traffic patterns and landings

chapter 7

part I The Rectangular Traffic Pattern

A traffic pattern is a geometrical course flown above the ground at a prescribed safe altitude so that a landing approach may be accomplished in a systematic sequence. It is also a means of controlling aircraft that are returning to or leaving a field.

When a number of aircraft are operating from the same field, it is absolutely necessary that each aircraft conform to the established traffic patterns and procedures. It is obvious that unless these safety measures are observed, there is a risk of collision. Accordingly, it is essential that you become thoroughly familiar with the details of the traffic patterns and associated procedures pertaining to the fields from which you will operate.

The normal pattern used for all primary flying training activities and generally throughout the Air Force is the rectangular pattern. There are deviations from this type of pattern, such as the modified 360° overhead approach used by fighter-type aircraft. This is covered in a more advanced phase of training. However, the rectangular pattern is standard and will be covered in detail in this chapter. (See illustration on next page.) The altitude for this normal rectangular pattern is 800 feet above the ground.

The traffic pattern will be broken into integral parts and explained separately. The term "leg" will be applied to each of these parts.

45° ENTRY LEG

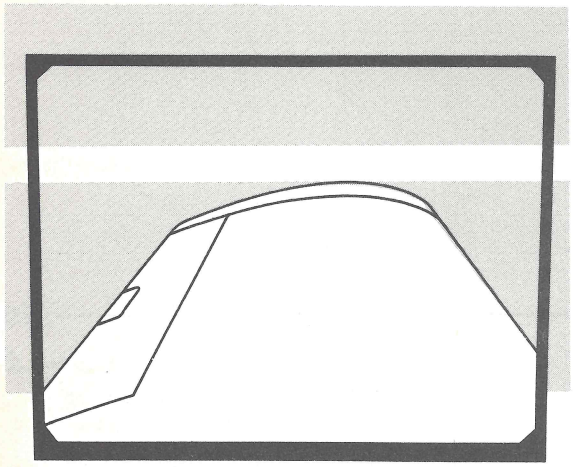
The 45° entry leg is a systematically planned approach to the traffic pattern providing clear vision of the entire pattern. It allows you sufficient time to accomplish all checks and procedures so that your full attention may be devoted to planning the remaining part of the pattern as well as the landing.

DOWN-WIND LEG

The down-wind leg is a course flown above the ground, parallel to the landing runway but opposite to the intended landing direction. Normally its distance from the runway will be determined by placing the inside wing tip on the edge of the runway. This is known as a "wing-tip distance." However, local conditions at your training base may result in its being placed farther out. It is important that you know what your instructor means when he tells you to "keep a wing-tip distance." (See illustration on next page.)

BASE LEG

The base leg is the transitional part of the traffic pattern between the down-wind and final, approach legs. Depending on the wind condition, it is established at a sufficient distance from the landing runway so that the glide ratio of the aircraft will be proper for the approach.



Wing-Tip Distance

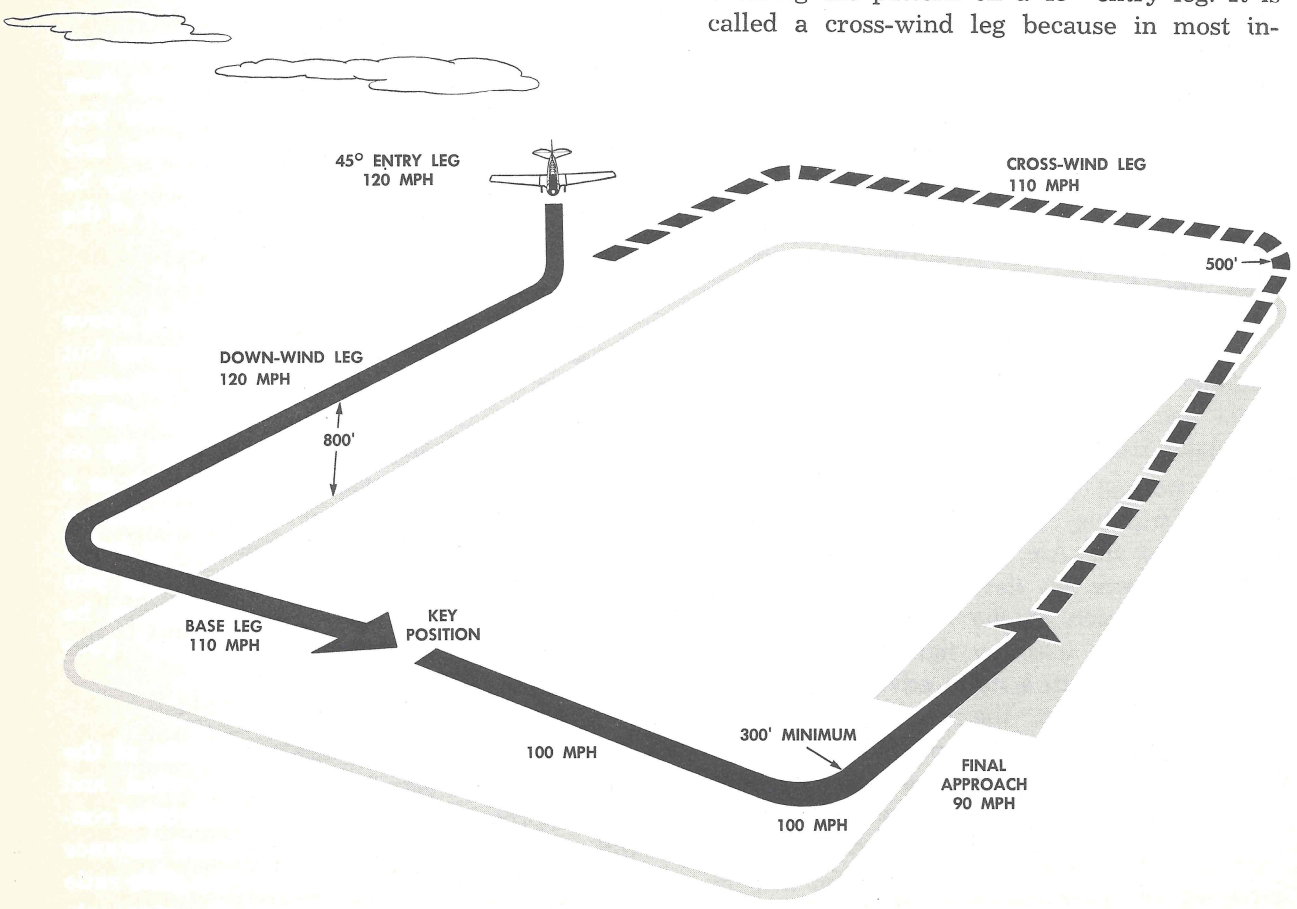
Its track across the ground is perpendicular to the landing runway, although the aircraft may actually be flying at an angle to overcome wind drift.

FINAL APPROACH

The final-approach leg is a flight path from the final turn to the point of touch-down. This is probably the most important leg of the entire pattern, for here your judgment must be keenest.

CROSS-WIND LEG

The cross-wind leg is that part of the rectangular pattern perpendicular to the take-off climb. It is used for leaving the pattern or getting to the down-wind leg after a go-around has been executed. In the latter case it is a time saver because you save time by going directly to the down-wind leg rather than re-entering the pattern on a 45° entry leg. It is called a cross-wind leg because in most in-



Standard Rectangular Traffic Pattern

stances it will be 90 degrees from the direction of the wind.

TECHNIQUES OF FLYING THE LEGS OF THE TRAFFIC PATTERN

Now that the component parts of the pattern have been introduced, the techniques involved in flying them will be explained.

LETDOWN TO TRAFFIC ALTITUDE

Prior to letting down to traffic altitude (800 feet above the ground), you must accomplish several very important checks in the interest of safety. At a prescribed safe altitude make the following checks:

1. Check the radio to determine that you have the proper channel, that the volume is turned up, and that the set is operating properly.
2. Adjust the mixture control to the full-rich position.
3. Make sure the shoulder harness is locked.
4. Check the tail wheel locking control for the locked position (if applicable).
5. Open the canopy.

