0°
THICKNESS RATIO		12%
PLAN TAPER RATIO		42.5%
LOCATION OF M.A.C. FROM ROOT L.E. VERT		7.8"
LENGTH OF M.A.C.		155.89 IN
ASPECT RATIO		9.43
TOTAL AILERON AREA AFT OF HINGE ℄		107.6 SQ. FT
AILERON BALANCE AREA		45.2 " "
AILERON TAB AREA		7.8 " "
SLAT AREA		67.8 " "
FLAP AREA (TOTAL)		249.6 " "
WING CONTROL MOTIONS		
AILERON	18° UP	18° DOWN
AILERON TRIM TABS	30° UP	30° DOWN
FLAP	35°	

EMPENNAGE

HORIZONTAL AREAS		
TOTAL		208 SQ FT
ELEVATOR TO HINGE ℄ (INCL TAB)		78.6 " "
ELEVATOR BALANCE		25.5 " "
ELEVATOR TRIM TAB		6.7 " "
STABILIZER		189.6 " "
VERTICAL AREAS		
TOTAL (INCLUDING DORSAL)		230 " "
RUDDER TO HINGE ℄ (INCLUDING TAB)		62.5 " "
RUDDER BALANCE		26.8 " "
RUDDER TRIM TAB		4.6 " "
FIN LESS DORSAL		163 " "
DORSAL		4.5 " "
EMPENNAGE CONTROL MOTIONS		
ELEVATOR	26°±2° UP	15°±2° DOWN
ELEVATOR TRIM TAB RH	30°±2° UP	35°±2° DOWN
ELEVATOR TRIM TAB LH	15°±2° UP	35°±2° DOWN
RUDDER	26°±2° LEFT	26°±2° RIGHT
RUDDER TRIM TAB	35°±2° LEFT	35°±2° RIGHT

C.G LOCATIONS

DESIGN GROSS WT: WHEELS UP	
DESIGN GROSS WT: WHEELS DOWN	
EXTREME FWD.	
EXTREME AFT.	

ALIGHTING GEAR

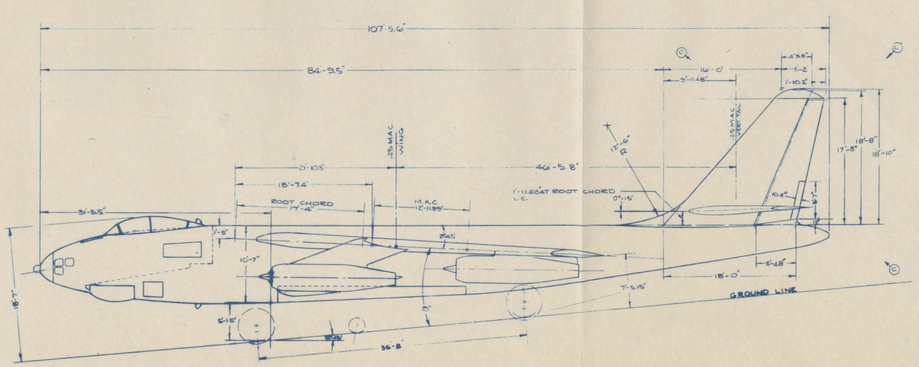
MAIN WHEELS	
EXTRA HIGH PRESSURE TIRES - DUAL	56" DIA
ROLLING RADIUS	24.4 RADIUS
VERTICAL OLEO TRAVEL ABOVE TAXI POSITION	2.25
VERTICAL OLEO TRAVEL BELOW TAXI POSITION	9.75
AUGULAR TRAVEL FOR STEERING	
OUTRIGGER WHEELS	
EXTRA HIGH PRESSURE CHANNEL TREAD	26X6.6
ROLLING RADIUS	11.2 RADIUS
VERTICAL OLEO TRAVEL	24

POWER PLANT

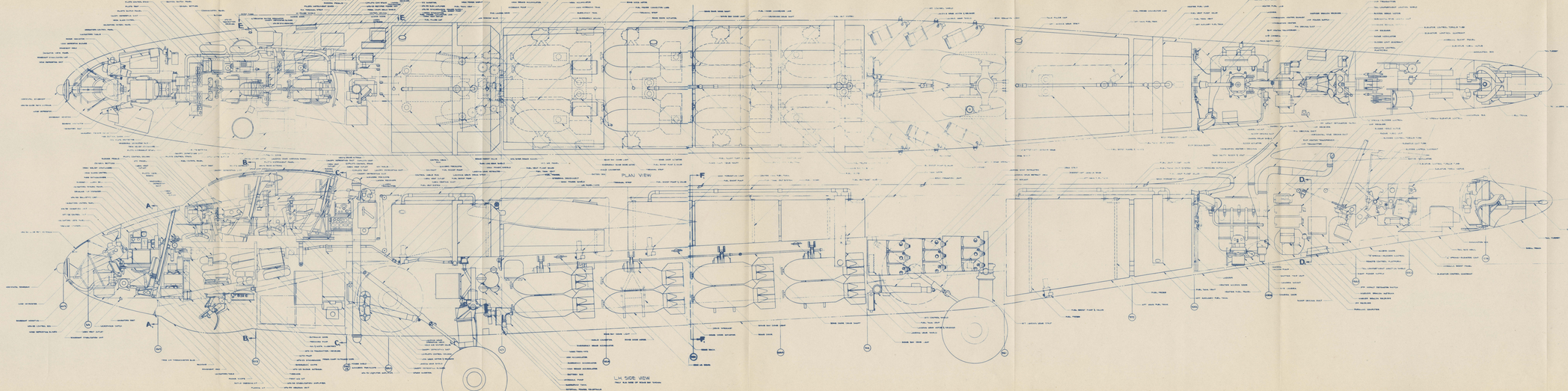
SIX GENERAL ELECTRIC TYPE TG-180 AIRCRAFT GAS TURBINES FOR JET PROPULSION (AAF MODEL J-36)

WEIGHTS

DESIGN GROSS WT	125,000 LBS
WEIGHT EMPTY	
USEFUL LOAD	
MAXIMUM ALTERNATE GROSS WT	162,500 LBS
MAXIMUM ALTERNATE USEFUL LOAD	

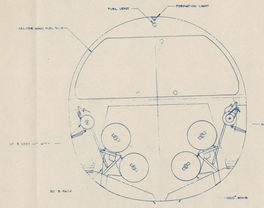


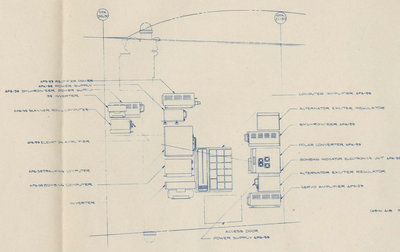
PRINCIPAL DIMENSIONS

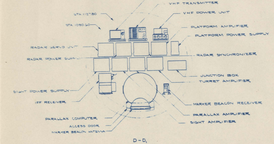


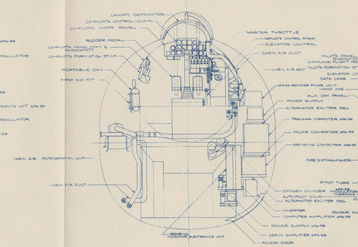
D-5001
RESTRICTED
1-114

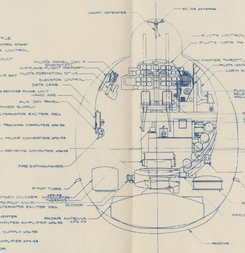
GENERAL ARRANGEMENT

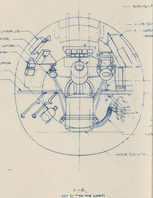

FUEL VENT
FORMATION LIGHT
ACTUATOR DRIVE SHAFT
F-F
TAIL SECTION OF WING RAY

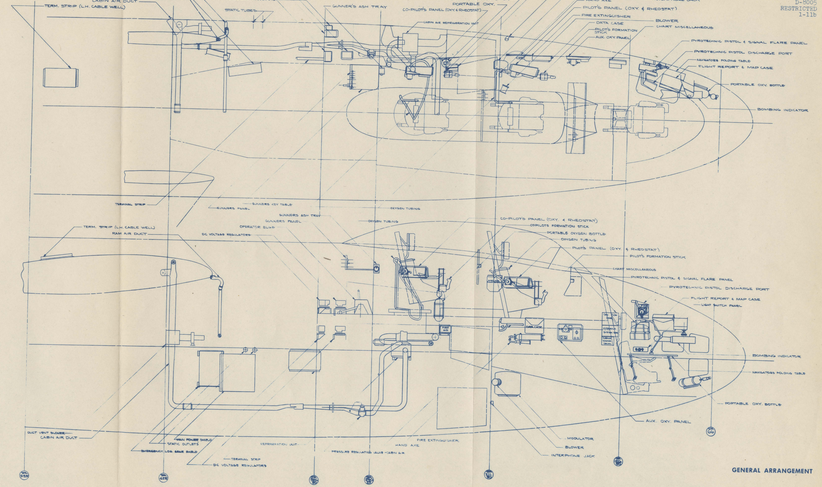

COMPUTER AMPLIFIER APA-59
ALTERNATOR EXCITER REGULATOR
SYNCHRO-TEER APA-59
POLAR CONVERTER APA-59
BOMBING INDICATOR ELECTRONICS UNIT APA-59
ALTERNATOR EXCITER REGULATOR
SERVO AMPLIFIER APA-59
ACCESS DOOR
POWER SUPPLY APA-59
E-E

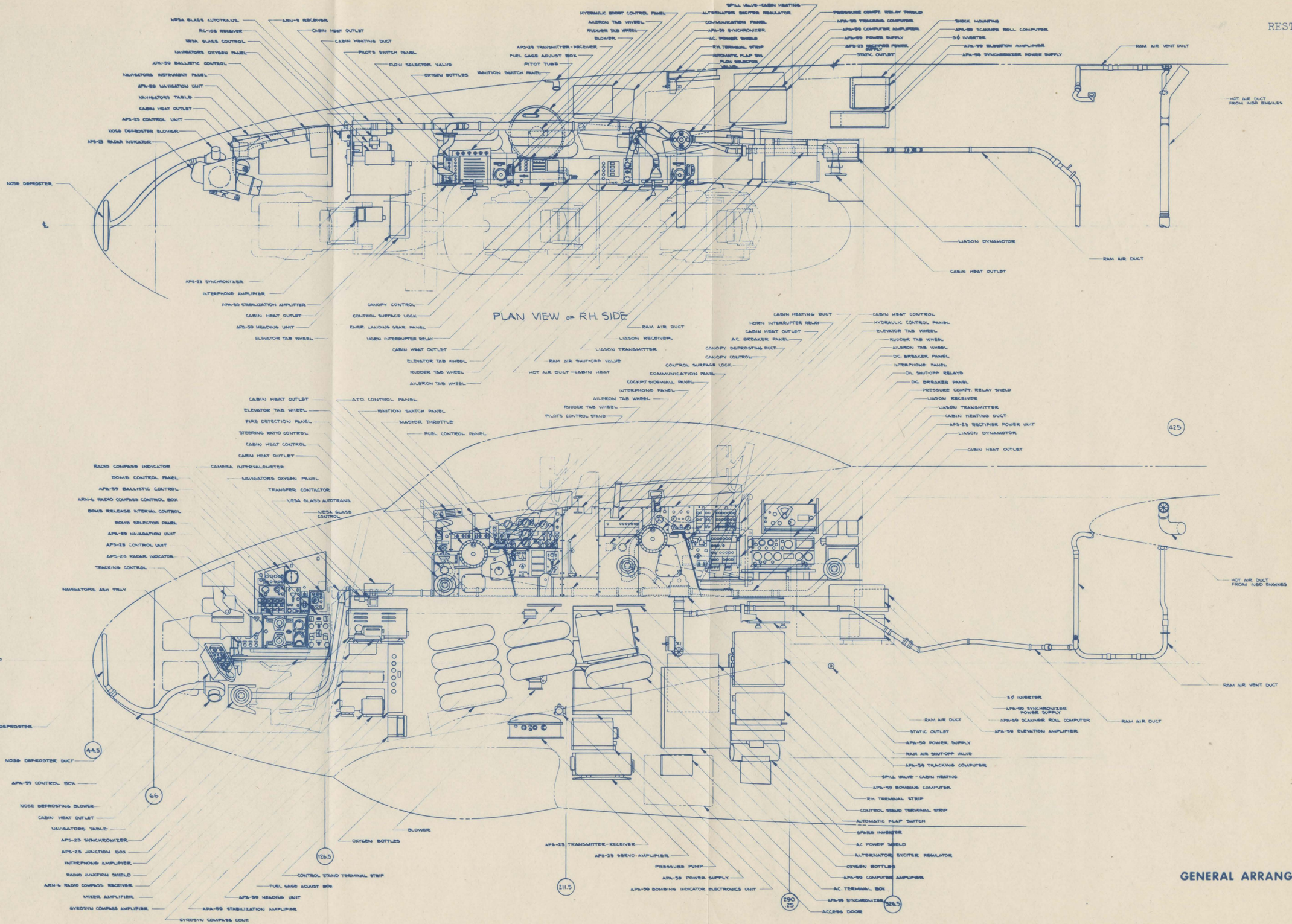

VHF RELAY BOX
VHF TRANSMITTER
VHF BLOWER UNIT
PLATFORM AMPLIFIER
PLATFORM POWER SUPPLY
RADAR SYNCHRONIZER
JUNCTION BOX
TUNNEL AMPLIFIER
RADAR BEACON RECEIVER
PARALLAX AMPLIFIER
SIGHT AMPLIFIER
ACCESS DOOR
RADAR BEACON ANTENNA
D-D


