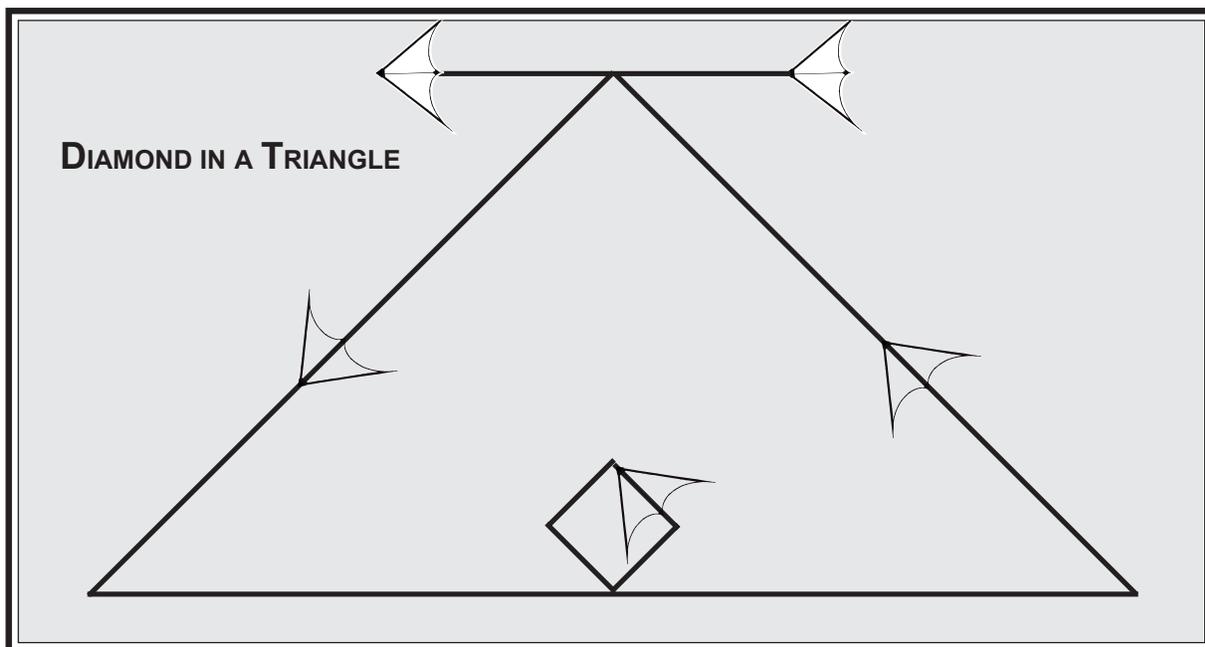


## Chapter 7: Most Magical Maneuvers: Formidable Precision Figures

Here are some figures that are designed to make you sweat. But they are also designed to challenge you and make you feel good about your flying ability. Just remember -- maneuvers with tight angles, multiple turns, and lots of parallel lines aren't more difficult, only more complex.

As maneuvers become more elaborate, it becomes increasingly important to keep the big picture in mind. Focus on details like even speed, crisp corners, and straight lines. But because those details will often come quite quickly, one-after-another, you won't have time to think too much about each of them individually. So think, instead, about how the whole figure will look in the sky. Let your practice, muscle control, and flying instincts take over.

You'll be surprised at how good a flier you are when you stop thinking.

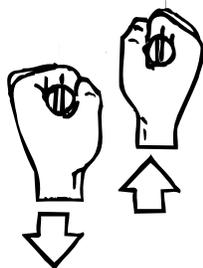


**Diamond in a Triangle:** Here is a maneuver that is harder than it looks. Long straight diagonals, low horizontals, tight turns, and that nasty little diamond make this figure a serious challenge.

Start with a high altitude horizontal pass from left to right. Fly straight across the window and then turn up and over to move into position at the very top. Use a pull-pull turn, leading with the left, and step back to increase power. Establish a straight line to the left and call "IN" about one-third from the center.

When you reach the center at the top of the window, push a forty-five degree turn. Your target should be the far left bottom corner.

This will be a very long diagonal line and you need to fly it as straight as possible. Any slippage in the angle will throw your proportions off. Any corrections will be very easy for people to see. Remember that you are passing through the power zone and any changes in speed will make your flight look jerky.