From your knowledge of local landmarks and orientation points, such as roads and their compass courses surrounding the field, plan your let-down so as to arrive at traffic altitude approximately two miles from the field on the traffic-pattern side and in line with the up-wind border of the field. This is accomplished so that the 45° entry leg will be of sufficient length to allow you plenty of time to complete the pre-landing checks.

Since all turns in the traffic pattern will be standard medium-banked turns, use extreme caution when entering onto the 45° entry leg. It is possible that aircraft will be entering from the opposite side of the leg and may be in a banked attitude at the same time your aircraft is in a banked attitude, thus preventing either from seeing the other. To guard against this, plan your entry so that you will be funneled in at an angle of 45° or less.

45° ENTRY

Enter traffic on a course 45° to the down-wind leg of traffic so that the actual entry will be accomplished within the up-wind half of the down-wind leg. This will allow you to have a down-wind leg of sufficient length to make corrections in flight attitudes. It will also allow you to anticipate the need for drift corrections, spacing in relation to other aircraft, and the execution of the turn onto the base leg.

Immediately after rolling out on the 45° entry leg, accomplish the pre-landing check and establish an airspeed of 120 MPH. For most T-6 aircraft, approximately 22″ Hg manifold pressure and 2000 RPM will give this airspeed. It is important to note that after the 120-MPH airspeed has been attained, the proper trim technique must be used. The rudder trim control should be slightly forward to compensate for the torque effect (asymmetrical loading of the propeller) caused by the nose-high attitude of the aircraft. The elevator-trim control should be in the rear position sufficiently to maintain this slight nose-high attitude.

On this leg of the traffic pattern as well as all others, look for wind-drift and make necessary corrections so that a constant track across the ground will be maintained. Adjust your spacing on other aircraft so that you will know positively that they will not interefere with your pattern. Remember that if you are too close to an aircraft on the entry or down-wind leg, you are certainly going to be too close on the final approach.

DOWN-WIND LEG

The turn from the entry to the down-wind leg should be a standard medium-banked turn with the roll-out executed so that the aircraft is aligned parallel to the runway. The conditions of flight for this leg are the same as for the 45° entry leg, i.e., pre-landing check completed and 120 MPH.

On this leg you should have ample time to correct for wind drift, re-trim the aircraft, and make minor corrections in your spacing on other aircraft in the traffic pattern. Throughout the leg, look around. Your lateral references for straight flight are the same as for straight flight at normal cruise; however, a slightly higher pitch attitude will be present.

Make sure that the wing tips are equidistant below the horizon. The positioning of the down-wind leg from the runway has been covered previously.

During the early part of landing practice, there may be a tendency for you to use the runway as the lateral horizon line. If you should do this, the wing tip on the runway side will be the distance below the runway edge that it should actually be from the horizon line. Since the aircraft would then be in a banked attitude, it would turn toward the runway. Now, how would this affect your traffic pattern? It would cause your down-wind leg to move progressively closer to the runway; consequently, your base leg would be so short that you would not have enough time to establish the proper glide attitude before executing the turn to the final approach. This condition might also cause you to think there was an extremely strong cross-wind. *Do not let this happen to you.* Make sure your wings are level by checking both wing tips with the horizon line.

One of the most important functions of this leg is the anticipation of the point where the turn to the base leg should be executed. This decision will greatly affect the remaining part of the pattern. The prevailing wind conditions will govern whether or not the base leg should be close in or farther out. When the wind is comparatively strong, the base leg will necessarily be closer to the runway than when the wind is light. This is understandable when the effect of the wind on the glide ratio and the drift of the aircraft are considered. With these thoughts in mind, plan the turn accordingly. Execute the turn with a medium bank just as you did in your practice of rectangular courses.

BASE LEG

While executing the base-leg turn, retard the throttle to approximately 19″ Hg and establish a 110-MPH airspeed. The aircraft should be re-trimmed and this airspeed maintained to the key position. After rolling out on the base leg, and while maintaining straight and level flight, re-check the wind drift to determine if your correction is proper and that you are maintaining a straight track across the ground.

The Key Position

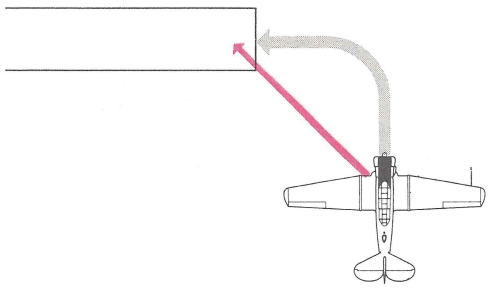
The key position is a point on the base leg at which the throttle is closed and the glide established. Several considerations should be given to the selection of this position. It should be selected early enough to allow plenty of time for closing the throttle, decreasing the airspeed to 100 MPH, establishing a 100-MPH gliding attitude, and trimming the aircraft prior to executing the turn from the base leg onto the final approach. It is good practice to place the key position at an angle of approximately 45° to the desired landing spot; that is, your line of sight to the desired landing spot should be at an angle of 45° to the longitudinal axis of the aircraft. (See illustration on opposite page.) This is approximately halfway between the nose and the inside wing tip.

Another consideration of the key position during concentrated landing practice is the consistency of the position, regardless of where the base leg is placed. If you change the position of both the base leg and the key position, you will spoil your judgment of the aircraft's gliding distance. It is very important, therefore, that you keep the key position at 45° to the landing runway, especially during the early part of your training, and vary the base leg to compensate for wind effect. This will greatly augment your judgment in estimating the gliding distance of the aircraft. After you become proficient in positioning the base leg to correct for wind, make adjustments in the key position as an additional correction.

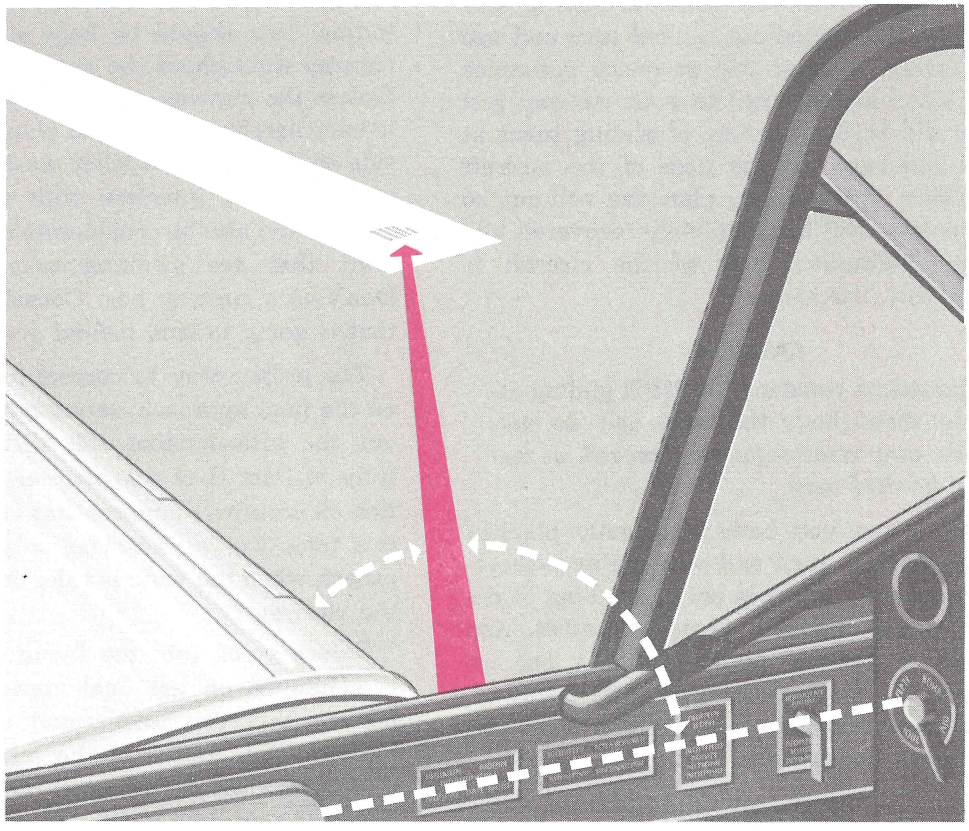
When you are practicing power-off approaches and landings, the base leg and key position should be properly established. This is necessary in order for you to glide from the base leg to the desired landing spot without the addition of any power.