CANOPY DEFROSTER
CO-PILOT'S CONTROL COLUMN
CO-PILOT'S INSTR. PANEL
RUDDER PEDALS
CO-PILOT'S PANEL (CKY & RHEOSTAT)
CO-PILOT'S FORMATION STICK
PORTABLE OXY.
FIRST AID KIT
MASTER THROTTLE
CONTROL STAND
ELEVATOR CONTROL
CABIN AIR DUCT
CABIN PRESSURE REGULATOR
HAND AXE
AUX. OXY. PANEL
POWER SUPPLY
TRACKING COMPUTER APA-59
POLAR CONVERTER APA-59
BOMBING COMPUTER APA-59
FIRE EXTINGUISHER
PITOT TUBE
OXYGEN CYLINDER
ALTERNATOR EXCITER REG.
BLOWER
RADAR ANTENNA
COMPUTER AMPLIFIER APA-59
POWER SUPPLY APA-59
SERVO AMPLIFIER APA-59
ACCESS DOOR
C-C


IFF/SIF ANTENNA
PILOT'S CONTROL COLUMN
PILOT'S SEAT RAIL
MASTER THROTTLE
PILOT'S CONTROL STAND
CABIN AIR DUCT
PILOT'S PANEL (CKY & RHEOSTAT)
AIRBORNE FLIGHT RECORDER
PILOT'S FORMATION STICK
ELEVATOR CONTROL
OIL CAKE
CABIN AIR DUCT
HAND AXE
AUX. OXY. PANEL
RUDDER PEDALS
PORTABLE OXY.
FIRST AID KIT
PRESSURE REGULATOR
OXYGEN CYLINDER
FIRE EXTINGUISHER
BLOWER
PITOT TUBE
TRACKING COMPUTER APA-59
PRESSURE PLANT
RADOME
B-B

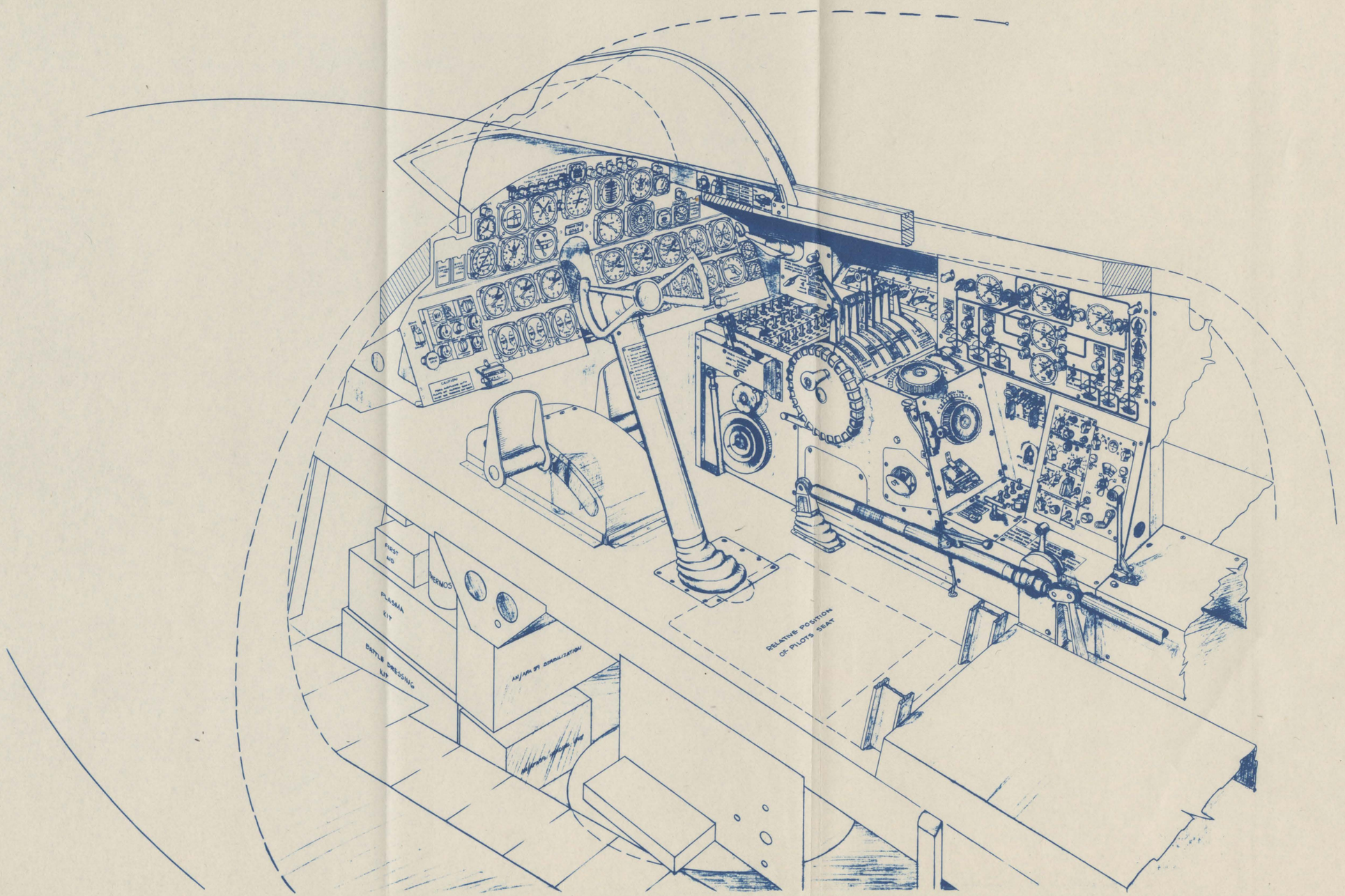

NAVIGATOR'S INSTR. PANEL
VERTICAL SPEED "G" UNIT
RUDDER CONTROL PANEL
RUDDER INDICATOR
FLAP CONTROL
A-A


RAM AIR DUCT
SHIELD (WALL MOUNTED)
TERM. STRIP (L.H. CABLE WELL)
115 VOLTS REGULATORS
STATIC TUBES
SCANNER'S ASH TRAY
PILOT TUBE
FIRST AID KIT
AIRPLANE FLIGHT RECORDER - INTERPHONE JACK
HAND AXE
CO-PILOT'S FORMATION STICK
PORTABLE OXY.
CO-PILOT'S PANEL (CKY & RHEOSTAT)
FIRE EXTINGUISHER
DATA CASE
PILOT'S PANEL (CKY & RHEOSTAT)
AUX. OXY. PANEL
BLOWER
CHART STOWAGE
PILOT'S FORMATION STICK
PROTECTIVE PISTOL & SIGNAL FLARE PANEL
PROTECTIVE PISTOL DISCHARGE PORT
RADIATOR MOUNTING TABLE
FLIGHT RECORDER & MAP CASE
PORTABLE OXY. BOTTLE
BOMBING INDICATOR
RADIATOR MOUNTING TABLE
PORTABLE OXY. BOTTLE
AUX. OXY. PANEL
INTERPHONE JACK
VENTILATOR
BLOWER
FIRE EXTINGUISHER
PRESSURE REGULATOR AIR CHECK VALVE
HAND AXE
INTERPHONE JACK
TERMINAL STRIP
115 VOLTS REGULATORS
SHUT OFF VALVE CABIN AIR DUCT
RAM AIR DUCT
TERM. STRIP (L.H. CABLE WELL)
115 VOLTS REGULATOR
SCANNER'S ASH TRAY
SCANNER'S SEAT
OPERATOR SEAT
PITOT TUBE
CO-PILOT'S PANEL (CKY & RHEOSTAT)
PORTABLE OXYGEN BOTTLE
CO-PILOT'S FORMATION STICK
PILOT'S PANEL (CKY & RHEOSTAT)
PILOT'S FORMATION STICK
CHART STOWAGE
PROTECTIVE PISTOL & SIGNAL FLARE PANEL
PROTECTIVE PISTOL DISCHARGE PORT
FLIGHT RECORDER & MAP CASE
RADIATOR MOUNTING TABLE
PORTABLE OXY. BOTTLE
BOMBING INDICATOR
AUX. OXY. PANEL
INTERPHONE JACK
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BLOWER
FIRE EXTINGUISHER
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TERMINAL STRIP
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VENTILATOR
BLOWER
FIRE EXTINGUISHER
HAND AXE
PRESSURE REGULATOR AIR CHECK VALVE
GENERAL ARRANGEMENT

