

The cowl flaps are controlled by levers on the control console. Notches in the face of the console lock the cowl flap levers in either the fully open or fully closed position.

FUEL SYSTEM

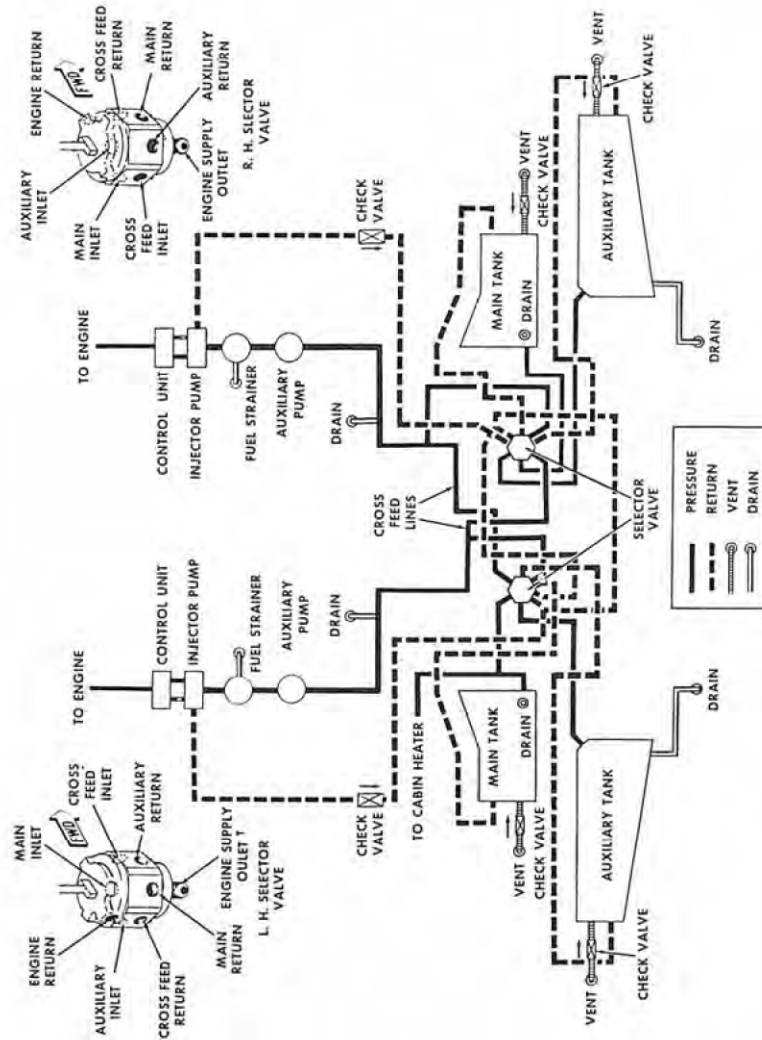
The fuel system on the T-42A airplane consists of a separate, identical supply for each engine. Two 40-gallon main cells in each wing leading edge and two 31-gallon auxiliary cells in the wing panels outboard of each nacelle provide a total usable fuel supply of 142 gallons. During normal operation, each engine draws fuel from its respective fuel cells with the engine fuel pump. For emergency purposes, cross feed lines are provided so that fuel from any cell can be supplied to either engine, but the system does not allow for fuel to be transferred from one cell to another. A fuel selector valve for each engine and a schematic diagram of fuel flow is provided on the selector panel on the floor of the cockpit.

Filler neck openings fitted with bush type caps are provided in the upper wing surface. Each cell is filled individually as fuel will not transfer from one cell to another. Fuel quantity is measured by float-type transmitter units in each cell which transmits signals to the fuel gages on the instrument panel. A two-position selector switch determines the cell, main or auxiliary, to which the gage is connected.

An individual electric boost pump is provided for each engine. These pumps are used for starting and will provide near maximum engine performance if the engine driven fuel pump should fail. A vapor return line from each fuel injector unit returns excess fuel to the cell from which it is being drawn during either normal or cross feed operation. The fuel system is drained at eight locations as shown in the fuel system schematic and the servicing diagram.

During single engine operations, fuel may be drawn from any cell within the system by the boost pump for the operating engine. Check valves within the system prevent the operating engine's fuel pump from drawing air into the system through the dead engine during single engine cross fed operation. A mechanical interlock prevents the placing of both fuel selector valves on cross feed at the same time.

FUEL SYSTEM SCHEMATIC



SECTION V

Emergency Operating Procedures

“The best time to know procedures and the worst time to practice them is during an emergency.”

Emergencies created by the failure or malfunction of one or more components or accessories may be broadly classified in one of two groups: those requiring immediate action and those in which you have sufficient time to decide on and execute a plan of action according to the demands of the particular situation.

In this discussion of emergencies the situations requiring immediate corrective action are treated in check list style for easy reference and familiarization. Other situations are discussed with respect to cause, condition, effect, and possible corrective measures. Your practice of these suggested techniques should be frequent enough for you to maintain proficiency in the rapid initiation of the proper procedures. Complete mastering of the emergency procedures peculiar to multi-engine flying can not be overly stressed.

Emergency situations seldom will occur if you follow good inspection and maintenance practices; otherwise, your need for a complete understanding of this section is multiplied.

SINGLE-ENGINE OPERATION

The flight and handling characteristics of the T-42A on one engine are excellent. The airplane may be safely maneuvered or trimmed for normal hands-off operation, which is easily sustained by the operative engine as long as *sufficient airspeed is maintained*. However, to properly use these safety and performance characteristics, you must have sound understanding of single-engine performance and the limitations resulting from an unbalance of power.