Establishing the Glide

When you have selected the key position, close the throttle and trim the aircraft. This will entail moving the rudder trim control to the full rear position to help compensate for the effect of aircraft rigging. Hold a constant altitude until the airspeed decreases to 100 MPH, then decrease the pitch attitude and establish a 100-MPH gliding attitude. Keep the aircraft properly trimmed throughout the remaining part of the pattern.



After the glide has been established, flaps may be used at your discretion; however, remember that the pitch attitude will have to be changed accordingly in order to maintain a 100-MPH glide. It is a good policy to use flaps sparingly on the base leg so that some will be available for use on the final approach. Flaps are most important on the final approach, since there is little else to prevent you from overshooting your desired landing spot. (See section on flaps.) During your training your instructor will limit the use of flaps on the base leg to one-half flaps. He will do this in order for you to attain proficiency in placing the base leg first before learning to use the flaps for minor corrections in judgment.



Key Position

During concentrated landing practice, plan your base legs so that you will receive ample practice in no-flap glides and landings as well as those with various flap settings. This will allow you to realize the differences in the pitch attitude and glide ratio of the aircraft for a wind condition. When the wind is fairly strong or diagonal (crossed) to the runway, *use very little or no* flaps. The use of flaps will be further explained in this chapter.

The Base-to-final Turn

The base-to-final turn must be initiated before the aircraft reaches the final-approach glide path in order to allow for the forward movement of the aircraft while the turn is being executed. Therefore, after you have established the gliding attitude, you must consider the effects of wind and plan the base-to-final turn just as you planned the turn onto the base leg from the down-wind leg. While maintaining a constant 100-MPH gliding attitude, roll into a medium-banked turn and use the runway as your 90° recovery reference point. Continue the turn to your runway just as you did in the practice of gliding turns at higher altitudes. As the nose of the aircraft approaches the runway, plan the roll-out so that the turn will be completely recovered just as the longitudinal axis of the aircraft is aligned with the runway.

CAUTION

Maintain a constant 100-MPH gliding attitude throughout the turn and *do not, under any circumstances, exceed a medium-banked turn.*

In the event you have incorrectly planned the base-to-final turn and you are over-shooting the runway, there is only one thing to do. APPLY POWER, RECOVER FROM THE TURN, AND EXECUTE A NORMAL GO-AROUND. Do not attempt to "S" the aircraft back to the runway. Steep turns must always be avoided when you are close to the ground.

FINAL APPROACH

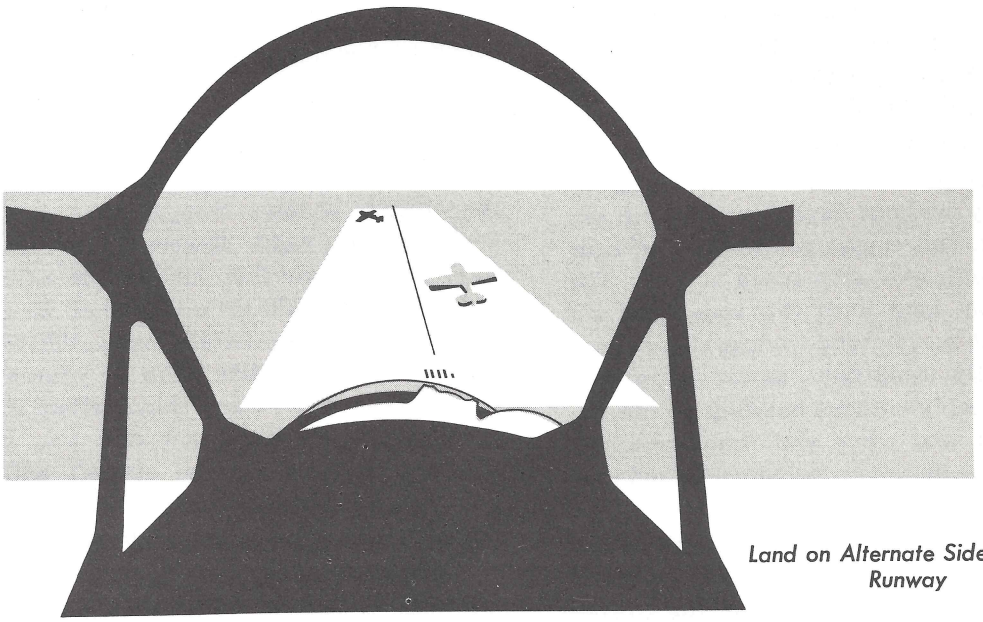
The final approach must be established at least 300 feet above the ground. Since the average amount of altitude lost in the base-to-final turn is approximately 150 feet, it must be initiated at a considerably higher altitude. Normally the final approach will be established at approximately 500 feet above the ground.

During the roll-out from the final-approach turn, prepare to align the longitudinal axis of the aircraft with the appropriate landing lane which you plan to use. Immediately after rolling-out, you must establish a proper cross-wind correction, if necessary, and make appropriate corrections for the glide ratio of the aircraft by use of flaps or power.

The longitudinal axis of the aircraft should be aligned with an imaginary line that runs the entire length of the runway so that any wind will be recognized immediately. Since the velocity of the wind may vary as the aircraft continues down the final approach, the longitudinal axis should be kept aligned with the runway throughout the approach and landing. Unless the runway on which you are landing is very narrow, you should plan to land on one side so that the "propeller wash" of other aircraft will not interfere with your approach. You should also be considerate of the other aircraft that are awaiting take-off clearance. Don't be a runway hog. Consider the aircraft that is going to land behind you.

The proper way to correct for a cross-wind on the final approach, round-out, and throughout the after-landing roll will be explained fully in Part II of this chapter under the section on cross-wind approaches and landings. At this time, we will consider only a normal approach when the wind is calm or straight down the runway.

Before going into the flying technique that is employed on the final approach, it is important that you understand what is meant by the "glide ratio" of the aircraft and how it is affected by flying speed. The lift and drag created by the use of flaps should also be considered.



Land on Alternate Sides of the Runway

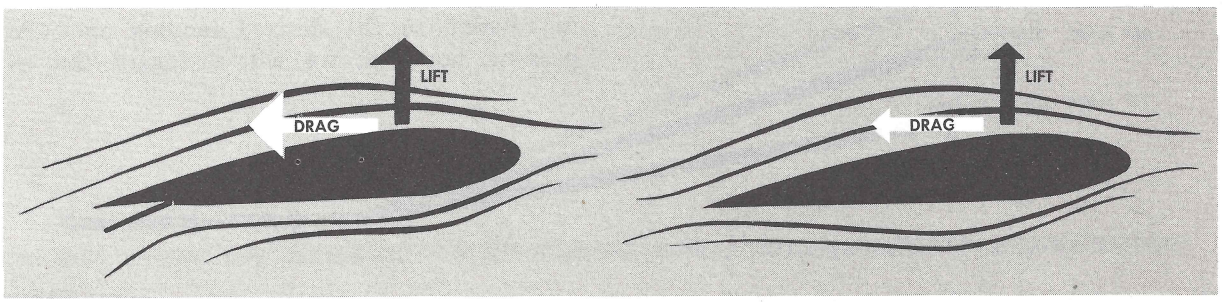
Effect and Use of Flaps

A flap may be defined as a secondary control surface which may be lowered into the airstream. The use of flaps increases both the lift and drag of the airfoil. Because of this fact they have several advantages: the greater lift permits a lower landing speed; the greater drag permits a steeper gliding angle without an increase in speed; this allows for clearing obstructions while gliding to a landing; and by acting as "airbrakes," a shorter after-landing roll is possible.

You have learned that the lift of a wing may be increased by increasing the camber and also by increasing the angle of attack. When the flaps are lowered, they cause the angle of attack to increase; the camber, in effect, is also increased. Of course, when either, or both, of these are increased, the lift, and consequently the drag is increased.

The T-6 utilizes the split-type flap. The T-6 wing is constructed in such a manner that the bottom part of the wing near the trailing edge is hinged and can be lowered while the top surface remains fixed.