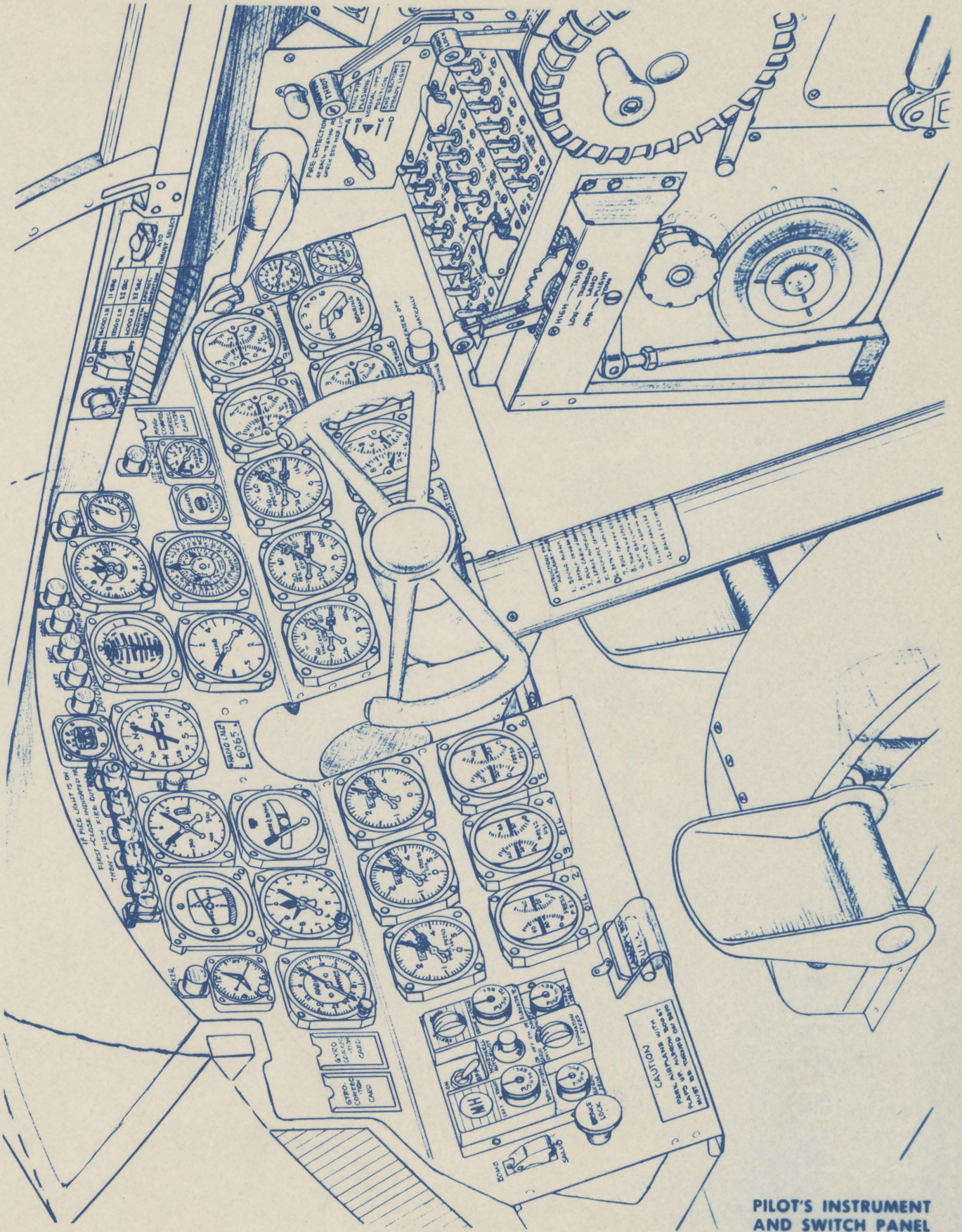


LH. SIDE VIEW OF R.H. SIDE

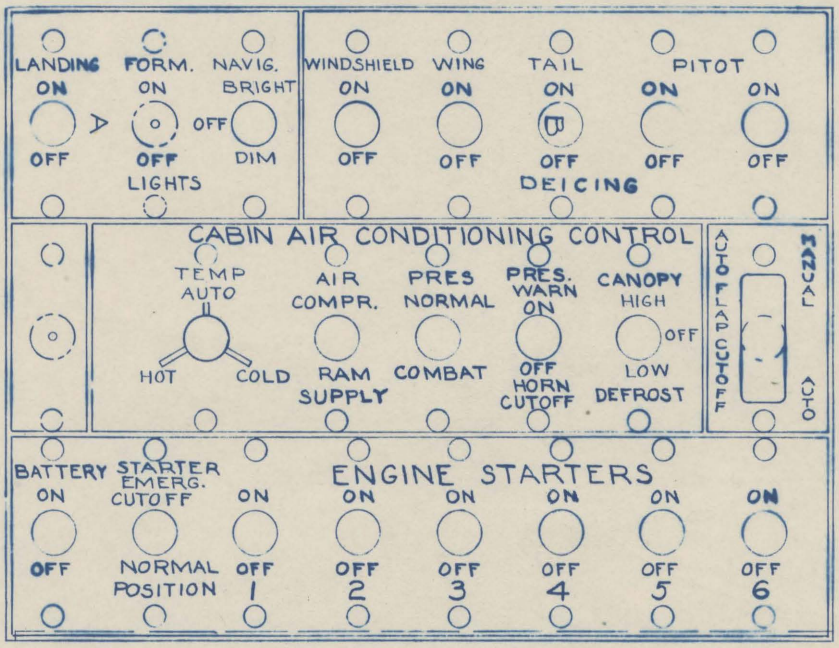
GENERAL ARRANGEMENT



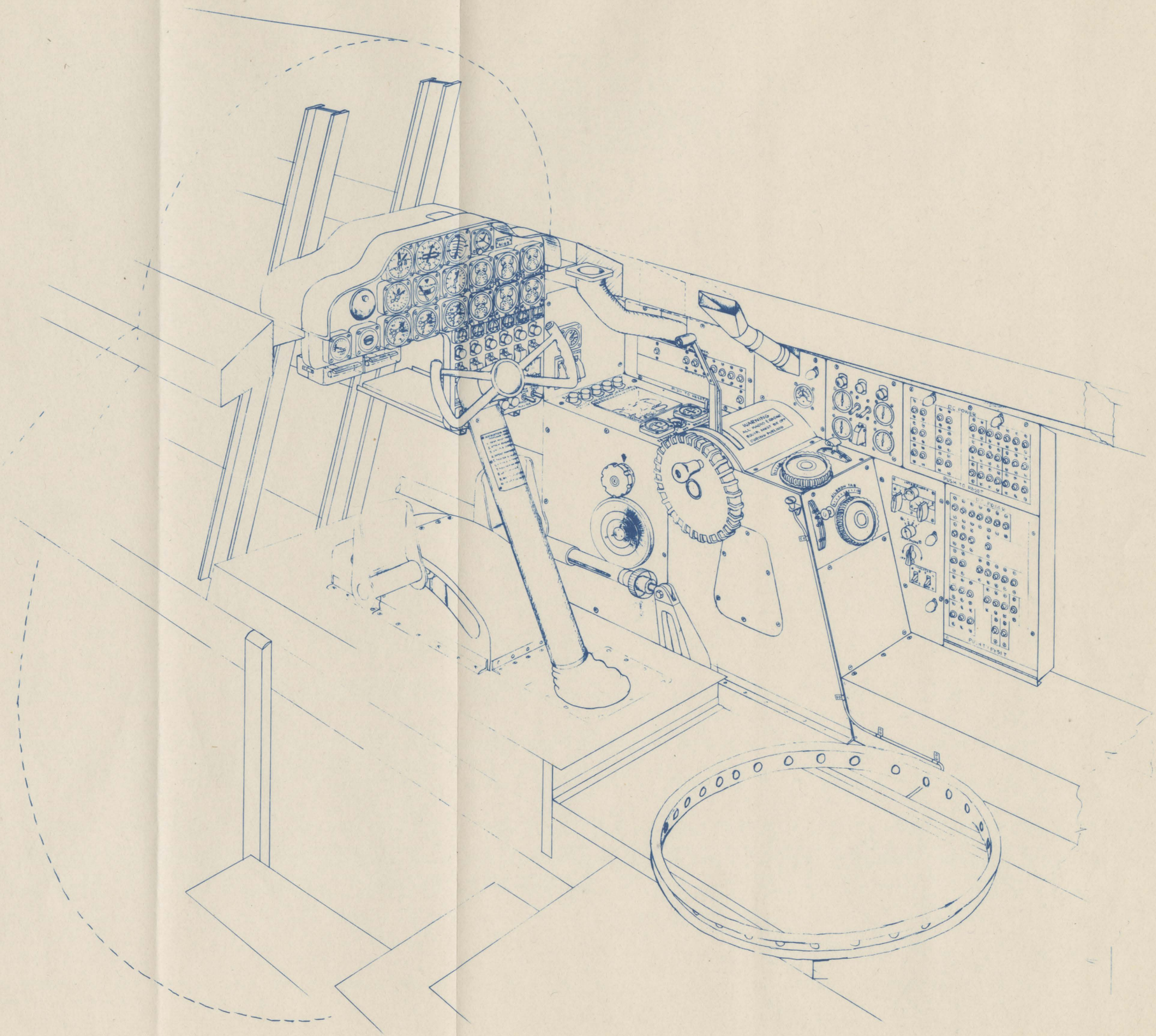
PILOT'S STATION



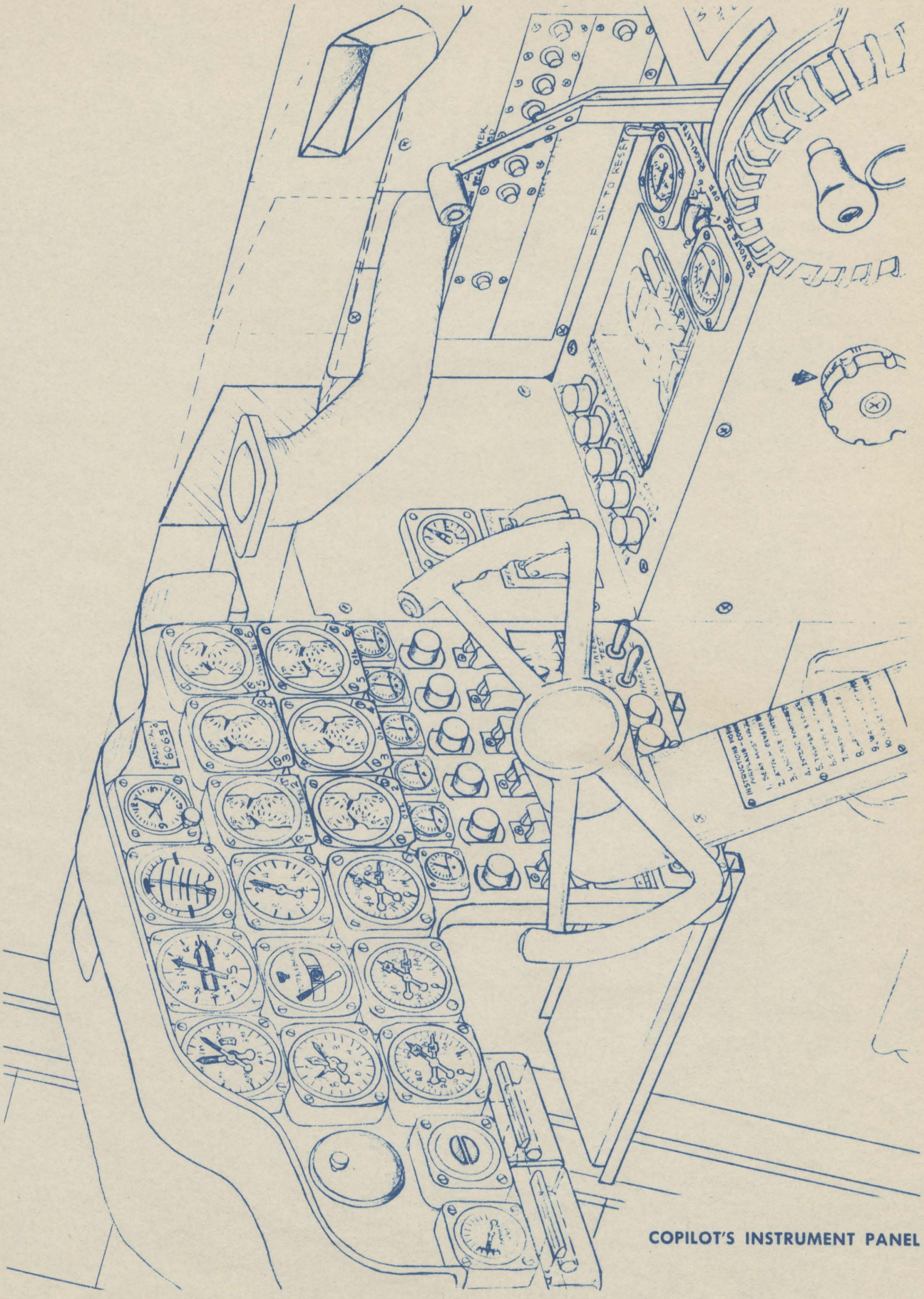
PILOT'S INSTRUMENT AND SWITCH PANEL



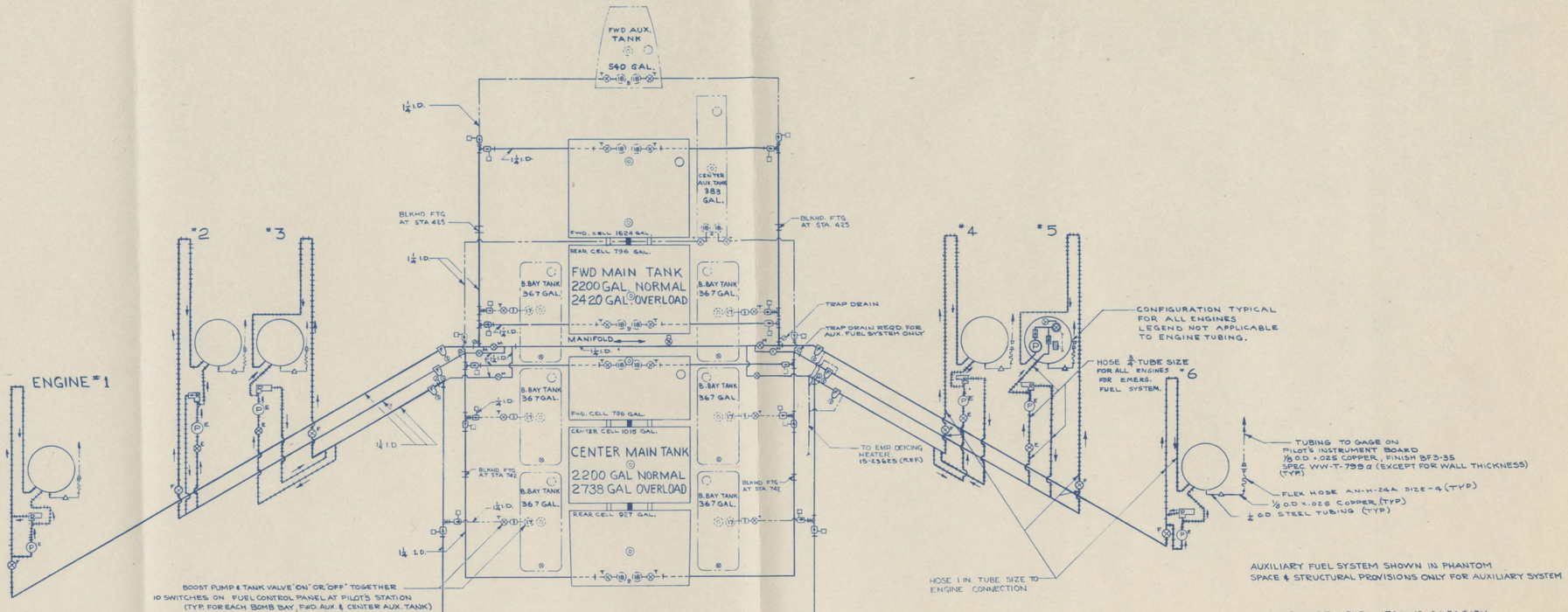
PILOT'S SWITCH PANEL



CO-PILOT'S STATION



COPILOT'S INSTRUMENT PANEL



AUXILIARY FUEL SYSTEM SHOWN IN PHANTOM
SPACE & STRUCTURAL PROVISIONS ONLY FOR AUXILIARY SYSTEM

FUNCTIONAL CHART EMERGENCY FUEL SYSTEM

FOR ANY POSITION OF FUEL FLOW SELECTOR SWITCH.