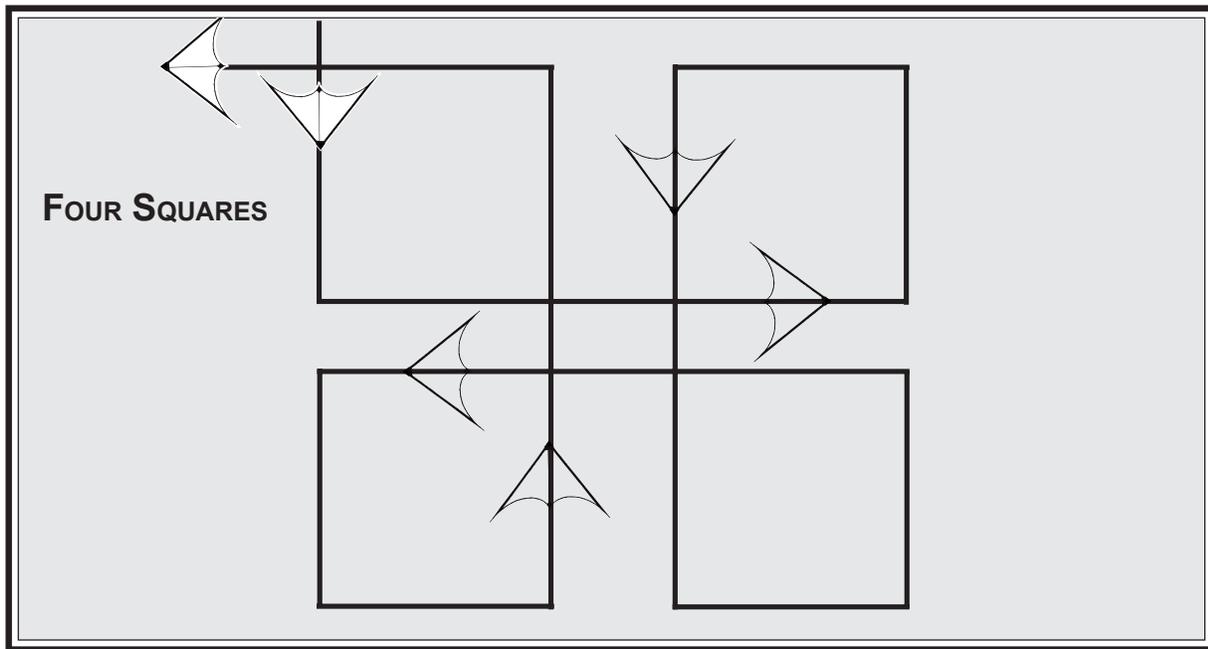


USE A PUSH-PULL  
COMBINATION TURN FOR A  
SHARP 135 DEGREE ANGLE

When you reach the edge of the window, you need to snap around, parallel to the ground. This is a full one-hundred-thirty-five degrees, so push hard. Try using a combination turn to make the angle sharp. Anticipate the turn and practice so that the nose of your kite pops right around and flies back to the right, just above the surface.

At such a low altitude, any drifting will bring you in contact with the ground, so fly straight and careful. Concentrate on flying perfectly parallel to the surface at a constant speed.





**Four Squares:** Remember the Dice? This one is even more fun!

Compared to some of the other figures we have been flying lately, Four Squares is fairly easy. All of the angles are ninety degrees, all of the turns are left, and none of the segments are so small that you have to rush. The main problem is flying all four sections the same size.

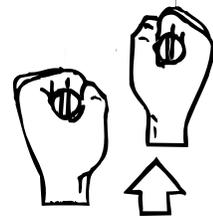
Try drawing an imaginary cross in the air. Divide the window in half vertically and horizontally. Position your squares around these two imaginary lines. Notice that none of your horizontals extend beyond half way out from the center. Each of the short lines, vertical or horizontal, are equal in length. So are the long lines, for that matter.

So now, we probably have you real confused. Let's see how it looks from the beginning.

Start in a vertical climb midway to the left edge of the window. Move back as you climb to generate extra lift. Then, at the top of the window, turn up and over so you are flying straight down. Call IN as soon as the nose of the kite comes back around toward the ground.

Continue flying straight down. As you approach the imaginary line, halfway between the top and bottom of the window, push-right to turn left. You should now be on a horizontal line just above center that stretches from halfway to the left, to halfway to the right.

As you approach the end of that line, push-right to turn up. Angle into another vertical that bisects the right half of the window. Anticipate the turn so you can position it perfectly.



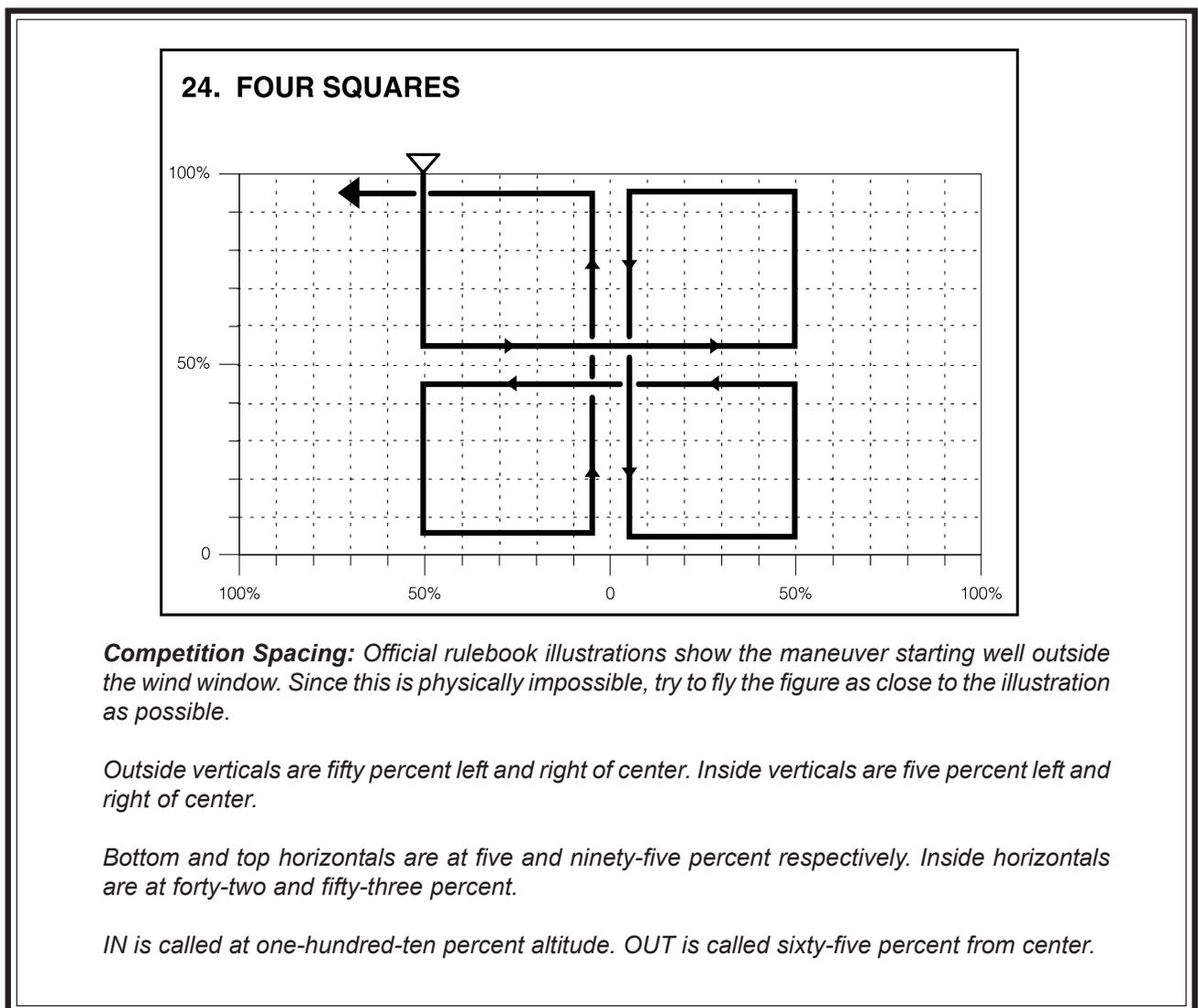
**PUSH-RIGHT TO TURN LEFT.  
MAKE EACH TURN THE SAME.**