As was stated before, when the lift increases, the drag increases. Since the flaps are used to reduce the landing speed, there is no objection to this increase in drag. In fact, it is desirable since more drag makes it possible to glide steeper without an increase in speed and also makes it possible to land with a shorter landing roll. A steeper glide is not only per-



Effect of Flaps on Lift and Drag

mitted by the use of flaps, but is actually required in order to maintain the necessary safe flying speed. Remember to adjust your gliding attitude to suit the flap setting (the more flaps, the steeper the gliding attitude).

If you attempt to shorten the approach by diving steeply without flaps, you pick up excessive speed. This causes you to level off near the ground with excessive speed and lift. The aircraft cannot land until this speed and lift are dissipated, so you tend to float along above the ground. By using flaps, however, you can glide more steeply without building up this excessive speed, and when you round out, you are close to the minimum flying speed and may land almost immediately.

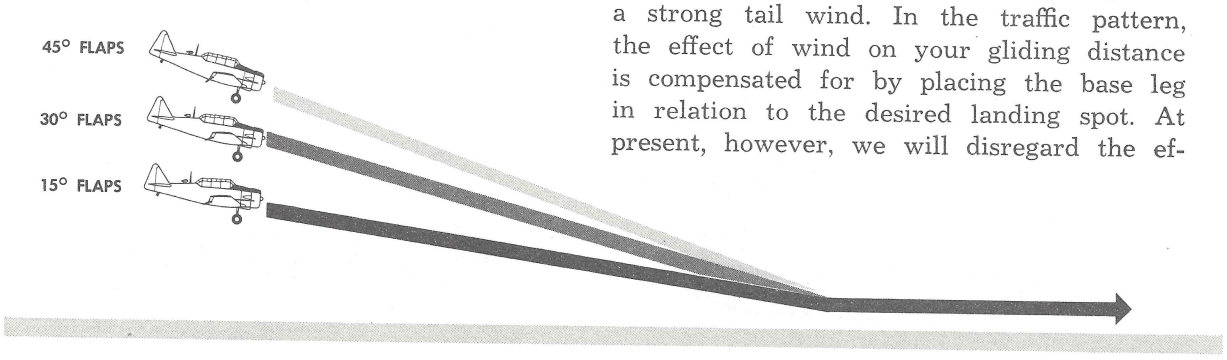
When using full flaps, a steeper gliding angle is required than when using less than full flaps; that is, the more flaps used, the steeper the gliding angle must be to maintain a safe airspeed. Obviously then, the use of full flaps will require a greater degree of round-out to attain a three-point landing attitude. You should allow for this, and time your round-out accordingly. Make sure you are in a position to land when the three-point landing attitude is attained.

Because of the greater induced drag present when full flaps are used, the critical angle of attack is being approached more rapidly. A more complete stall will then develop and the nose tends to drop faster than if less flaps had been used. You will find that the more flaps used, the more back-stick pressure it takes to attain and maintain the landing attitude.

Glide Ratio

The glide ratio of an aircraft is the distance the aircraft will travel forward in relation to the altitude it loses. For instance, if an aircraft travels eight thousand feet forward while it loses one thousand feet of altitude in a descent, its glide ratio is said to be 8 to 1. Technically, it is practically impossible to know exactly what the glide ratio of your aircraft will be because so many things affect it; however, it is very important that you have a fair idea of how far the aircraft will glide under certain conditions. Otherwise, you would not know where to place the base leg or when to close the throttle.

The glide ratio of the aircraft is affected by all four fundamental forces that act on the aircraft (lift, drag, thrust, and weight) as well as wing-loading (centrifugal force) during changes in pitch attitude. If all factors affecting the aircraft are constant, the glide ratio will be constant. Therefore, in order to judge the gliding distance of your aircraft, you must keep all of these forces constant. Although the effect of wind will not be covered thoroughly in this section, it has a very prominent effect on the gliding distance of the aircraft relative to its movement over the ground. This is easily understood because you know that you would not glide nearly as far if you were gliding into a strong head wind as you would if you were gliding with a strong tail wind. In the traffic pattern, the effect of wind on your gliding distance is compensated for by placing the base leg in relation to the desired landing spot. At present, however, we will disregard the ef-



Effect of Flaps on Gliding Angle

fect of wind and concentrate on the forces over which you have some control.

From your study of aerodynamics, you know that the weight (gravity) of the aircraft will remain constant for any one loading. Thus, we can consider the weight constant for the T-6 during the final approach. You also know that the thrust of the aircraft is dependent on the output of the engine at one propeller setting. During a power-off approach to a landing, the throttle is closed; consequently, the thrust is constant. Likewise, during a power-on approach to a landing, the thrust will be constant when the power setting is constant.

From your study of climbs and descents in Chapter III, you learned that the lift of the aircraft will remain constant for any one airspeed. The angle of attack of the airfoil, with respect to the flight path, remains the same regardless of any variation of the flight path from the horizontal. Therefore, if you maintain a constant airspeed on the final approach, the lift will be constant.

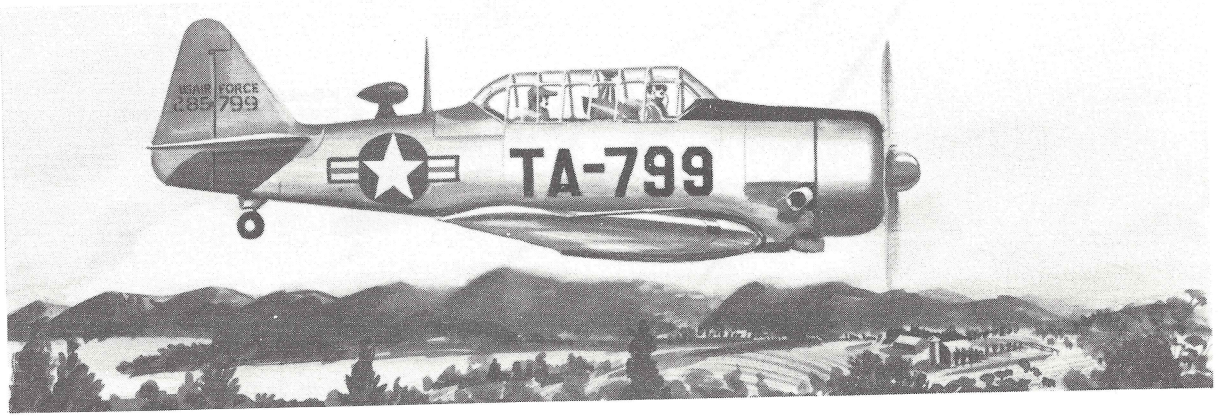
Under different conditions of flight, the drag factors may be varied through the use of the landing gears and/or flaps to a greater degree than lift. Since the landing gear was lowered early in the traffic pattern, its effect on drag will be constant and will cause you little concern on the final approach. But when the flaps are lowered in the glide, the airspeed will decrease unless you increase the thrust or lower the pitch attitude. Since power should not be used during a power-off approach, unless you are undershooting your desired spot, you must adjust the pitch attitude to maintain a constant airspeed.

You should now understand the importance of keeping all factors constant in order to maintain a constant glide ratio; you must realize that the flap setting should be established as early as possible after rolling out on the final approach. If you put down more flaps, you must adjust the pitch attitude accordingly to maintain a constant airspeed.

CAUTION

Do not lower the flaps close to the ground on the final approach. If you do, you will spoil your judgment of your glide ratio and, consequently, spoil the landing. *Never retract the flaps on the final approach.* Since the flaps will come up rapidly, the lift of the airfoil will be disrupted and considerable altitude will be lost. If the flying speed were low at the time, the aircraft would stall. This is *extremely dangerous* when close to the ground.

As you learned in the study of turns, the wing loading of an aircraft is increased by centrifugal force during changes of pitch attitude. The effect of this increased wing loading is proportionate to the rate of change in attitude. This in turn causes a decrease in the effective lift of the aircraft. The effect of centrifugal force is negligible on the final-approach



glide. However, unless the round-out to a three-point landing attitude is executed properly, centrifugal force may have a very prominent effect on the glide ratio of the aircraft. This will be explained in the landing section of this chapter.