POSITION OF CONTROLS			EMERGENCY SYSTEM OPERATION
MASTER THROTTLE	EMERGENCY FUEL PUMP SWITCH	LANDING GEAR	
BELOW 7000 R.P.M.	ON	DOWN	OFF
ABOVE 7000 R.P.M.	ON	DOWN	ON
ABOVE 7000 R.P.M.	OFF	DOWN	OFF
ABOVE 7000 R.P.M. CONTINUOUSLY FROM TIME OF TAKE-OFF	ON	UP	ON
	OFF	UP	OFF
BELOW 7000 R.P.M.	ON	UP	OFF
	OFF	UP	OFF
ABOVE 7000 R.P.M FROM PREVIOUS SETTING BELOW 7000 R.P.M.	ON	UP	OFF
	OFF	UP	OFF

NOTE - EMERGENCY SYSTEM SHOULD BE USED ONLY ON TAKE-OFF AND IS LIMITED TO 10 MINUTES CONTINUOUS DUTY.

FUNCTIONAL CHART - NORMAL FUEL SYSTEM

TYPICAL FOR EACH ENGINE FUEL CIRCUIT

FLOW SELECTOR SWITCH POSITION	UNIT	THROTTLE POSITION		
		CLOSED	OPEN	ANY
TANK TO ENGINE	BOOST PUMP & TANK VALVE	OFF	ON	
	MANIFOLD VALVE			OFF
MANIFOLD TO ENGINE	BOOST PUMP & TANK VALVE			OFF
	MANIFOLD VALVE			ON
TANK-MANIF.-ENGINE	BOOST PUMP & TANK VALVE			ON
	MANIFOLD VALVE			ON
ANY	FUEL FIRE VALVE	OFF	ON	

NOTE: "ON" SIGNIFIES VALVE OPEN; "OFF" VALVE CLOSED, & FLOW SELECTOR SWITCHES ON FUEL CONTROL PANEL AT PILOT'S STATION

Ⓟ EMERGENCY FUEL SYSTEM PUMP PESCO 5-1342A

RELIEF VALVE, EMERGENCY FUEL SYSTEM SAVAL 5342

SELF SEALING COUPLING (QUICK DISCONNECT AN6242-4

LEGEND

- CAP
- HOSE END FTG
- TEE
- FUEL TANK - FIXED SELF SEALING EXTERNALLY FILLED
- FUEL TANK - AUXILIARY FIXED TANKS SELF SEALING & EXTERNALLY FILLED BOMB BAY TANKS SELF SEALING, DIRECTLY FILLED, DROPPABLE
- TANK ELEMENT ELECTRONIC FUEL GAGE
- FUEL BOOSTER PUMP TYPE B-18A SPEC. 28G19A (15 P.S.I. MIN. @ 0 FLOW 6.5 P.S.I. MAX @ 0 FLOW) TYPE B-17 SPEC. P-2863 (23 P.S.I. MIN @ FLOW 13 P.S.I. MAX.)
- HOSE, FUEL - SELF SEALING SPEC. AN-H-27a. END FITTINGS SIMILAR TO AN792
- HOSE, MED. HIGH PRESS. HYDRAULIC SPEC. AN-H-24a. END FITTINGS PER AN792 (AU6269 TYPE A)
- BREAK-AWAY FTG. - DROP TANK
- PRESSURE SWITCH - INDICATOR LAMP CIRCUIT OPEN AT BOOST PRESSURE (9-11173-1)
- CHECK VALVE - WHITTAKER W-1550-20D
- SHUTOFF VALVE - MOTOR SLIDE WHITTAKER W-7955-1&D (D) * = TANK VALVE ** = MANIFOLD VALVE *** = FIRE VALVE **** = EMERGENCY FUEL SYSTEM SHUTOFF VALVE
- DRAIN VALVE - SUMP (BACC40A-2)
- DRAIN VALVE - FILTER (KOEHLER 6030-A)
- MANUAL SHUTOFF VALVE (KOEHLER K-14658) AND DEFUELING COUPLING
- LINE TRAP DRAIN PLUG
- ENGINE J-35 (TG-180-C1)
- Ⓟ ENGINE FUEL PUMP VARIABLE VOLUME
- ENGINE CHECK VALVE
- ENGINE FUEL REGULATOR
- ENGINE STOP COCK
- ENGINE FLOW DIVIDER

FURNISHED WITH ENGINE

- VENT INTERCONNECTOR
- FUEL PRESSURE TRANSMITTER SPEC. AN-T-36 (NOZZLE PRESSURE)
- FUEL FILTER PUROLATOR 34371
- FUEL INTERCONNECTOR

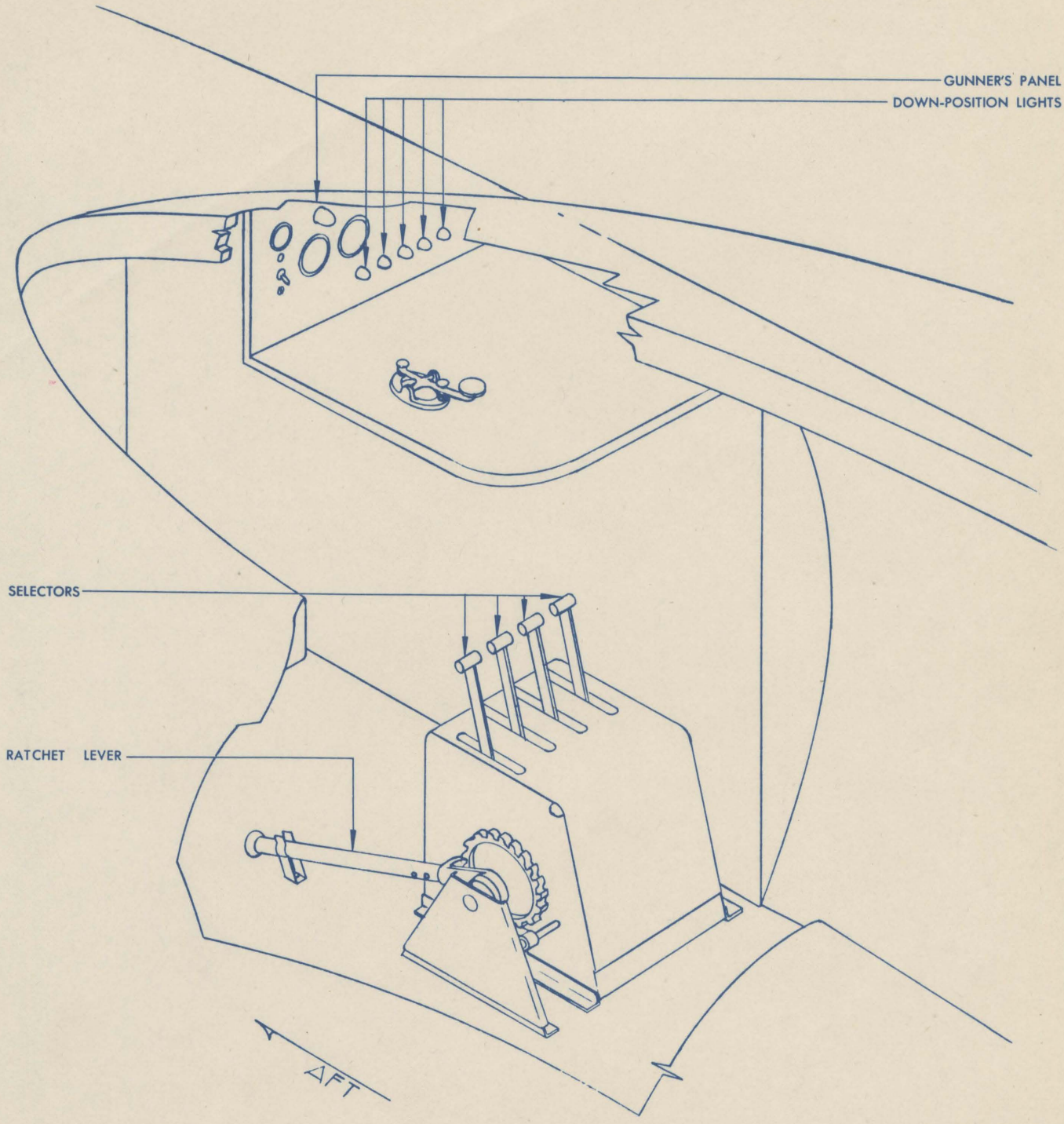
CHART - FUEL TANKS CAPACITY

TANK	NORMAL QUANTITY GAL.	OVERLOAD CAPACITY IN MAIN TANKS GAL.	MAXIMUM CAPACITY GAL.	
FWD. MAIN	2200	2420	2420	2960 GAL. ENG. 1&6
FWD. AUX.			540	
CENTER MAIN	2200	2738	2738	3121 GAL ENG. 2&5
CENTER AUX.			383	
REAR MAIN	2200	2522	2522	3415 GAL. ENG. 3&4
REAR AUX.			893	
BOMB BAY			2300 MAX.	361 GAL. PER ENG. MINIMUM
TOTAL	6,600	7,680	11,596	

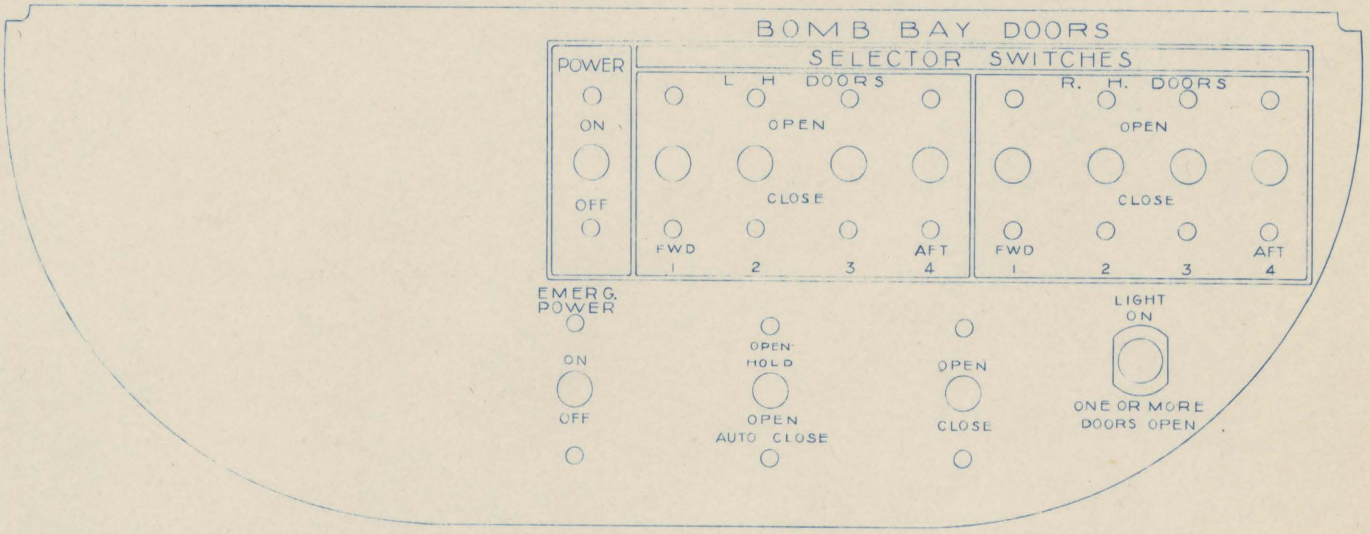
SYSTEM TO BE BALANCED SUCH THAT NORMAL CONTINUOUS FLOW TO BE FROM TANKS IN FOLLOWING SEQUENCE:
1. BOMB BAY TANKS
2. MAIN & AUXILIARY TANKS

DIAGRAM IS SCHEMATIC ONLY
TANKS SHOWN IN DIAGRAMMATIC PLAN VIEW
ENGINES SHOWN IN DIAGRAMMATIC REAR VIEW
VENT SYSTEM SHOWN ON SHEET 2.