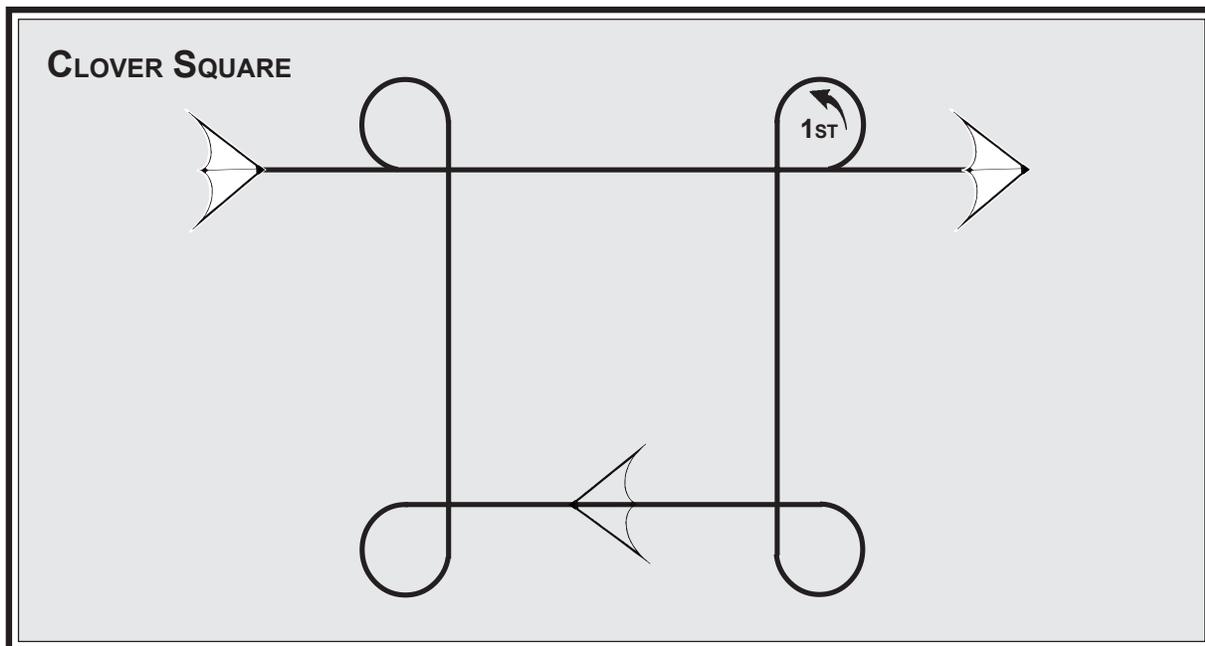
Fly straight up to the top of the window, and then turn ninety degrees to the left. Fly straight across the top, and then turn down just before you reach the imaginary line dividing the window vertically in half. These two short lines on the outside of this first small square are the ones that are equal in length.

Now all you need to do is keep repeating the process. Fly a long line to define the inside edges of the squares, two short lines to form the outside edges, and then another long line. "Straight, left, left, left, straight."

Be careful in those long horizontals. As you know, because of the effects of gravity, your kite may have a tendency to drift toward the ground. Concentrate on flying perfectly parallel to the surface, and maintain the pace that you have already set for the maneuver.

At the end of your fourth long line, you should be flying straight up toward the top of the window. Make this vertical the same length as the others, and as you reach the end, turn left. Fly three-fourths of the way out toward the edge and call "OUT".





**Clover Square:** Think of this one as a simple square, centered in the window, but with outside loops at the corners instead of angles. Picture the square, and where the corners will be.

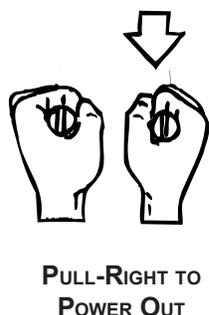
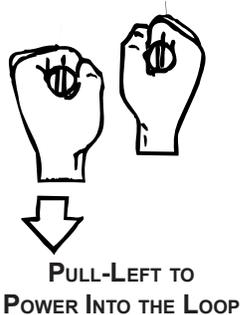
All four sides of the square are equal in length, and the loops should be of identical size. Be particularly careful on the two lower loops. Not only are they dangerously near the ground, but because they both turn under, the inertia of the kite will tend to push it even closer as you turn.

Start in a horizontal pass from the left, about three-fourths up the window. This can easily be reached from a vertical climb on the left edge and a crisp right turn designed to impress the judges before you even begin. Stabilize your straight flight, and call “IN” about two-thirds of the way from center.

Fly all the way across the window. The first loop will be in the upper right corner. Make a mental note of where your horizontal line is, because you will need to duplicate it at the end of the maneuver.

The corner of the square will be a quarter of the distance past center. As you pass the corner, pull back with your left hand and begin a tight, round turn up and over. Pull-left to power in; pull-right to power out. The loop is nearly one-fifth the height of the window, so don't make it too small. But don't make it too big either. Practice so the proportions of the turn match the drawings of the figure.

Each loop is a test of your ability to exit a spin maneuver at exactly the right point. Your goal is to finish the first one and be flying straight down toward the ground. Anticipate, and begin your exit a micro-second early.