Two major factors govern the single-engine operation; airspeed and directional control. The minimum single-engine control speed is the

speed at which you still have directional control with the aircraft in take-off configuration, one engine inoperative and full take-off power on the operating engine. However, bear in mind that this speed is a minimum for control and *below the speed at which the airplane will climb.*

The best single-engine rate-of-climb speed at sea level is indicated by the blue line on the airspeed indicator. This speed is extremely important for best performance in an emergency. In fact, it is probably the most important speed you will be concerned with during your practice of emergency procedures or should an actual emergency occur. If the best single-engine rate-of-climb speed is allowed to vary from the optimum, your rate of climb will decrease, or if you are above the critical single-engine altitude, your rate of sink will increase.

If you have best single-engine rate-of-climb speed, normal single-engine procedures may be followed. Otherwise, you must attain this necessary airspeed through acceleration or altitude loss. If this is not possible, it will be necessary to land. The technique to be used in a given situation and the decisions you must make will depend entirely upon your altitude and airspeed at the particular time the emergency arises. The variation in best rate-of-climb speed with altitude is shown in the graphs in Section VI.

Airspeeds given in Section III and Section VI are recommended for average piloting techniques, under average conditions; they do not represent the maximum airplane performance under ideal conditions, but have been determined on the basis of actual flight tests to afford you with a reasonable margin of safety.

The chief advantage of an additional engine is the ability of the airplane to go on flying if one engine fails. However, having two engines, like having blind flying instruments, is a safety factor which depends on the knowledge, technique and the recent experience of the pilot in his particular airplane.

A zero-thrust graph with instructions for simulated one-engine-out conditions is provided to aid in reduction of risks involved in single-engine practice. Practice these techniques until they become instinctive.

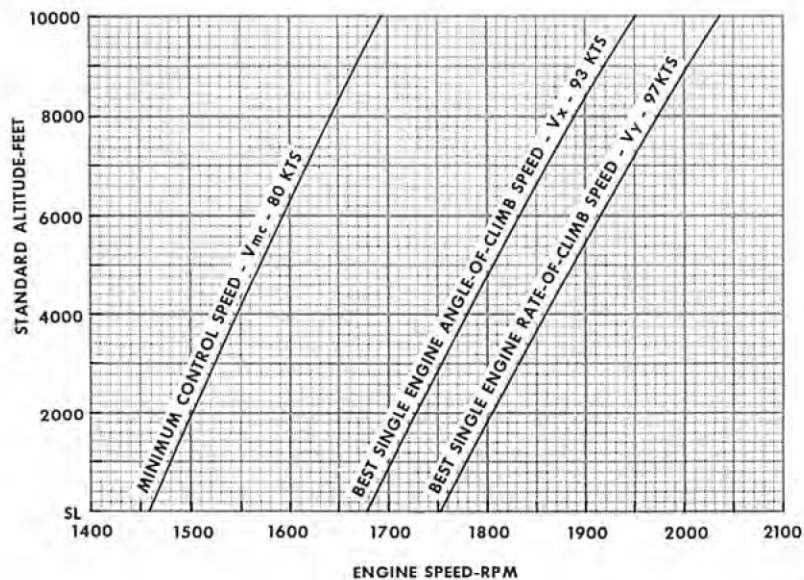
SIMULATED ONE ENGINE OUT PROCEDURE

Simulated one-engine-out conditions may be set up whereby zero thrust power settings may be used instead of complete engine shut-down in order to avoid the risks involved in the training or practice of single-engine technique. The three airspeeds represented in the accompanying graphs are V_{mc} (minimum single-engine control speed), V_x (best single-engine angle-of-climb speed), and V_y (best single-engine rate-of-climb speed) with the landing gear up and the propeller feathered. In order to set up a zero thrust condition for single-engine practice, use the following procedure:

Use of the Zero Thrust Graph

1. Select your pressure altitude (altimeter set at 29.92 inches Hg) and either the V_{mc} , V_x or V_y airspeed.
2. Observe the OAT and determine the standard altitude from the altitude conversion chart.

ENGINE SPEED FOR ZERO THRUST



pump (if on). Check fuel and oil pressure. If either indicator does not respond normally, abandon attempt at starting. Refeather and secure engine.

5. Let engine warm up at approximately 2000 rpm and 15 inches manifold pressure. Observe oil pressure closely; if not normal in 30 seconds, shut down and refeather.

6. When oil and cylinder head temperatures are in normal range, bring engine up to normal power and retrim. Set rpm first, then open throttle.

SINGLE-ENGINE LANDING

Essentially, a single-engine landing is the same as a normal landing, except that you should allow a larger safety margin during the pre-landing pattern and final approach. This safety margin is in the form of more airspeed, a slightly higher pattern and final approach altitude, and a wider pattern which will eliminate any steeply banked turns.

Since you have more altitude, your final approach may be higher and because of the larger pattern you may line up with the runway further out; thus you will have time to correct for any wind drift, stabilize your final approach speed and rate of descent and judge more accurately your use of gear and flaps. Also, you can ease off the power on your good engine a little sooner; rudder trim should be reduced to neutral as power is decreased.

Lower the landing gear only after final approach is established. If a base leg is used, the gear may be lowered as you roll out of the turn on final; in making a straight-in approach aim for the first few feet of runway and set up a glide path to overshoot rather than undershoot, then lower the gear. Do not lower the flaps until the gear is down and locked and you are sure of making the field. Full flaps may be used to shorten the landing roll or to steepen the approach if you are overshooting.

With full flaps and gear down, level flight cannot be maintained at full gross weight on one engine; unless time will permit you to clean up the airplane, do not attempt to go around.