DIAGRAM FUEL FLOW



LANDING GEAR EMERGENCY EXTENSION CONTROL



BOMB DOOR CONTROL PANEL

SECTION II
OPERATING INSTRUCTIONS

BEFORE ENTERING THE PILOTS' COMPARTMENT

RESTRICTIONS.

a. All acrobatics are strictly prohibited.

b. Do not allow the indicated airspeed pointer to reach the maximum airspeed pointer.

c. Do not exceed 350 MPH IAS when extending the landing gear.

d. Do not exceed 250 MPH IAS when extending the wing flaps 50%.

e. Do not exceed 210 MPH IAS when extending the wing flaps fully down.

f. Do not exceed 250 MPH IAS when opening the canopy for ventilation.

GROSS WEIGHT AND BALANCE. Check the airplane's weight and C. G. position for take-off and landing. Refer to the "Handbook of Weight and Balance," AN-01-1B-40 for weight information.

EXTERNAL CHECKS.

a. Condition of tires.

b. Chocks in place.

c. Check shock struts and strut extension.

d. Check removal of landing gear ground-safety locks and duct plugs.

e. Check control surfaces.

f. Remove any frost, ice, snow, or dust from wings and tail surfaces.

ENTERING THE AIRPLANE. Entrance is gained through a door on the left forward side of the airplane. When the door is opened a collapsible ladder can be reached to provide means of ascension into the passageway. Entrance into the crew compartment is gained by ascending a short ladder in the forward end of the passageway and through the pressurized compartment door.

ON ENTERING THE PILOTS' COMPARTMENT

PILOT	COPILOT
1. Check forms 1, 1A, and F.	
2. Check parachute, clothing and life preserver	2. Check parachute, clothing and life preserver
3. Check oxygen mask and oxygen pressure	3. Check oxygen mask and oxygen pressure
4. Adjust seat, rudder pedals and control column	4. Adjust seat, rudder pedals and control column
5. Set parking brake	5. Check generators "ON"
6. Check wheels chocked	6. Check hydraulic pressures
7. Check autopilot "OFF"	7. Check emergency hydraulic pump switch on "AUTOMATIC" and the manual bypass switch "CLOSED"
8. Check ATO switch "OFF," selector on "33 SEC." and arming light "OFF"	8. Check circuit breakers
9. Check master ignition "ON" and the individual ignition switches "OFF"	9. Check landing gear emergency extension selectors in "DISENGAGE" and the ratchet lever stowed
10. Set fuel selectors to tank to engine	
11. Check throttles in "CUT-OFF"	
12. Check wing flap lever in "OFF"	12. Set altimeter
13. Check landing-gear lever in "OFF"	
14. Check surface-booster switches "ON"	
15. Check cabin-pressure release handle in place	
16. Check canopy control "OFF"	
17. Check radios "OFF"	
18. Unlock surface-control lock and test controls for freedom	

ON ENTERING THE PILOTS' COMPARTMENT (CONTINUED).

PILOT	COPILOT
19. Check if external power source is connected, if not turn battery switch "ON," and check fuel warning lights on	19. Check hydraulic fluid quantity
CAUTION Do not move throttles from "CUT-OFF" after electrical power is turned on until engines are being started	
20. Interphone "ON" . Check fire-detection system	20. Interphone "ON" 21. Check inverter switch on "MAIN INVERTER"
21. Set altimeter	22. Check ignition inverter with test switch
22. Check fire guard posted	23. Check inverter voltage on regulated AC voltmeter

FUEL SYSTEM MANAGEMENT

STARTING, TAKE-OFF, AND LANDING. Set fuel selectors to "TANK TO ENGINE." In this position, the fuel booster pumps and tank valves are operated by throttle movement. See page 2-10 "Fuel Flow Panel."

FUEL BALANCING. Set the fuel selectors for the fullest tanks to "TANK AND MANIFOLD TO ENGINE" and the fuel selectors for the tanks with the lowest quantity to "MANIFOLD TO ENGINE" until the desired fuel level is obtained then return all selectors to "TANK TO ENGINE."

EMERGENCY SYSTEM. The emergency fuel system switch is turned on only during take-off and on go-around emergency. It is not to be used in flight.

ATO OPERATION

CAUTION

Check the period of time that the ATO units have been installed on the airplane. Exposure of the units to temperature variations is governed by certain time limits.

CAUTION

Personnel must be kept clear of the blast area when the units are installed.

STARTING.

a. Check if arming light is "ON," if not, the units will not fire
b. Set thrust selector for amount and duration of thrust desired
c. When thrust is desired, move firing switch to "START"

FIRING SEQUENCE.

SELECTOR POSITION	
11 second	All units simultaneously
22 second	One bank (3 units on each side of the airplane) will start firing followed in 5 seconds by the second bank which in turn is followed in 5 seconds by the third bank of units
33 second	Same as "22 second" position but with 10 second intervals between firing of the banks

STOPPING.

a. If firing has started with the selector on the "11 second" position, stopping the units is impossible

b. If firing has started, with the selector on the "22 second" position, moving the firing switch to "OFF" within the first four seconds will stop the second and third banks from firing and within the first nine seconds will stop the third bank from firing.

c. In the "33 second" position firing of the second and third banks can be stopped if the firing switch is turned "OFF" in the first nine seconds and the third bank can be stopped by turning the firing switch "OFF" within the first 19 seconds from initial actuation.

NOTE

For maximum performance use the ATO units just before the take-off speed is reached. This will insure ATO operation during the critical period after the airplane leaves the ground.

STARTING ENGINES

NOTE

Engine speeds as given in these instructions are actual values with 100% being 7700 RPM. Tachometer readings may be lower such that 100% is 7600 RPM.

PILOT

1. Starting sequence 3, 4, 5, 6, 2, and 1
2. Check master ignition switch "ON"
3. Turn selected engine's ignition switch to "1" or "2," alternate for each start as a plug check.
4. Momentarily move the starter switch to "ON"
5. After the RPM reaches 8% to 10%, within the 40 seconds maximum time, open the throttle until the fuel pressure reaches 30 to 35 PSI; maintain this fuel pressure by throttle manipulation. Main fuel tank warning lights for the engine being started should go out when the throttle is opened. Oil pressure should be at least 4 PSI at 10% RPM
6. When the fuel pressure reaches 30 to 35 PSI, the engine should fire within 7 seconds.
7. If the engine does not fire within one minute after engaging starter or within 10 seconds after 35 PSI is reached, return the throttle to "CUT-OFF" and move the starter-cutout switch to the "EMERGENCY CUTOUT" position momentarily. Allow the combustion chambers to drain and the starter-generator to cool for at least three minutes before attempting another start

CAUTION

Do not repeat the above procedure more than twice before shutting down to investigate starting failure. Allow twenty minutes for starter-generator cooling before beginning another series of three starting attempts.

8. After the engine has fired, indicated by rise in exhaust temperature, increase the RPM to 52%. The fuel pressure should be approximately 100 to 120 PSI.
9. Turn the engine's ignition to "OFF"
10. If engine starting is being made on the battery only, accelerate the operating engine to 65% RPM to provide generator power, before attempting to start the remaining engines. While accelerating the engine, it is important that an exhaust temperature of 820°C is not exceeded. As the RPM increases, the throttles can be opened more rapidly

NOTE

Because of the heavy electrical loads demanded by engine starting, it is recommended that external power be used whenever possible to start the engines.

11. After all engines are operating, turn master ignition switch "OFF" and turn all individual ignition switches to "BOTH"

ENGINE FIRE DURING STARTING

If an engine catches fire during starting, the following procedure should be used:

a. Move all throttles to "CUT-OFF."
b. Momentarily move the starter-cutout switch to "EMERGENCY CUTOUT."
c. If the fire is not extinguished by this procedure, use the fire extinguisher

IDLING CHECK

PILOT

1. Run engines at 52% RPM
2. Vibration should not be noticeable
3. Bearing-temperature indicators should indicate above 40°C

IDLING CHECK (CONTINUED).

PILOT

4. Exhaust temperatures should indicate between 500°C and 550°C
5. Fuel pressures should indicate between 100 and 120 PSI
6. Oil pressure should indicate between 30 and 40 PSI
7. Radios "ON"
8. Set trim tabs
9. Set steering-ratio selector in "HIGH"
10. Obtain taxi clearance

TAXIING

Differential engine thrusts are ineffective and should not be used to aid in steering while taxiing. Taxi the airplane with engines No. 3 and 4 operating at 52% RPM and engines No. 1, 2, 5 and 6 retarded to a uniformly low RPM but not less than 33% RPM. Engines No. 3 and 4 should be used to change the thrust as required for taxiing. The brakes should be used as little as possible during taxiing. When using the brakes, apply pressure to bring the airplane to almost a stop, then release the brakes entirely. This will allow cooling periods while the airplane is gaining momentum. While taxiing, move the steering-ratio selector from "HIGH" to "LOW" to test both positions. Also test the flight controls for freedom of movement while taxiing to save time between starting and take-off.

TAKE-OFF

PILOT

1. Line up the airplane with the runway
2. Set ratio selector to "LOW"
3. Lower wing flaps fully down
4. Check trim tabs
5. Advance each throttle until the tachometers indicate 52% RPM. Then accelerate all engines by advancing the master throttle to 85% RPM
6. Turn the emergency fuel-system switch "ON"
7. Hold the individual throttles while at 85% RPM and advance the master throttle to full open; an abrupt rise to approximately 90% RPM will indicate emergency system operation
8. Turn master ignition switch "ON"
9. Retard master throttle far enough to show emergency fuel system shutoff and to pick up all throttles
10. Advance the master throttle to full open
11. Check at 100% RPM; exhaust temperature between 650°C and 680°C and bearing temperatures between 110°C and 180°C
12. With the throttles opened on all engines and the engines operating within limits, release brakes and begin take-off
13. Use JATO if desired, during the latter part of take-off run if arming light is "ON"
14. When the airplane is in the air, apply brakes and then move the landing gear lever "UP"

CAUTION

Do not apply brakes while retracting the gear or when the gear is up and wheels are spinning

15. When the airspeed is at least 40 MPH above take-off speed, move the wing-flap lever "UP"
16. Only after sufficient airspeed and altitude are gained, turn the emergency fuel-system switch "OFF." Check fuel pressure for indication of a failed engine
17. Turn master ignition "OFF"
18. Reduce power with master throttle to 96% RPM or lower for continuous operation

COPILOT

6. Check generator voltage with the DC voltmeter and selector
7. Check hydraulic pressures and emergency hydraulic system switch in "AUTO" and the manual bypass switch "CLOSED"

ENGINE FAILURE ON TAKE-OFF

PILOT

1. If the take-off is refused for any reason, retard the master throttle to the "IDLE" position and move all throttles to "CUT-OFF"
2. If it is impossible to check the airplane's ground roll with the brakes, move the emergency landing gear retraction switch "UP" to collapse the landing gear and turn off the battery switch
3. If the airplane is airborne and an engine fails, move its throttle without interruption to "CUT-OFF." Trim the airplane as desired

CAUTION

Do not attempt to restart a failed engine until the emergency fuel system is turned off.

CLIMB

The best climbing airspeed for the XB-47 is at 270 MPH TAS and allowing the airspeed to increase at the rate of 4 MPH TAS per 1000 feet. Reasonable variation in these speeds will not materially affect the rate of climb. The engines should be operated near the maximum continuous settings for best efficiency and fuel consumption.

ENGINE FAILURE IN FLIGHT

PILOT

1. Move the failed engine's throttle without interruption to "CUT-OFF"
2. Press the engine's fire-shutoff button to prevent excessive oil accumulation in the engine
3. Turn the engine's ignition switch "OFF"
4. Trim the airplane as required
5. Set the engine's fuel selector to "TANK AND MANIFOLD TO ENGINE"
6. If the engine is windmilling, at the end of every fifteen minute period, momentarily move its throttle past the "IDLE" position and return to "CUT-OFF"; then after one minute again press the fire-shutoff button. This procedure will keep the hydraulic pump lubricated.

ENGINE STARTING IN FLIGHT

PILOT

1. Turn all engine ignition switches to "OFF" except for the engine to be started
2. Turn master ignition switch to "ON"
3. Set fuel selector to the desired fuel source
4. Momentarily turn the engine's starter switch "ON"
5. Advance throttle until firing takes place as indicated by exhaust temperature
6. After accelerating, turn master ignition "OFF" and turn the remaining engine ignition switches to "BOTH"

AUTOPILOT NORMAL OPERATION

Operate the autopilot as follows:

a. Power switch "OFF"
b. Turn the formation-stick selector knob to "OFF"
c. Center the turn-contol knob
d. Turn the power switch "ON" and allow five minutes for warmup. Check green lights for intermittent glowing.
e. Trim the airplane for "hands off" flight
f. Push the "ENGAGE" button and release. Check green lights for steady glowing.
g. Use autopilot trim knobs as desired.

CAUTION

NEVER operate the mechanical trim tabs with the autopilot engaged.

If necessary to retrim the airplane because of improper balance, push the center of the trim knob of the respective control surface to release. After retrimming with the mechanical trim tab, push the "ENGAGE" button for recontrol of the control surface by the autopilot.