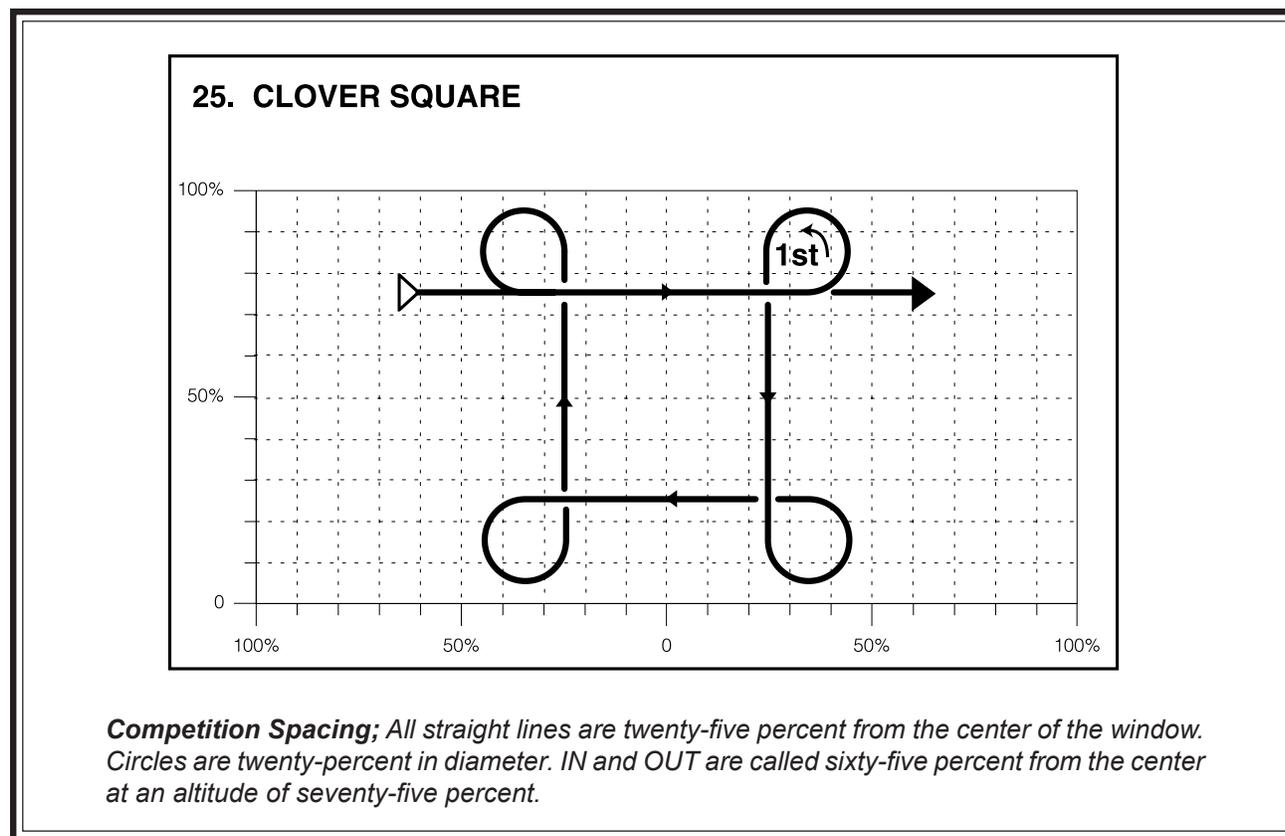


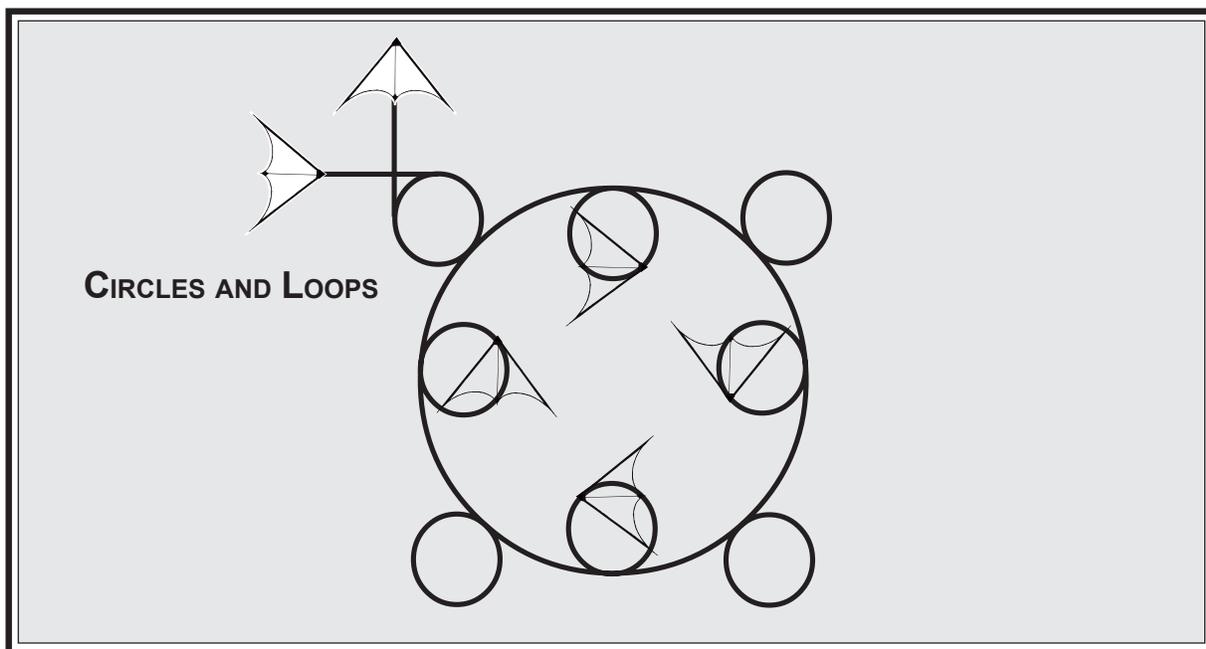
You are right in the power zone now, so you will need to move in to slow the kite's speed. Keep the lines tense enough that you will be able to accelerate into your second loop. Make it exactly the same size as the first one, but use a little more power to avoid any risk of hitting the ground. Time your exit so you are now flying straight across the base of the window, parallel to the ground. The ground pass should be identical in length to the first vertical dive.