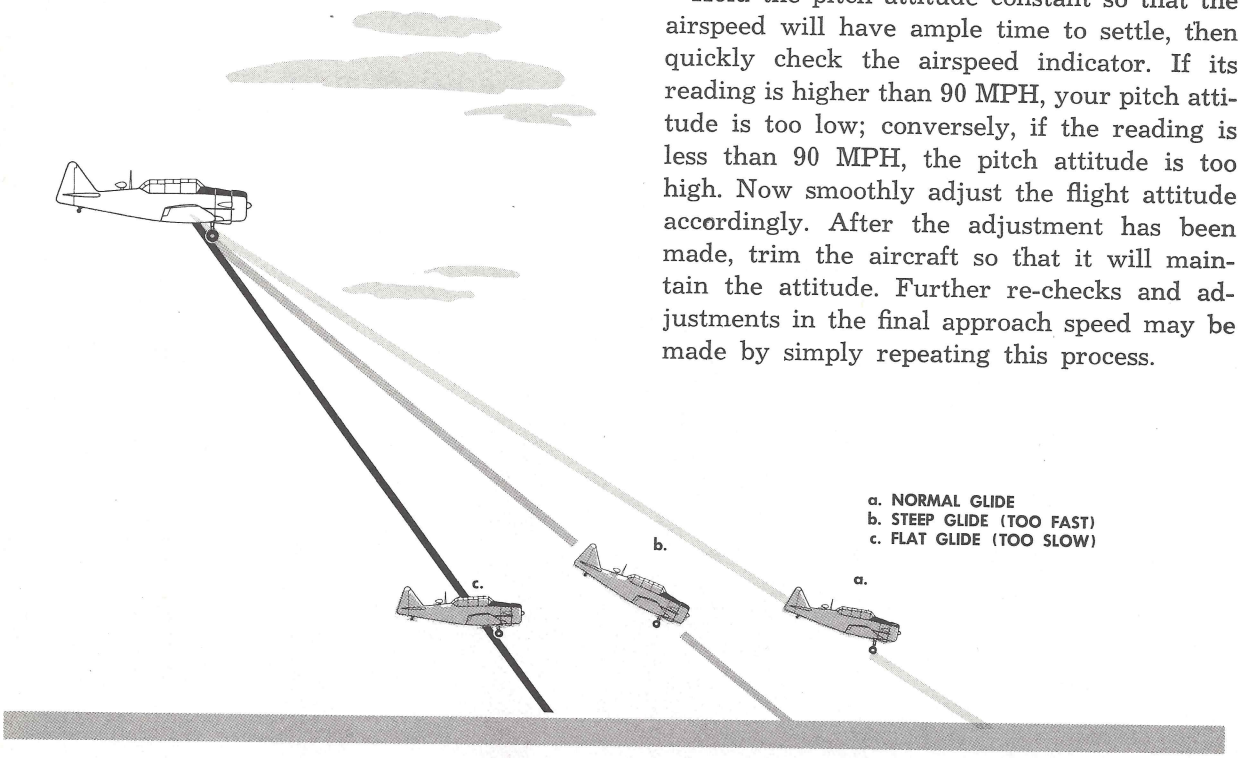
Now in one sentence we can sum up the factors that affect the glide ratio of the aircraft on the final approach. For all practical purposes there is only one glide ratio per pitch attitude (airspeed), per power setting, per flap-setting, for one wind condition. When you maintain a constant glide attitude, your airspeed and glide ratio will be constant, thus allowing you to estimate where the aircraft will land.

Changes in the gliding airspeed will result in proportionate changes in your glide ratio; that is, as the airspeed of the glide is reduced, the glide ratio is also reduced. The best speed for the final approach glide is 90 MPH regardless of the amount of flaps used. This speed will give you a good rate of closure with your runway, provide you with a safe margin of flying speed above a stall, and keep the aircraft from floating during the round-out to a landing. If the final-approach airspeed is less than 90 MPH, the aircraft will settle very rapidly. For this reason *never* try to stretch a glide. Always glide normally. The slower the gliding speed below normal, the faster you will lose altitude.

Flying Technique on the Final Approach

Immediately after rolling out on the final approach, align the longitudinal axis of the aircraft with the appropriate side of the runway on which you plan to land and adjust the pitch attitude to what you think is a 90-MPH gliding attitude for the conditions of flight. This attitude is slighly higher than the 100-MPH gliding attitude (same conditions of flight) used on the base leg and during the base-to-final turn. Your instructor will demonstrate the 90-MPH gliding attitude for different flap settings.

Hold the pitch attitude constant so that the airspeed will have ample time to settle, then quickly check the airspeed indicator. If its reading is higher than 90 MPH, your pitch attitude is too low; conversely, if the reading is less than 90 MPH, the pitch attitude is too high. Now smoothly adjust the flight attitude accordingly. After the adjustment has been made, trim the aircraft so that it will maintain the attitude. Further re-checks and adjustments in the final approach speed may be made by simply repeating this process.



Effects of Gliding Attitudes and Speeds on Glide Ratio (Constant Flap Setting)

When the power and/or flap settings are changed, you must also change the pitch attitude to maintain a constant 90-MPH glide. Again adjust the pitch attitude *first,* then check the airspeed indicator after it has had time to settle. When flying under visual flight rules, *always maintain constant flight attitudes by checking the visual references first* then use the flight instruments as a secondary check. Always re-trim the aircraft after each adjustment. The only time an aircraft is not trimmed during the traffic pattern is *during* round-out, and subsequent touch-down and landing roll. In these cases the aircraft is trimmed before they are executed.

Keep the longitudinal axis of the aircraft aligned with the runway throughout the final approach, round-out, and landing.

All adjustments in the final-approach glide must be completed at a sufficient height above the ground so that all of your attention may be given to planning the round-out and landing. Most instructors will require their students to have all adjustments completed at least 200 feet above the ground. *Do not lower additional flaps during the round-out.*

On the final approach you must estimate where the aircraft will land by your judgment of your glide ratio. If you think that you are going to overshoot your spot slightly, lower more flaps and readjust the gliding attitude. If you think that you are going to land well past your spot, there is only one thing to do — execute a *go-around.* If your flight path is too low or if you think that you are going to under-shoot your spot, add power and readjust the flight attitude. If there is any doubt about your approach being properly established, execute a go-around and set up a new pattern.

CAUTION

Do not use full flaps if the wind is gusty or if a cross-wind is present. Most landing accidents in the T-6 aircraft are a result of using full flaps in a gusty cross-wind.

It is very important that you be able to determine when a safe landing can be executed and/or when a go-around should be made. In the early part of your training you probably will not be able to determine exactly when a safe landing can be executed; consequently, you should always be prepared to execute a go-around. The following safety rule should be considered when deciding whether a safe landing can be made: *The runway is clear and the approach is well established.*

"The runway is clear" means that the landing will not be affected in any way by other aircraft or ground obstructions. There should not be any aircraft or other obstructions on the runway at the time the landing is to be executed. *Never* land directly behind another aircraft, because its "propeller wash" may spoil your round-out, and in addition, you will not be able to see the aircraft after you have landed.

"The approach is well established" means that all corrections have been made. The longitudinal axis of the aircraft should be aligned with the landing track. The aircraft should be properly trimmed so that your full attention may be devoted to the round-out.

As a final tip on planning the landing, keep in mind that *there is no excuse for taking a chance.* Unless you feel confident that you have weighed all aspects of the approach, execute a go-around and establish a new pattern.

Vision

During the approach, round-out, and landing, your vision is of prime importance. To make possible a wide scope of vision and to augment your judgment of height and movement, let your head assume a natural, straight-ahead position and cover the area on both sides of the aircraft's nose by moving the eyes. In the early stages of landing practice, if you look out both sides of the cockpit alternately by moving your head, you will spoil your judgment because your perspective out one side of the cockpit may not be the same as out the other. This also might lead to confusion and erroneous corrections.

Your focus should not be fixed on any one side or any spot ahead of the aircraft, but should be changing slowly and constantly from

side to side as well as from just below the nose of the aircraft up the horizon and back again. In other words, keep your head in one position and let your eyes rove from one point to another so that your brain can record the relation of your flight attitude to these different points. Actually, without your recognizing them, there will be a multitude of these points that your eyes and brain will use for comparison.