FORMATION STICK OPERATION.

a. Rotate the formation stick up into position.

b. After the autopilot is engaged, move the formation-stick selector knob to the desired function.

c. Press the control transfer button on the stick to be used.

AUTOPILOT EMERGENCY OPERATION

In case of malfunction of any single trim control, disengage the trim control by pushing the center of the respective trim-control knob. If an emergency should arise, disengage the autopilot by pushing the "AUTOPILOT RELEASE" button on the control wheel and then turn the power switch "OFF."

CABIN PRESSURE EMERGENCY OPERATION

The cabin pressure can be released in an emergency by the pilot with the pull handle at the base of the control stand. If heat is desired after the pressure has been released, a reheat button near the emergency handle is pushed.

NIGHT FLYING

Compartment, instrument and external lights are conventional.

STALLS

The XB-47 has good stall characteristics. No violent action follows the stall. The ailerons and rudder provide ample control well into the stall. At low airspeeds and high gross weights (120 MPH and 100,000 pounds) the stall warning will be indicated by a shaking of the tail surfaces. The airplane will tend to settle in the stall instead of an abrupt dive or roll. With the partial extension of the wing flaps and slats at low airspeeds wing-tip stall is prevented. Recovery from a stall is gained by dropping the nose slightly to gain airspeed.

ESTIMATED STALLING SPEEDS

GROSS WEIGHT	INDICATED AIR SPEED (MPH) FLAPS AND GEAR UP	FLAPS AND GEAR DOWN
140,000	178	139
130,000	172	134
120,000	165	128
110,000	158	123
100,000	151	117
90,000	143	111
80,000	135	105

SPINS

Spins are prohibited in this airplane. If an unintential spin occurs use normal recovery action.

ACROBATICS

All acrobatics are strictly prohibited in the XB-47 airplane.

DIVING

In diving the airplane do not allow the indicated airspeed pointer to reach the maximum airspeed pointer.

LANDING-GEAR EMERGENCY OPERATION

EMERGENCY RETRACTION. The pilot can retract the landing gear in an emergency by holding the emergency retraction switch at the base of the control stand until the position lights indicate the landing gear is up and locked. If any one gear fails to retract, the individual switches on the copilot's control stand or the switches on the landing gear panel in the passageway are held in the "UP" position until the position lights indicate the gear is up and locked.

CAUTION

When operating the emergency retraction switches, care must be used to prevent the motors from overrunning, as there are no limit switches to stop the motors.

EMERGENCY EXTENSION. The landing gear is manually extended as follows:

a. The copilot rotates his seat to face aft.

b. Move ratchet lever from its stowed position to the operating position.

c. Lift the desired selector lever from the disengaged position and move to the engaged position before operating the ratchet lever.

d. Oscillate ratchet lever until gear falls free and continue to ratchet the gear into the down and locked position.

e. When the landing gear is locked in the down position indicated by position light, lift the selector lever from the detent and return to the disengaged-position detent.

WARNING

Do not engage more than one selector lever at a time.

WING-FLAP EMERGENCY OPERATION

a. Move the "PRIMARY MOTOR" switch to the desired up or down position until the flaps are positioned correctly as shown by the flap position indicator.

b. If this fails to operate the flaps, move the "SECONDARY MOTOR" switch in the desired direction.

CAUTION

Make certain the wing flap lever is in the "OFF" position before operating the emergency switches. Care must be used when operating the emergency switches as there are no limit switches on this system.

EMERGENCY BRAKE OPERATION

If the brakes fail because of a loss of main system pressure, further downward movement on the pedals will allow the emergency hydraulic system to operate the brakes. Each brake pedal when pushed adds to the amount of brake pressure used, for example, the pilot obtains more braking force by pushing on both pedals and still more braking force is obtained if the copilot pushes on both of his rudder pedals at the same time while the pilot is braking.

EMERGENCY BAIL-OUT

If an emergency should arise and it is necessary to abandon the airplane, the crew is ejected as follows:

PILOT	COPILOT	NAVIGATOR
1. Sound alarm	1. Seat facing forward	1. Seat facing forward
2. Attach oxygen bail-out cylinder to mask if required	2. Attach oxygen bail-out cylinder to mask if required	2. Attach oxygen bail-out cylinder to mask if required
3. Pull cabin-pressure release	3. Uncouple control column and stow forward	3. Tighten and lock shoulder harness and lap belt
4. Leave autopilot on, to control airplane	4. Tighten and lock shoulder harness and lap belt	4. Pull hatch release handle
5. Uncouple control column and stow forward	5. Turn arming knob for catapult	5. Turn arming knob for catapult
6. Tighten and lock shoulder harness and lap belt	6. Sit back with head solidly against rest and place feet on rests	6. Sit back with head solidly against rest and place feet on rests
7. Pull canopy release handle	7. Grip handles	7. Grip handles
8. Order navigator to abandon airplane		8. Raise firing lever with right hand
9. Order copilot to abandon airplane	9. Raise firing lever with right hand	
10. Turn arming knob for catapult		
11. Sit back with head solidly against rest and place feet on rests		
12. Grip handles		
13. Raise firing lever with right hand		

NOTE

After a crew member is ejected, the seat must be released before pulling the parachute ripcord.

DITCHING AND CRASH LANDINGS

PILOT	COPILOT	NAVIGATOR
1. Signal the crew to prepare for ditching		
2. Check shoulder harness and safety belt fastened	2. Disconnect control column and stow forward	2. Move to forward end of passageway, sit on floor facing aft and fasten ditching belt
3. Make normal landing approach with landing gear up and wing flaps fully down	3. Check shoulder harness and safety belt fastened	
4. Land with as slow a forward speed as possible in a normal landing attitude		
5. Just before contact, move all throttles to CUT-OFF, press fire-shutoff buttons and turn battery switch "OFF"	5. As soon as contact is made release canopy	

APPROACH

PILOT	COPILOT
1. Retard master throttle to 4000 RPM position	
2. Turn master ignition switch "ON"	
3. Move landing-gear lever to "DOWN" when airspeed is below 350 MPH IAS	3. Check landing-gear position lights
4. Check wing-flap cutout switch in "AUTO"	4. Check emergency hydraulic system switch on "AUTO" and the manual bypass switch "CLOSED"
5. Move wing-flap lever "DOWN" when airspeed is below 250 MPH IAS for 50% flaps or 210 MPH IAS for full flaps if desired	

GO AROUND

PILOT	COPILOT
1. Advance master throttle to full open	
CAUTION Engine acceleration is slow and too rapid opening of the throttle causes excess fuel to be supplied to the engine resulting in excessive exhaust temperatures	
2. Move landing-gear lever "UP"	2. Check landing-gear position lights
3. When sufficient airspeed and altitude are gained, move the wing-flap switch "UP"	

LANDING

PILOT	COPILOT
1. Make final landing approach at 135 MPH for landing gross weight of 92,000 or lower, increase airspeed consistent with gross weight	
2. When landing is assured retard the master throttle to the "IDLE" position, if desired	

LANDING (CONTINUED).

PILOT

NOTE

Keep the engines at 52% RPM as long as possible to assure sufficient generator voltage and to prevent battery drain

3. Check wing flaps fully down (35 degrees)
4. Flare out and land in the normal take-off attitude

NOTE

The airplane cannot be landed "hot" because of the bicycle landing gear

5. After landing and before taxiing off of the runway move steering ratio selector to "HIGH," advance throttles and raise wing flaps
6. Turn master ignition and engine ignition switches "OFF"

LANDING WITH LANDING-GEAR FAILURES

PILOT	COPILOT	NAVIGATOR
1. Land with as light a gross weight as possible and after every effort has been made to lower the landing gear NOTE Land with as much of the landing gear down as possible in preference to a gear up belly landing		
2. Check shoulder harness and safety belt fastened	2. Check shoulder harness and safety belt fastened	2. Move to ditching position in passageway and fasten safety belt
3. Move wing-flap lever "DOWN"		
4. Land with as low a forward speed as possible in a normal landing attitude		
5. When ground contact is made move all throttles to "CUT-OFF" and turn battery switch "OFF"	5. On contact with ground, release canopy	

STOPPING THE ENGINES

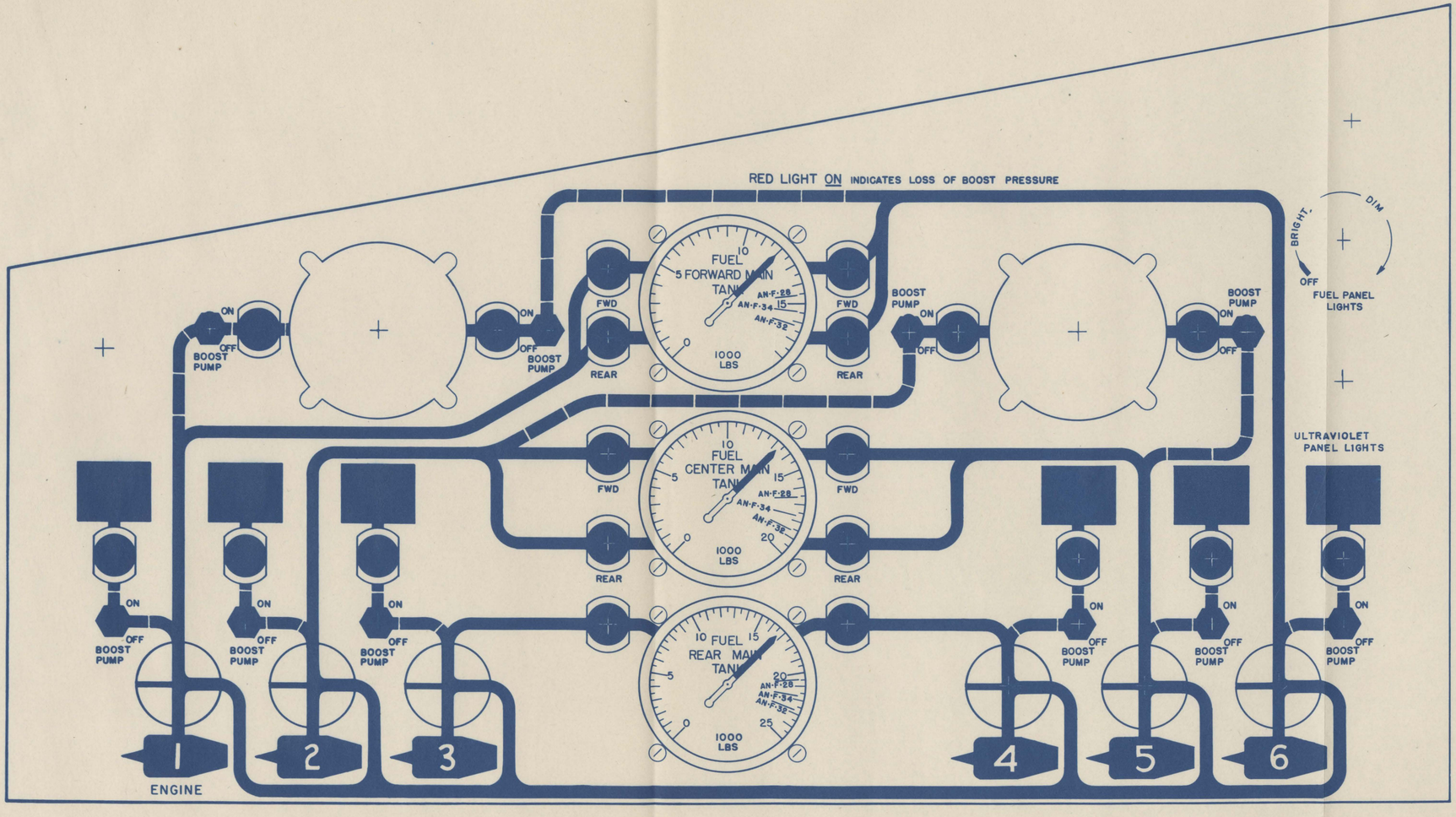
PILOT

1. Move all throttles to the "CUT-OFF" position
2. After all engines have stopped turn battery switch "OFF"

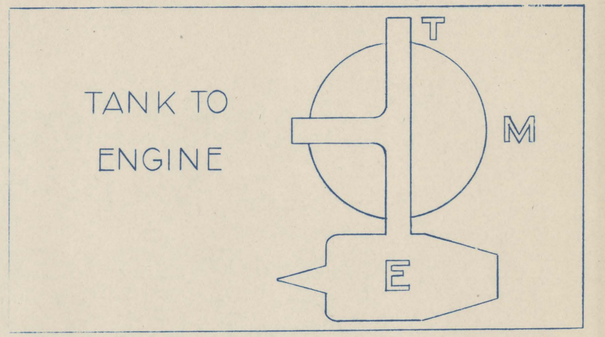
BEFORE LEAVING THE AIRPLANE

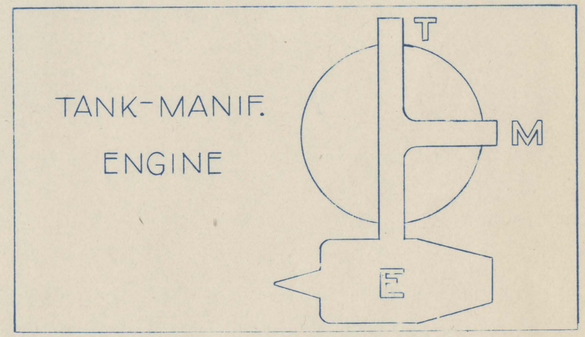
PILOT

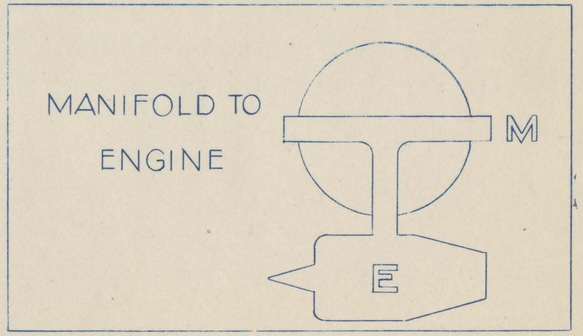
1. Check landing-gear lever "OFF"
2. Check wing flaps up and wing-flap lever "OFF"
3. Radios "OFF"
4. All switches "OFF" except generator switches
5. Move surface-control lock to "LOCK"
6. Brakes off, if wheels are chocked



FLOW DIAGRAM
FUEL PANEL







SECTION III
COMBAT EQUIPMENT

Not applicable for airplanes 46-65 and 46-66.