Since the bottom left corner of the square is a quarter of the way past center, begin your next turn just beyond that line. Pull-left. Move back to generate more speed and be careful as you turn under and then up. This third loop is the worst one of all.

As you exit the turn, the figure finally begins to get easier. Move back and fly straight up. As you cross what was your first horizontal pass, begin the fourth loop. Again, make it the same size as the previous three. Then fly out to the right, following the path of your original line. Two thirds of the way past center, call "OUT".

Now, take a moment to think about the maneuver you flew, its strengths and weaknesses. Were the sides of the square straight, or did you oversteer to the point where lines between the loops became bowed? Were the loops all identical in size? Were you able to maintain a constant speed through the climbs, dives, and horizontals? Each time you fly a maneuver, think about how you can make it better next time.





**Circles and Loops:** Here is another messy maneuver designed to make you dizzy.

Look at the figure closely before you start to practice. Notice that each smaller circle is nearly one-fifth the height of the window. Don't make them too small, but don't make them too big either. Practice so the proportions you fly match the drawings of the figure.

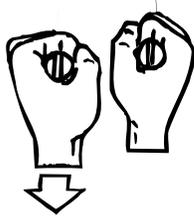
These circles are another test of your ability to exit a spin at exactly the right point. Your goal is to finish each one and transition into the larger circle.

Let's look at that larger circle. Seeing it as a circle will help you get the big picture, but won't help you fly it. Think of it as more of an octagon, with rounded rather than angular corners. You will fly each "corner" before you shift into the next small circle.

Finally, notice the location of each smaller circle. If this really were an octagon, the inside circles would be centered at the top, bottom, and sides. The outside circles would be on the diagonals. You start with the outside circle at the upper left part of the figure. And here is something very important: you fly this same circle at the end of the maneuver too. This means that, instead of eight small circles, you actually fly nine of them.

Ready to give it a try? Start near the top left edge of the window. Fly a horizontal pass to the right, and call "IN" half way to the center. Continue to fly straight.

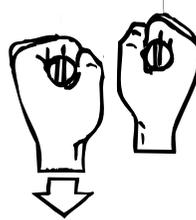
About one quarter of the way out from center, pull-right to begin your first loop. Concentrate on keeping it round and properly sized. This will actually be a circle-and-a-half, so continue on around past your starting point. Time your exit so you are flying at a forty-five degree angle to the ground.



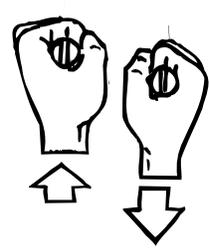
CURVE SLIGHTLY FOR THE BIG CIRCLE



PULL-LEFT MORE FOR AN INSIDE LOOP



RETURN TO CURVED FLIGHT FOR THE BIG CIRCLE



TRY COMBINATIONS FOR THE OUTSIDE LOOP

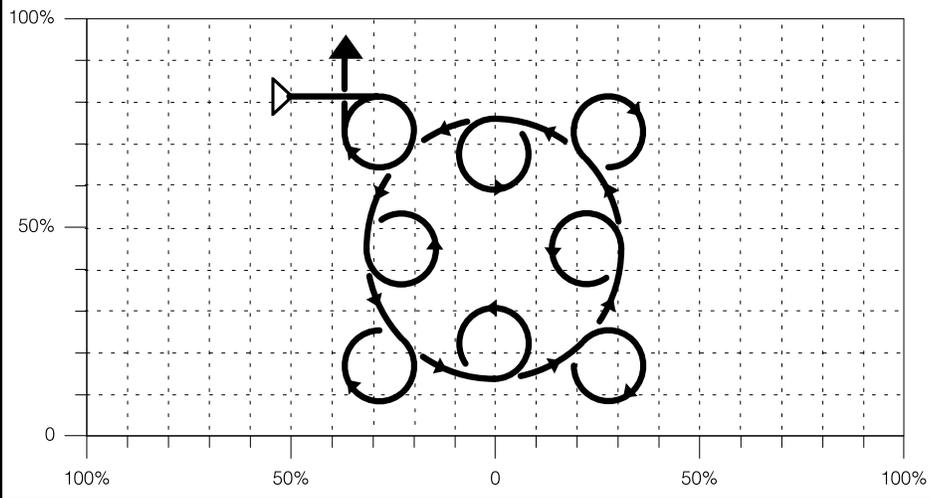
Fly the first part of the octagon, curving inward slightly. Then begin the next small circle. This circle is on the inside, so pull-left. Then exit and fly the next curving part of the octagon.

Soon, you should begin to build up a rhythm. Curve for the big circle, turn for the small ones. "Curve, turn; curve, turn." Arc just enough to give shape to the larger circle.

The two outside circles at the bottom of the figure may be troublesome. Power turns close to the ground always involve some risk, so concentrate extra hard to space them right and time your entrance and exit perfectly. Your goal is to make each small circle the same size and position them properly on the larger circle.

The eighth circle is at the top of the maneuver. When you finish, continue around the octagon and prepare to fly a ninth one. This final small circle should be an exact copy of the first one you flew. Go around one-and-a-half times, and exit straight up. Fly to the top of the window and call "OUT".