Concentration of vision too close to the aircraft will result in a "speed blur" of objects and colors on the ground, such as you experience in looking down from a fast-moving automobile. Concentration of vision too far ahead will not provide any criteria to judge or determine relative speed and depth perception. During the round-out, the three-point attitude should be achieved and maintained through ground coverage ahead of the aircraft, where objects and color patterns are distinct and provide a basis for judging distances and speeds.

Tips

A-B-C-D-E-F method of planning and executing the rectangular pattern: To summarize and augment your planning and to serve as a reminder of the important points to remember, the A-B-C-D-E-F method of planning and executing the rectangular pattern should be used. This method will be outlined briefly so that you may formulate a mental check-list of the things you must do when flying a traffic pattern.

A — Analyze the landing situation. Before and during the entry into the traffic pattern, you must think and plan ahead of the aircraft. You must: determine the direction of the landing and the type traffic pattern that is to be used; analyze the wind conditions by checking the tetrahedron, wind sock, smoke, or any other indicator available; determine the number of aircraft in the traffic pattern and your relation to them; execute the 45° entry and accomplish the pre-landing check; and fly a rectangular ground-track pattern at the prescribed altitude and airspeed. Continue to analyze the wind condition and traffic spacing throughout the remainder of the pattern. This is especially important on the final approach.

Since the wind direction and velocity have a tremendous effect on your traffic pattern and landing, it is extremely important that you know how to recognize and gauge its surface speed. Its direction, and to some extent its velocity, can be determined from the tetrahedron, wind sock, smoke, or blowing dust. The control tower transmits periodic wind and weather reports, so monitor the tower for latest developments. Wind velocity and direction can best be determined from the wind socks that are positioned around the perimeter of the landing field. (See illustration on opposite page.)

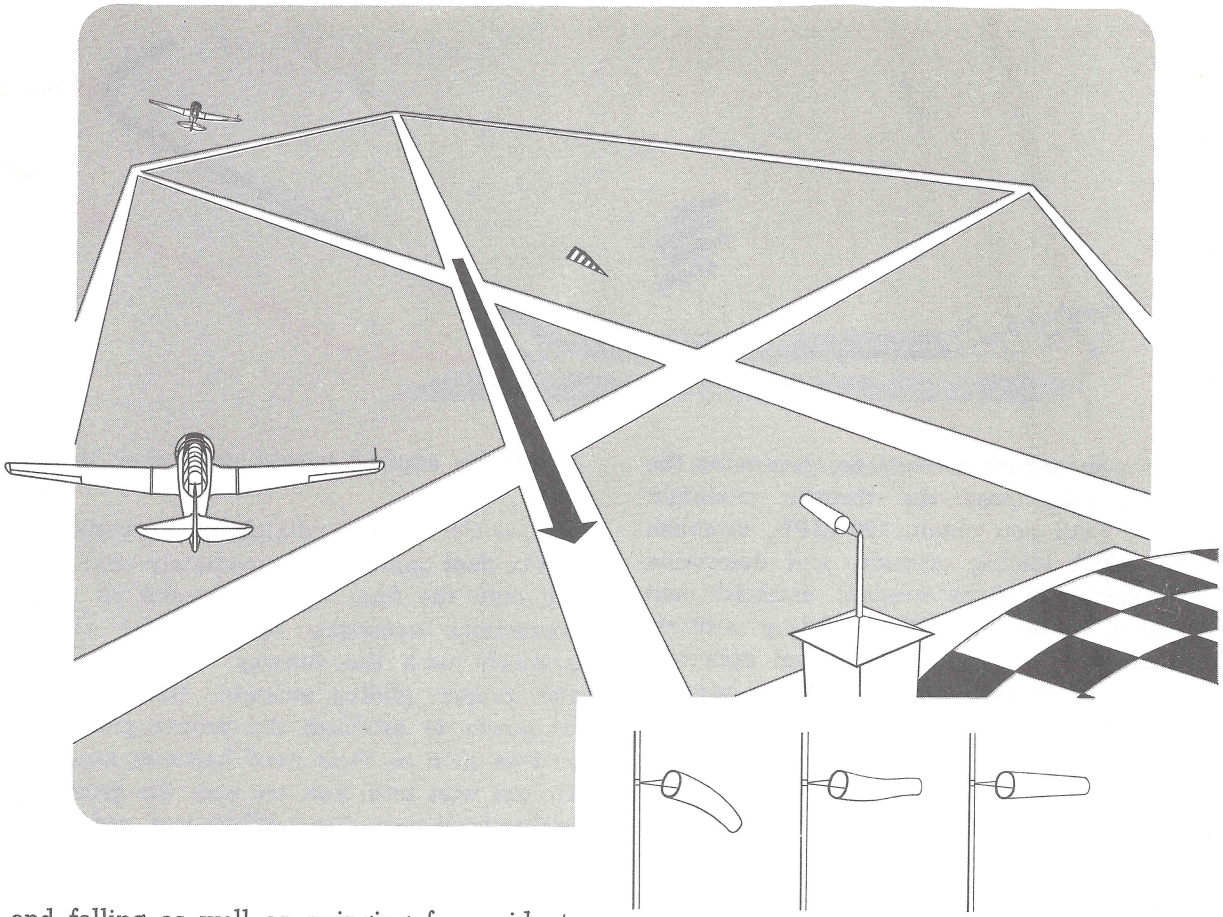
When the wind sock is hanging limply straight down, the wind condition is calm or very light. When it is standing straight out parallel to the ground, the wind condition is strong and steady. Although you cannot always determine the exact velocity of the wind when it is in this condition, you will know that it is strong and steady.

NOTE

Wind socks are constructed to indicate a minimum wind velocity when parallel to the ground. Some will stand straight out at 15 MPH, while others stand out straight at 20 or 30 MPH. Those that are made of light nylon will stand straight out at a lighter wind velocity than those made of heavy canvas, etc. Examine the wind socks around your field and determine what type they are, so that you may interpret their indications more accurately.

When a wind sock is alternately rising and falling, it indicates that the wind is also rising and falling. This is known as a gusty wind condition. The more rapidly it rises and falls, the more gusty is the wind.

When the wind sock is swinging from side to side, it indicates that the wind direction is shifting from various angles. This is known as a variable wind condition. If the sock is rising



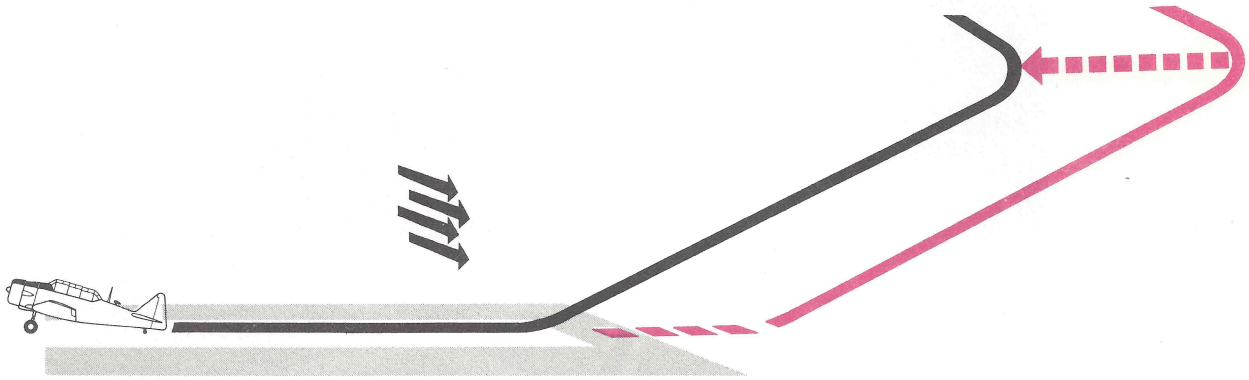
Analyze the Landing Situation

and falling as well as swinging from side to side, it indicates a wind condition that is both gusty and variable.

Smoke is also a good indicator of wind direction and velocity and should be used, when present, to check the accuracy of the tetrahedron and wind sock. When the smoke is rising straight up, it indicates a calm or very light wind condition. When it is lying flat along the ground, it usually indicates a strong wind; however, a temperature inversion may cause a similar occurrence. Since smoke swirls, eddies, and spirals as it rises, it will not give as good an indication of a variable or gusty wind condition as does a wind sock. So always check the wind condition by as many methods as possible.