SECTION IV
COMMUNICATION AND NAVIGATION EQUIPMENT

The XB-47 is equipped with the following radios for communication and navigation.

INTERPHONE SYSTEM (AN/A1C-2). This airplane has the AAF combat interphone system. The controls for the interphone are on the pilot's and copilot's sidewalls and in airplane 46-66 the navigator has a control panel at his station.

CONTROL PANELS. The interphone panels have gain control, channel selectors and filter positions.

STARTING AND STOPPING THE INTERPHONE EQUIPMENT. As soon as direct current power is turned on either with the battery or an external source of power, the interphone system will operate.

VHF COMMAND RADIO (AN/ARC-3). The VHF command radio controls are on the pilot's sidewall.

CONTROL PANEL. The controls consist of a multi-position channel selector, an "ON-OFF" switch and a volume knob.

STARTING AND STOPPING THE VHF COMMAND RADIO. Turn the switch on and select the desired channel. Turn the switch "OFF" to turn the radio set off.

LIAISON RADIO (AN/ARC-8). The liaison radio controls are on the pilot's sidewall below the VHF Command radio controls.

CONTROL PANEL. The controls consist of a multi-position channel selector and a four-position "OFF-VOICE-CW-MCW" emission switch.

STARTING AND STOPPING THE LIAISON RADIO. Turn the emission switch to "VOICE" or key position and select the desired channel frequency. Turn the emission switch to "OFF" to stop the equipment.

RADIO COMPASS (AN/ARN-6). The automatic radio compass controls are on the pilot's sidewall and in airplane 46-66 are on the navigator's panel. The compass indicators are on the pilot's and navigator's instrument panels.

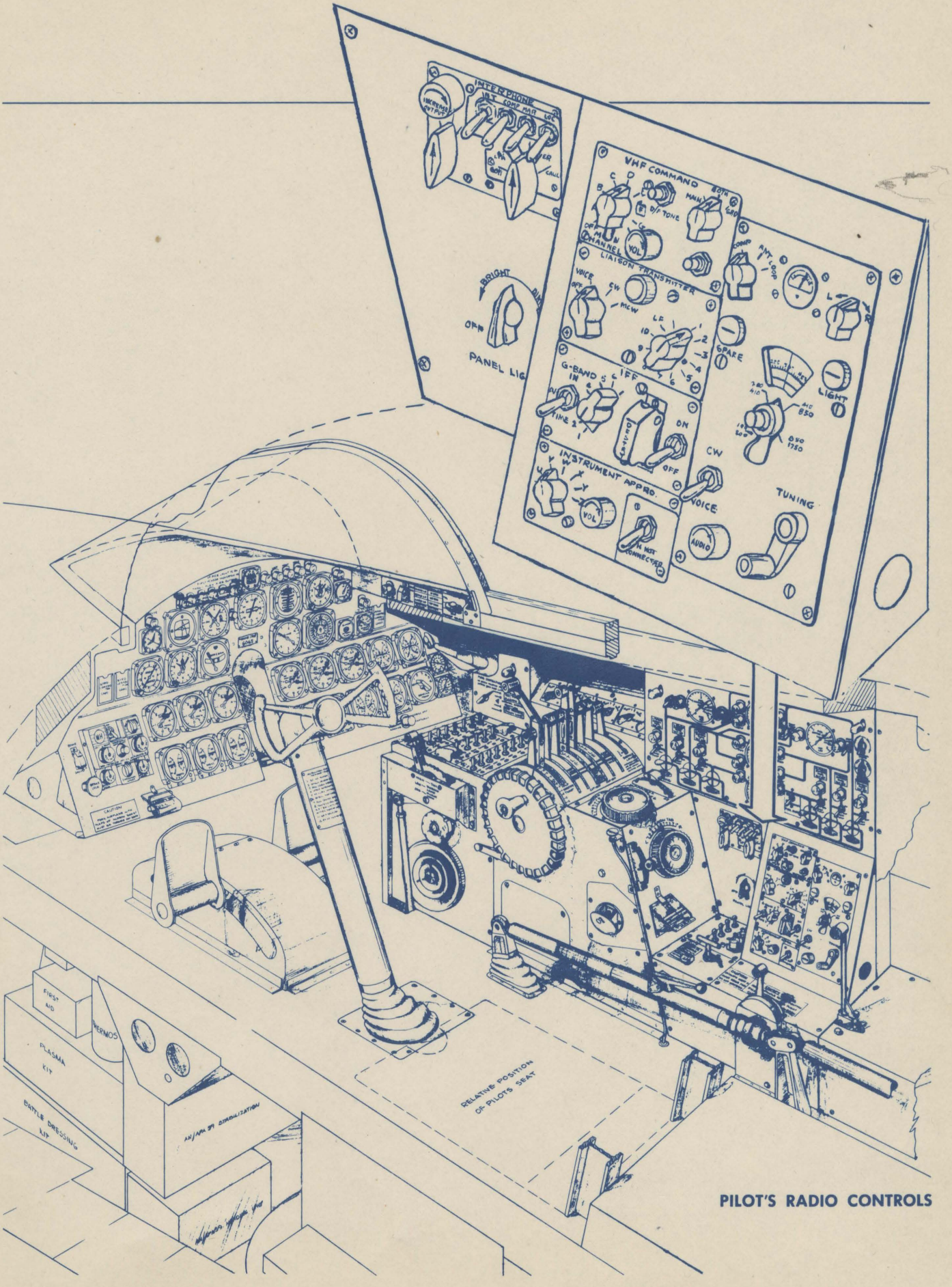
CONTROL PANEL. The panel contains a four-position, "OFF-COMP-ANT-LOOP" selector, a maximum-output meter, a left-right loop control, band selector and turning knob, a "CW-VOICE" selector and a volume control.

STARTING AND STOPPING THE RADIO COMPASS. Move the selector switch from "OFF" to "ANT" and tune in a desired frequency. Move the selector to "OFF" to turn the radio compass off.

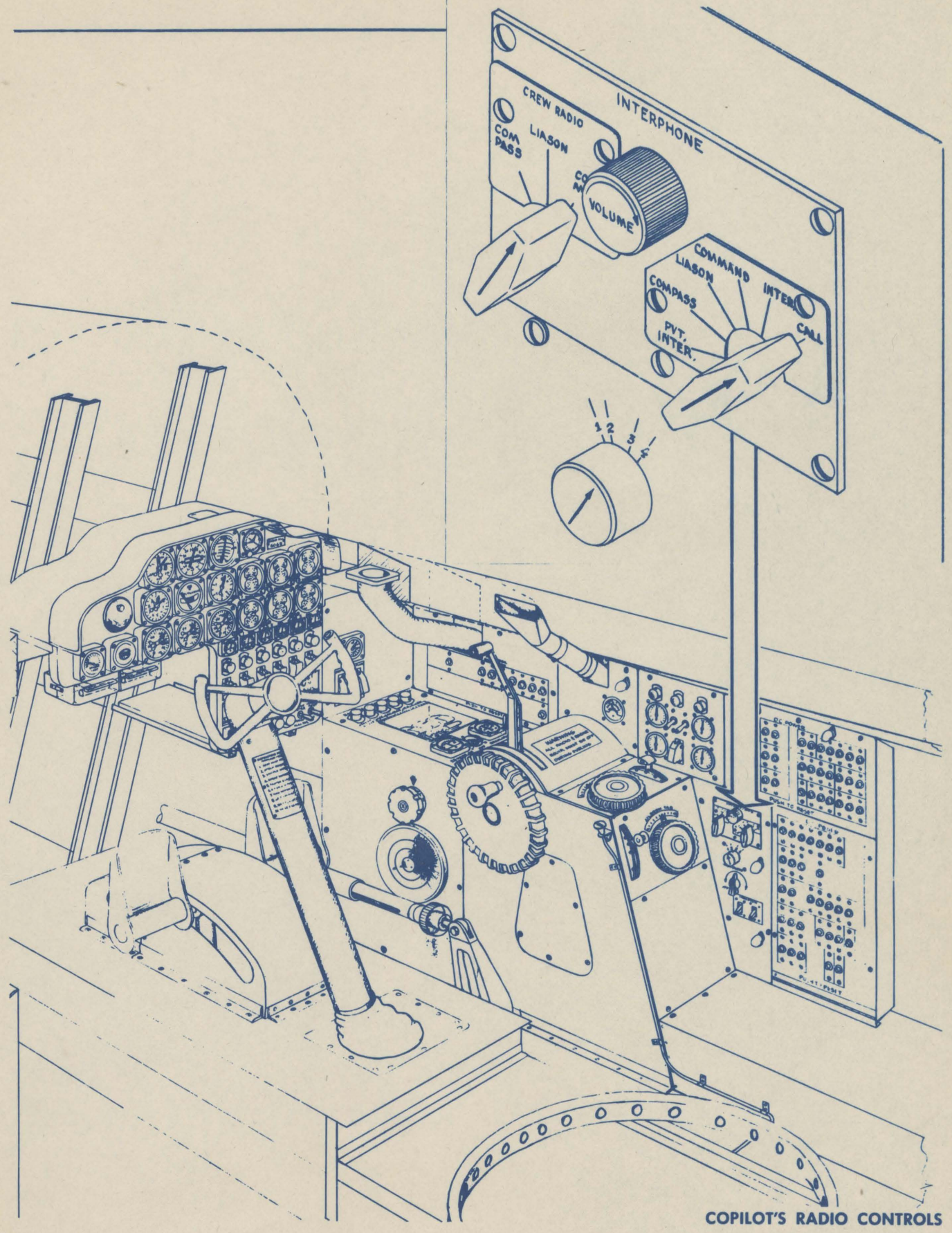
MICROPHONE SWITCHES. There are microphone switches for the pilot and copilot on the contol-column wheels and on the formation sticks. The navigator's microphone switch is on the floor at his station.

MARKER BEACON RADIO (RC-193-A). The marker beacon is automatic in operation and has an indicator lamp on the pilot's instrument panel.

STARTING AND STOPPING THE MARKER BEACON RADIO. The radio operates as soon as a direct-current power is turned on and is turned off when the direct-current power is turned off.



PILOT'S RADIO CONTROLS



COPILOT'S RADIO CONTROLS

SECTION V
MISCELLANEOUS EQUIPMENT

CABIN AIR CONDITIONING AND PRESSURIZING SYSTEM

Cabin air conditioning and pressurization is supplied by all six engines.

CABIN AIR-CONDITIONING CONTROLS. Cabin heat and ventilation is controlled by a four-position, "AUTO-OFF-HOT-COLD" switch (spring-loaded to "OFF" from "HOT" or "COLD" position) on the pilot's switch panel; a "DEC-INC" temperature control rheostat on the pilot's instrument panel; and a selector knob to regulate the amount of heat desired on the pilot's and copilot's control stands below the elevator trim-tab wheels. The cabin temperature is maintained automatically when the temperature switch is in "AUTO," but the temperature can be controlled manually by holding the switch in the "HOT" or "COLD" position as desired. A two-position, "COMPR-RAM" air supply switch, next to the temperature switch, controls the air for ventilation. See "Pilot's Switch Panel", page 1-14.