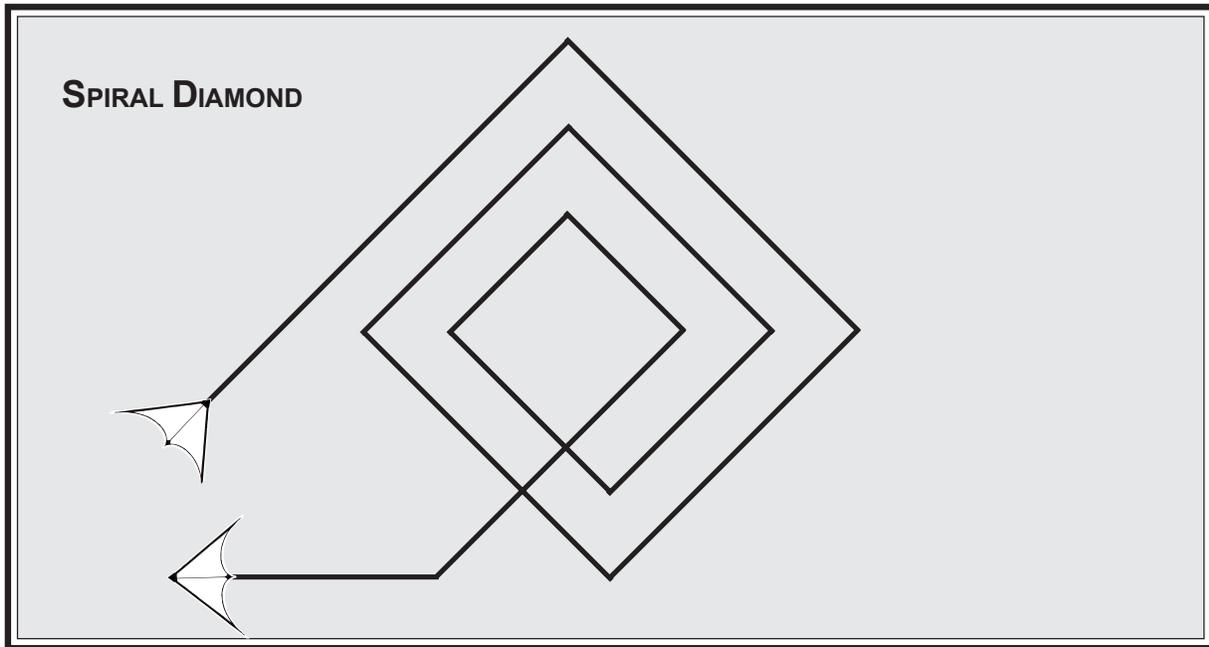
## 26. CIRCLES AND LOOPS



**Competition Spacing:** The large circle extends in altitude from twelve to seventy-eight percent. Small circles are eighteen percent in diameter.

IN is called at an altitude of eighty-two percent, fifty-percent left of center. OUT is called thirty-eight percent left of center at an altitude of ninety-five percent.

Competition diagrams are ambiguous as to whether the ninth circle is flown, or if the flier should simply curve around and exit. Clarify this with the judges before you fly.



**Spiral Diamond:** If you can fly the Square Spiral, you can fly the Spiral Diamond. All you need to do is tilt the figure on one corner. Of course, this does mean flying the straight lines as diagonals which is a bit more difficult.

Draw an imaginary horizontal line across the center of the window. Notice that each of the side turns, left and right, are exactly on that line. Now divide the window in half vertically. The two bottom turns are right on this vertical, but the three upper turns are just to the left. Seeing this difference will make your flying more accurate.

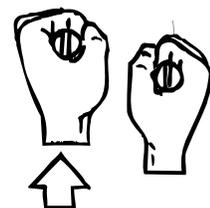
Start in a horizontal pass from the right. At the left edge of the window, snap a one-hundred-thirty-five degree turn so you are flying back toward the top center of the window. Stabilize your flight, and call "IN".

It's easy to get confused in this kind of maneuver and forget how many spirals you have left to go. You can solve this problem by counting out loud to yourself. The first line is "one". Remember, you only need to go around three times.

As you approach top center, push-left to turn right. Make this a perfect ninety-degree turn that sends you on a diagonal line to the right. Then, when you reach that imaginary horizontal that divides the window in half, snap another hard angle and turn back to the left.

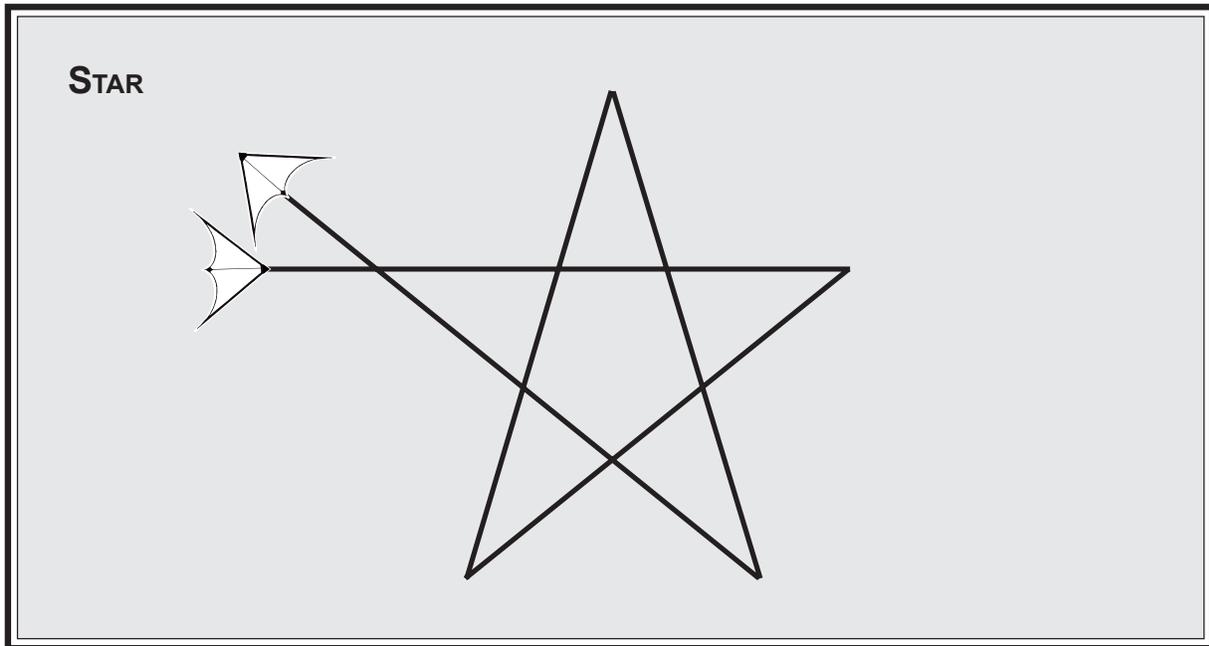
If you keep focused on those two imaginary lines and concentrate on flying perfect corners and forty-five degree diagonals, the maneuver will practically finish itself.