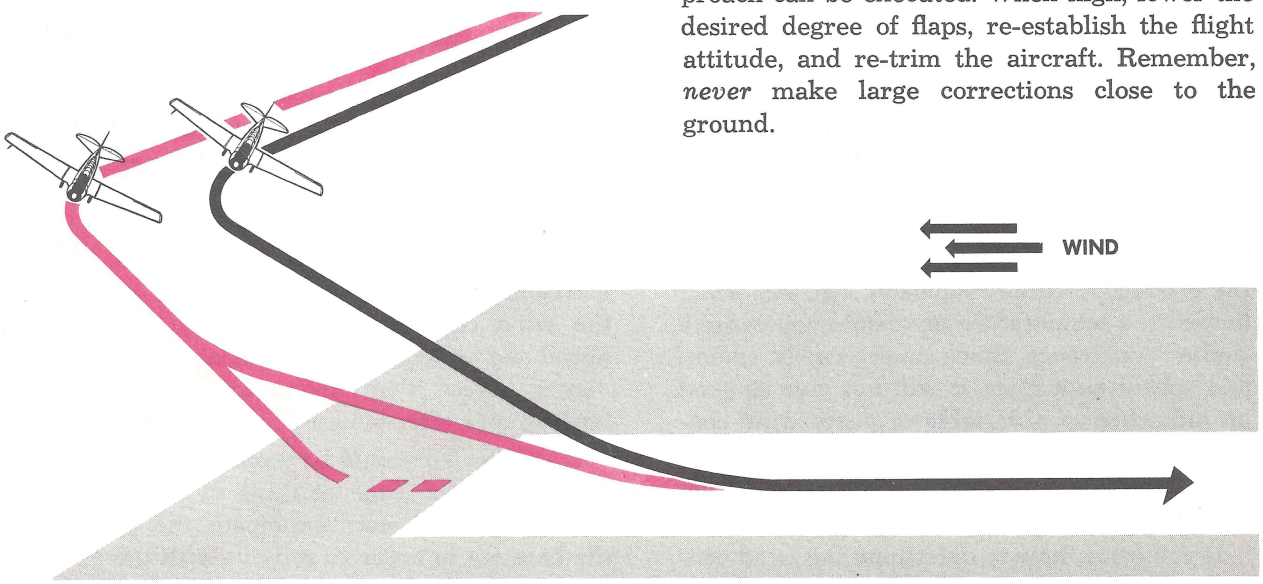
If you know how to determine the wind condition and take into consideration the other steps of your analysis, you can plan your drift correction and flap setting a full 800 feet above the landing field. Consequently, you can reduce the last-minute corrections to a minimum. In addition, you can plan the correct position of the base leg, at what point to initiate the base-to-final turn, and the approximate drift correction needed. Last but not least, knowing the wind condition will enable you to look ahead and anticipate the extent of the weather-vaning effect that may occur during the landing and after-landing roll.

B — Base leg should be properly established: As a result of your analysis of the landing condition, you must: anticipate the turn on the base leg in order to roll-out with the proper drift correction established; recheck the pitch attitude and airspeed and when nec-



essary make minor corrections; determine the key position, close the throttle, maintain altitude until you obtain 100 MPH, establish a 100-MPH gliding attitude, and determine the amount of flaps needed; establish and maintain a safe 100-MPH gliding attitude throughout the base leg and final approach turn; and anticipate and execute the base-to-final turn so as to roll out perfectly aligned with the landing runway. The base-to-final turn is the same as the gliding turn which you have been practicing at altitude. When, from your analysis of the wind condition, you detect a cross-wind, the wing-low drift correction should be applied immediately after turning final.

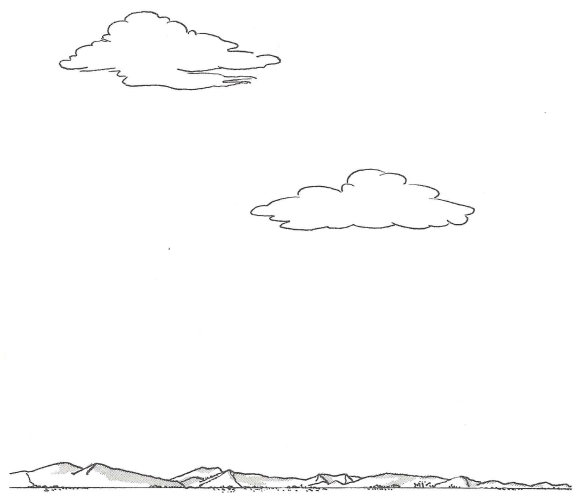
C — Correct immediately after turning onto the final approach: Immediately after turning onto the final approach make all minor corrections necessary to align the aircraft properly with the runway and to establish the proper gliding attitude. Use the flaps or power to establish the proper glide ratio just as soon as their need becomes apparent. Do not wait until you are near the ground to make these corrections. When low, add power and maintain your altitude and airspeed until you reach a position where a power-off approach can be executed. When high, lower the desired degree of flaps, re-establish the flight attitude, and re-trim the aircraft. Remember, *never* make large corrections close to the ground.



Correct Immediately on Final Approach

The final approach must be properly established at least 300 feet above the ground. When in doubt, always execute a go-around. This is a positive indication of good judgment.

D — Decide whether or not to land: On the final approach you must decide whether or not it is safe for you to continue the approach to a landing. After you have the glide properly established, you must determine where the aircraft will land and whether the approach can be continued safely. The runway must be clear, the approach well established, the wind condition considered and corrected for, and all other factors that may affect the landing must be adequately controlled.



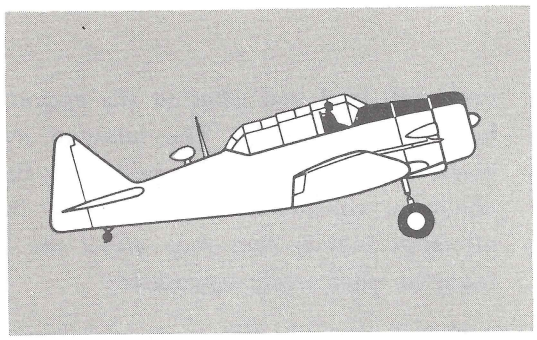
Decide Whether or Not to Land

If you continue the approach, there should not be any doubt of its being anything but a safe landing. If there remains any one factor which might contribute to a bad landing, and if it has not been corrected at least 100 feet above the ground, rather than risk a bad landing, *go around.*

E — Execute the landing: Use the correct and positive technique of executing the landing in order to contact the ground in a three-point attitude. You should remember this attitude by observing the attitude of the nose section in relation to the horizon when the aircraft is on the ground.

Always make sure that the longitudinal axis of the aircraft is parallel to your ground track throughout the approach, round-out, and especially when the aircraft contacts the ground. Make sure that the proper drift correction is maintained throughout the round-out, landing, and after-landing roll. If you neglect these precautions, you may land in a skid or a drift. This neglect is one of the main causes of ground accidents.