CABIN-PRESSURIZING CONTROLS. Cabin pressure is controlled by a two-position, "NORMAL-COMBAT," switch on the pilot's switch panel. In the "NORMAL" position, the cabin-pressure regulator will maintain a pressure of 6.55 PSI. In the "COMBAT" position, cabin pressure is maintained at 2.35 PSI. Cabin pressure can be released in an emergency by pulling a handle at the base of the pilot's control stand. Pulling the release handle also shuts off the cabin air supply. To restore heat in an unpressurized cabin the manual reset button near the handle must be pushed. A cabin pressure altimeter is on the pilot's instrument panel. See page 1-12.

CABIN-PRESSURE WARNING. An intermittent sounding of the warning horn indicates failure of the cabin pressure system. A pressure warning horn cutoff switch on the pilot's switch panel is used to turn the horn off. A warning light on the pilot's instrument panel indicates when the cutoff switch is not on.

DEFROSTING, DEICING AND ANTI-ICING SYSTEMS

CANOPY AND NOSE DEFROSTING. The canopy is defrosted by recirculating heated cabin air over the canopy. A two position, "OFF-ON," switch is on the pilot's switch panel. The nose is defrosted by an "OFF-ON" switch on the bombardier's switch panel.

WINDSHIELD DEICING. Windshield deicing is controlled by an "ON-OFF" switch on the pilot's switch panel. The deicing temperature is automatically controlled.

SURFACE ANTI-ICING SYSTEMS. The wings and empennage have thermal anti-icing systems to remove ice and prevent ice formation. The thermal systems operate by circulating heated air through the leading edges of the wings and empennage.

The wings are heated by compressed air supplied by all six engines. Three combustion heaters in the fuselage below the vertical stabilizer provide heated air for the empennage. Fuel for the combustion heaters is supplied from the main fuel system.

SURFACE ANTI-ICING CONTROLS. Two "OFF-ON" switches on the pilot's switch panel control the surface anti-icers. One controls the wing anti-icing system and the other controls the empennage combustion heaters. An overheat warning light on the pilot's instrument panel indicates the empennage heaters are automatically turned off by the overheat switch. See "Pilot's Switch Panel", page 1-14.

SURFACE ANTI-ICING OPERATION. When anti-icing is desired, move the switches to "ON." The systems will remain in operation until the switches are turned "OFF." The empennage combustion heaters operate when the switch is on and a ram air pressure equivalent to an airspeed of 150 MPH is obtained. When the intake temperature during ground operation exceeds 40°F or 70°F in flight is exceeded, thermal switches will automatically turn the combustion heaters off.

When the outlet temperature of the combustion heaters reaches 400°F an overheat switch automatically turns the heaters off. When this is indicated by the warning light glowing, turn the tail switch "OFF" and after a short period turn the switch "ON" again.

HEATER FUEL PANEL. A heater fuel panel near the combustion heaters has manual fuel controls for the heaters. The panel is inaccessible in flight. The manual valves are used when different fuels are used. When kerosene is used, the inboard valve is open and the other is lockwired closed. When gasoline is used for fuel,

the outboard valve is opened and the inboard valve is lockwired closed.

PITOT HEATERS. The two pitot-static heads are heated electrically and are controlled by separate "OFF-ON" switches on the pilot's switch panel.

OXYGEN SYSTEM

The XB-47 has a dual pressure-demand type oxygen system. Oxygen is supplied by 10 oxygen cylinders. A filler valve for the oxygen system is in the service hatch on the right side of the fuselage forward of the wing. See page 5-3.

The pilot's and copilot's stations, and on AAF46-66 the navigator's station are provided with a pressure-demand regulator, a blinker-type flow indicator, and an oxygen pressure indicator.

If it is necessary to fly the airplane unpressurized, use the following procedure: At altitudes up to 30,000 feet set the regulator dial on "NORMAL." From 30,000 to 40,000 feet set the dial on "SAFETY."

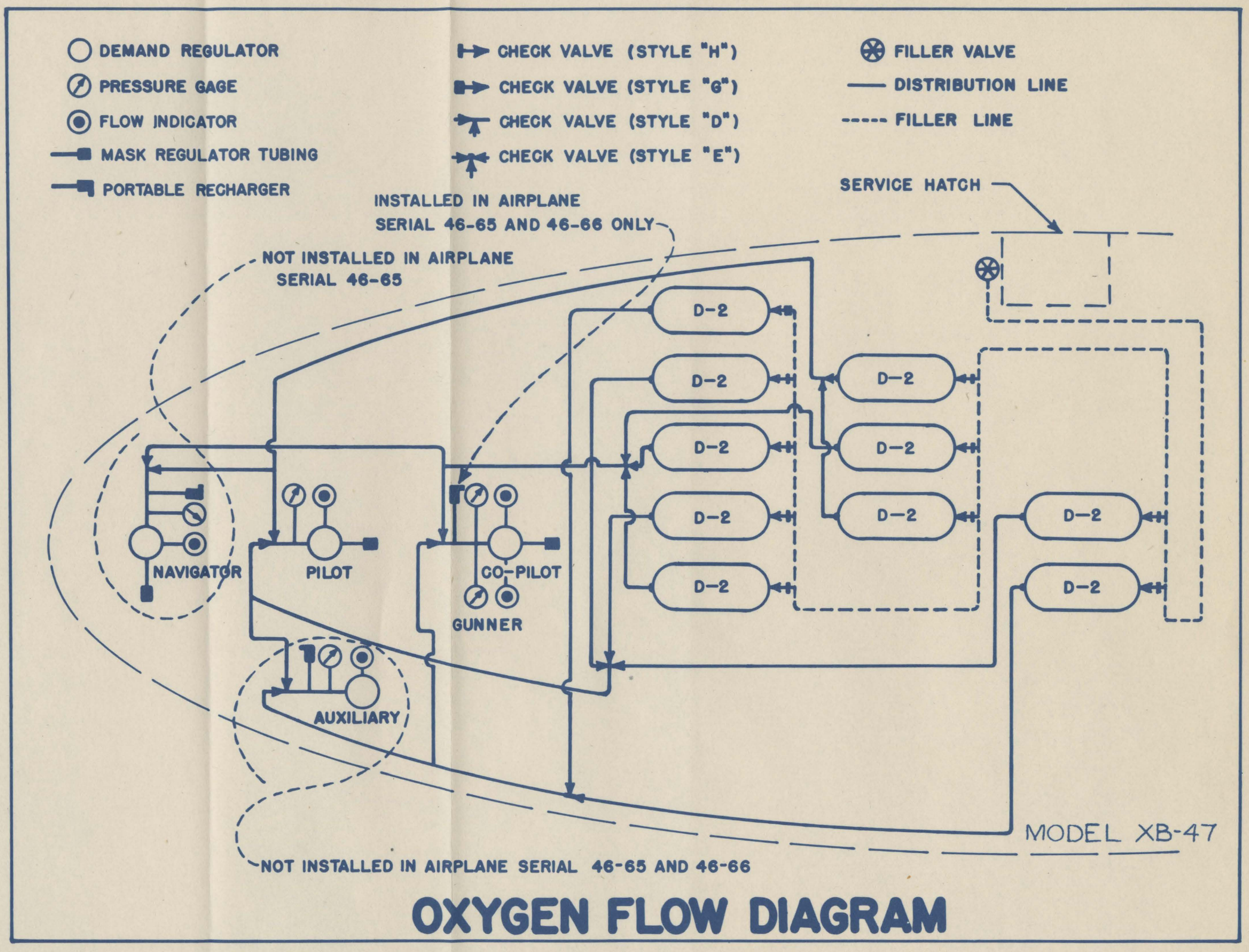
CAUTION

Always have oxygen equipment ready for instant use when flying at oxygen altitudes, in case of cabin pressure failures.

LIGHTING SYSTEM

EXTERIOR LIGHTS. The formation lights, landing lights, and navigation lights are controlled by switches on the pilot's switch panel. See page 1-14.

INTERIOR LIGHTS. Panel lights at the crew stations, fluorescent lights, spotlights, work table lights, entrance and passageway lights are provided for interior and panel illumination. Switches that control the lights are near each light.



OXYGEN FLOW DIAGRAM

SECTION VI
FLIGHT OPERATIONS DATA

The Airspeed Calibration Chart and Range Charts will be added latter when the information becomes available.

TACHOMETER

MINIMUM	26.3 % RPM	RED RADIAL LINE
NORMAL	52.6 % to 97.4 % RPM	GREEN RANGE
MAXIMUM	101.2 %	RED RADIAL LINE

EXHAUST TEMPERATURE

NORMAL	260°C to 680°C	GREEN RANGE
MAXIMUM	820°C	RED RADIAL LINE

BEARING TEMPERATURE

NORMAL	80°C to 150°C	GREEN RANGE
MAXIMUM	175°C	RED RADIAL LINE

OIL TEMPERATURE

MINIMUM	10°C	OIL TEMPERATURE
MAXIMUM	77°C	RANGES MAY BE CHANGED LATER

FUEL PRESSURE

NORMAL	40 PSI to 450 PSI	GREEN RANGE
MAXIMUM	500 PSI	RED RADIAL LINE

OIL PRESSURE

MINIMUM	5 PSI	RED RADIAL LINE
NORMAL	10 PSI to 50 PSI	GREEN RANGE

HYDRAULIC PRESSURE

MAIN SYSTEM----------	MINIMUM	0 TO 2000 PSI	RED QUADRANT
----------	NORMAL	2000 TO 3000 PSI	GREEN RANGE
MAIN BRAKE SYSTEM---------	MINIMUM	0 TO 1500 PSI	RED QUADRANT
---------	NORMAL	1500 TO 3000 PSI	GREEN RANGE
EMERGENCY SYSTEM----------	MINIMUM	0 TO 2000 PSI	RED QUADRANT
----------	NORMAL	2000 TO 3000 PSI	GREEN RANGE
EMERGENCY BRAKE SYSTEM----	MINIMUM	0 TO 1000 PSI	RED QUADRANT
----	NORMAL	1000 TO 3000 PSI	GREEN RANGE

AIRCRAFT MODEL
XB-47

T A K E - O F F C L I M B A N D L A N D I N G C H A R T

ENGINE MODEL
J-35

TAKE-OFF, DISTANCE FEET

GROSS WEIGHT LB.	HARD SURFACE RUNWAY			
	NACA STD. DAY		ARMY HOT DAY	
	GROUND RUN	TO CLEAR 50' OBST.	GROUND RUN	TO CLEAR 50' OBST.
100,000	3400	4050	4700	5200
110,000	4200	4950	6050	6600
120,000	5150	5950	7750	8350
125,000†	5700	6500	8800	9500
130,000	6250	7100	10000	10900
138,980✳	7350	8300	----	----
145,870△	8340	9500	----	----
T.O. RPM = 7700 FULL FLAPS DATA AS OF 9-27-46 BASED ON: CALCULATED DATA				

† - DESIGN GROSS WT.

✳ - WT. FOR MAX BOMB LOAD

△ - WT. FOR MAX FUEL LOAD

C L I M B D A T A

STARTING GROSS WT. LB. AT S.L.	SEA LEVEL		AT 10,000'				AT 20,000'				AT 30,000'				AT 30,000'			
	BEST	CAS	BEST	CAS	FROM S. L.		BEST	CAS	FROM S. L.		BEST	CAS	FROM S. L.		BEST	CAS	FROM S. L.	
	MPH	KTS	MPH	KTS	TIME MIN.	FUEL USED#	MPH	KTS	TIME MIN.	FUEL USED#	MPH	KTS	TIME MIN.	FUEL USED#	MPH	KTS	TIME MIN.	FUEL USED#
80,000	268	233	264	229	3.0	600	254	221	6.0	1350	237	206	9.6	2200	213	185	15.0	3300
100,000	270	234	268	233	3.6	1000	256	222	7.5	2150	243	211	13.50	3600	220	191	22.2	5600
120,000	271	235	271	235	4.2	1400	264	229	9.6	3050	250	217	17.4	5300	---	---	----	----
140,000	272	236	275	239	4.8	1950	270	234	12.0	4200	259	225	24.0	7200	---	---	----	----
NO ALLOWANCE FOR WARM-UP, TAXI OR TAKE-OFF RPM = 7700 DATA AS OF 9-27-46 BASED ON: CALCULATED DATA																		

L A N D I N G D I S T A N C E F E E T

GROSS WEIGHT LB.	HARD DRY SURFACE	
	GROUND ROLL	DIST. TO CLEAR 50' OBST.
80,000	2560	4400
100,000	3150	5400
120,000	3700	6380
140,000	4250	7380
DATA AS OF 9-27-46 BASED ON CALCULATED DATA		