**PUSH-LEFT TO TURN RIGHT.**



**COUNT YOUR TURNS.  
YOU ONLY NEED TO GO  
AROUND THREE TIMES**



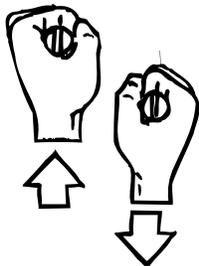


**Star:** Before you begin practicing this maneuver, walk out about a hundred feet onto the flying field. Directly downwind from your flying position, place some kind of marker. You can be formal and anchor a small flag out there, or just flop your hat onto the ground. Now, figure out where the boundaries of the window are, and put markers a quarter of the way out in each direction. Then go pick up your handles and let's fly this thing.

Start in a horizontal pass from the left, midway between the ground and the top of the window. Halfway back toward center, call "IN".

Fly straight and level across the window. Fly past your marker on the right side. Then snap the kite around hard. Pivot-right and aim the nose directly at your marker on the left side of the window.

Diagonal dives are nothing new by now, and having a target should make things easier. Move forward to slow your flight, but keep the lines tense enough for another sharp turn.



USE A PUSH-PULL  
COMBINATION TO  
PIVOT-RIGHT

As you approach the ground at your marker on the left side, pivot again. Push hard! Your second target is the top of the window straight up above your center marker.

Beginning to get the picture? Approach your mark at the top of the window, pivot, and fly down toward the marker on the right side. Remember, move back when you climb; move forward when you dive. Speed control is just as important in advanced maneuvers as it is in easier ones.

*Making the maneuver large will give people a better chance to see the move you are attempting to fly. However, there is another good reason to fly “big”.*

*If you are flying a short line, a waver can affect a large portion of the maneuver. In a longer line, the error is less noticeable or significant. On the other hand, if you can avoid any mistakes, keeping a longer line straight demonstrates complete control for a longer period of time.*

*That’s exactly the kind of solid control the judges are looking for.*

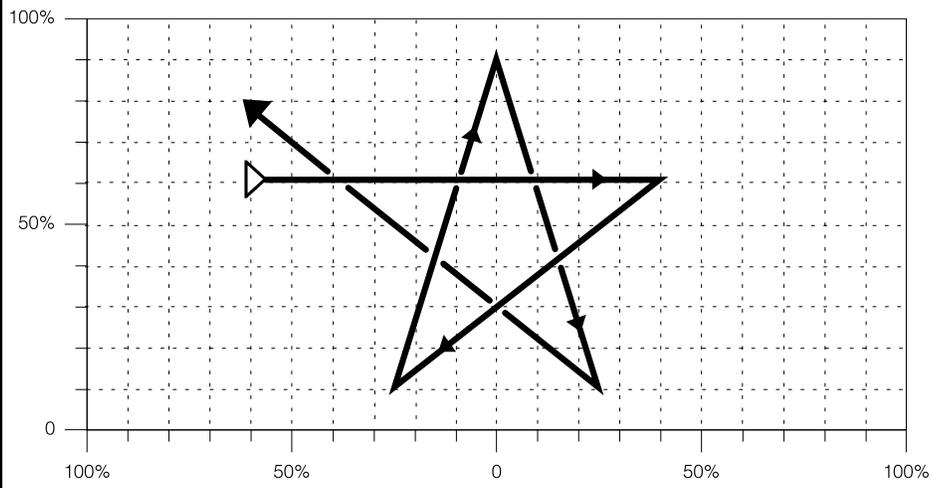
As you approach your right ground anchor, prepare for your last pivot. Anticipate the turn. Make it the same distance off the ground as the one you did on the opposite side of the window.

Turn and fly back up to the left at a forty-five degree angle. This will be a long diagonal, but the hard part is already behind you. Climb out half way to the left edge, and call “OUT”.

Using practice markers on the field is a completely legitimate training technique. They are particularly useful in maneuvers that need careful measurements and balance.

Markers aren’t allowed in competition, but by then, you’ll have practiced enough that you won’t need them.