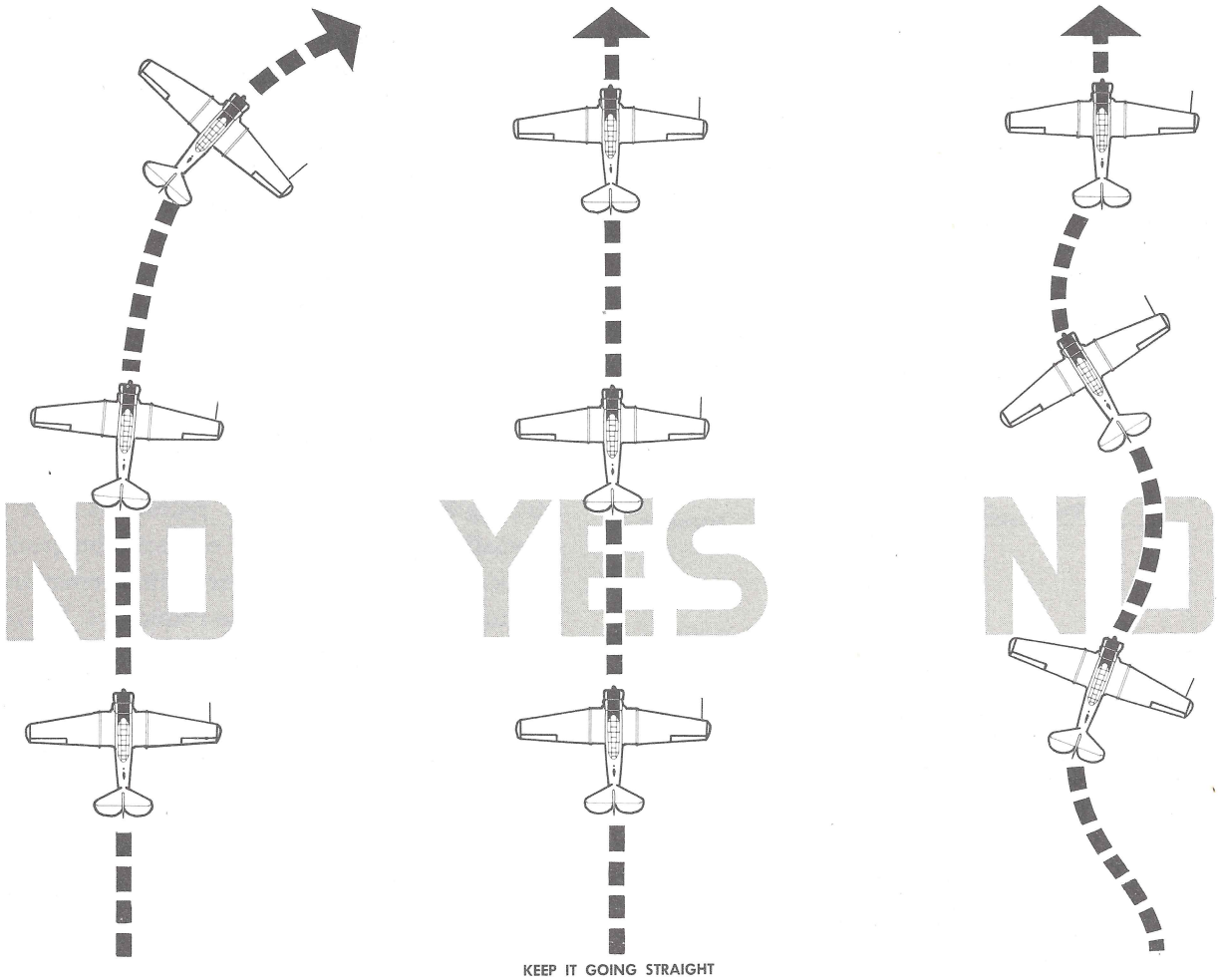
F — Follow through after the landing (ground control): As soon as the aircraft is firmly on the ground in a three-point attitude and rolling straight ahead, bring the stick smoothly all the way back. This will make it more difficult for the tail wheel to become disengaged if the aircraft starts to swerve and will help to overcome any weather-vaning tendency that may be present. Keep looking out of the cockpit so that you may recognize immediately any tendency of the aircraft to turn.



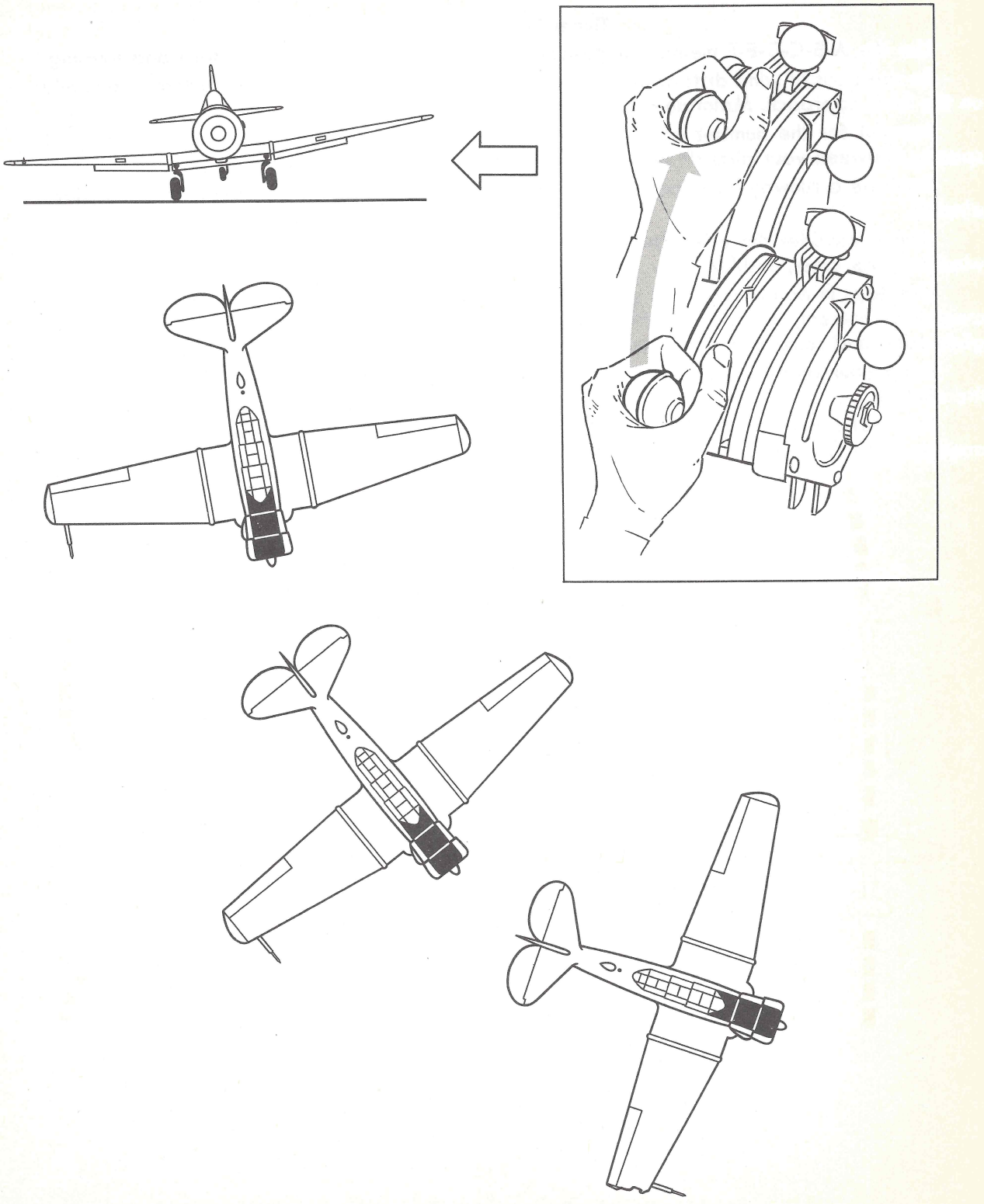
Execute the Landing

During the after-landing roll, use all available means to keep the aircraft safely under control. Use aileron, rudder, brake, and throttle in any proportion that is necessary to maintain directional control and to keep the wings level. In cases of emergencies *there is nothing that will substitute for good judgment. A landing is not complete until the aircraft is parked on the ramp.*

"G" for ground accident is a ready and willing substitute for any part of the A-B-C-D-E-F that is omitted.



Follow Through after Landing; Don't Let It Swerve or Weather-Vane



Ground Accident

Things To Remember

Use the A-B-C-D-E-F method of planning and executing the traffic pattern and landing.

Be conscious of wind drift at all times. Check for drift on each leg of the pattern, especially on the final approach. Maintain a constant track across the ground.

Account for the number of aircraft ahead of you in traffic. Be sure there is plenty of spacing between your aircraft and the one in front of you.

Don't be a runway hog; land on one side so that the other side may be used by another aircraft.

Always consider the effect that the surface wind may have on your landing. Anytime the wind is strong, cross, and/or gusty, be alert and prepared to execute a go-around if necessary.

Use flaps in accordance with your analysis of the surface wind condition. When there is a cross-wind present, use only the flaps that are necessary to make minor corrections in your glide ratio and *remember* that your judgment and flying technique must be keen and precise.

Keep your aircraft properly trimmed so that you can relax and "feel" the pressure on the controls.

Don't take a chance on a bad landing. When in doubt, *execute a go-around* and establish another traffic pattern.