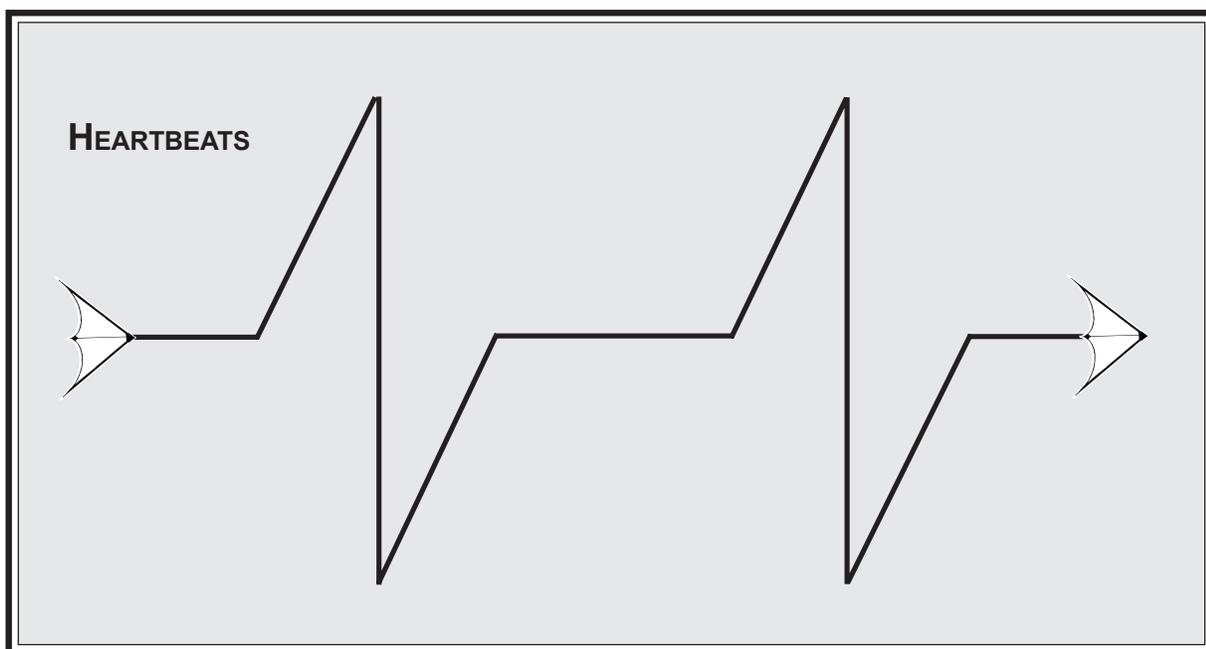
## 28. STAR



**Competition Spacing:** *IN is called fifty-five percent left of center at sixty percent altitude. The first horizontal ends forty percent right of center.*

*The base of the star is twenty-five percent left and right of center at an altitude of ten percent. The top is at ninety percent altitude.*

*OUT is called sixty percent left of center at an altitude of seventy-five percent. The final diagonal intersects the first horizontal forty percent left of center.*



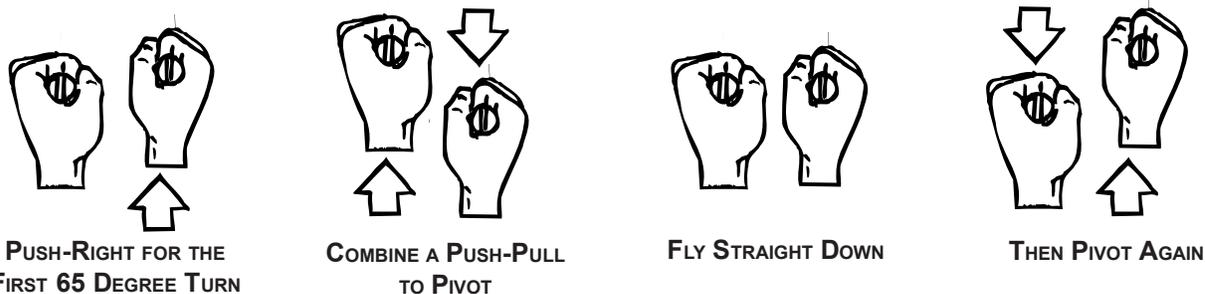
**Heartbeats:** Advanced maneuvers are supposed to be difficult. This one combines tight turns, lots of parallel lines, and a horizontal that stretches the entire length of the window, but is broken into three sections. This horizontal provides an easy frame of reference for people watching, and it will be easy for them to see if your spacing is off. And of course, the maneuver makes it easy for you to get that spacing wrong.

Start in a horizontal pass from the right that is just below center. Fly out to the left edge, roll up and over, and call "IN". Your goal is to begin a horizontal pass to the right that is exactly halfway between the top and bottom of the window. Fly it nice and slow. Take a moment to memorize the altitude of this line. You're going to need to find it several times again later.

Push-right to turn up. This is a sharp angle of about sixty-five degrees. If you think of a forty-five degree angle as turning "halfway", you can picture a sixty-five as "two-thirds". Or you can just look at the picture. Either way, you need to angle your kite toward the top of the window at a sharp diagonal.

Keep your flight straight, and as you approach the top, prepare for an even sharper turn. Usually, you move back in a climb, but with really sharp turns, the slower you are flying, the easier it will be to get the angle right. So fly slowly. Then, swing the nose of the kite around and fly straight toward the ground. Move in to maintain that slow pace.

At the bottom of the window, prepare for another sharp turn. Push-right to turn left. You want this new diagonal to be perfectly parallel to the last one. If you are flying slowly enough, it will seem like the nose of the kite pivots and the body follows it around.

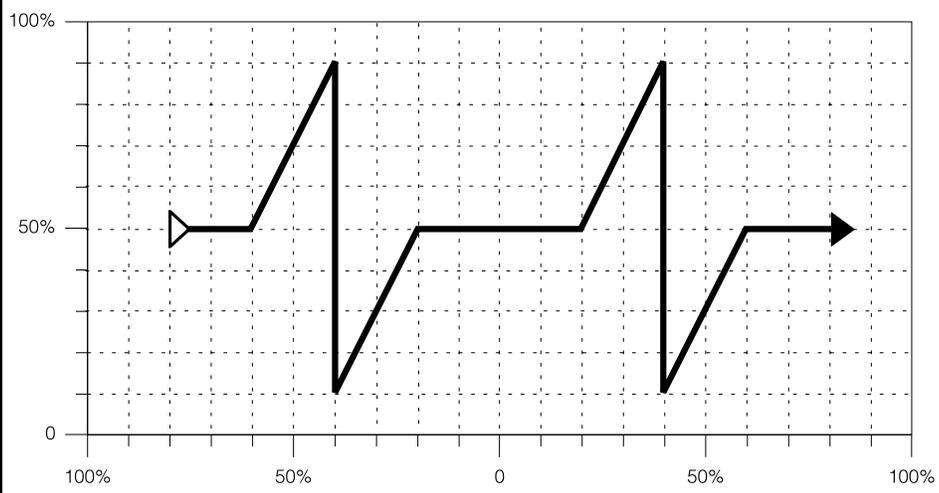


Each of the diagonals are fairly short. As you approach the horizontal divider, push-left to resume your pass from left to right and fly over to the right half of the window.

Now, all you have to do is repeat the whole thing again. The challenge in the first half of the maneuver was to keep diagonal lines parallel and angles sharp. You still need to do that in the second half, but now you have the added challenge of positioning the turns at the exact same altitudes as before. Take things slow. Don't let the fact that you are approaching the finish line ruin your concentration.

As you finish the final diagonal, turn once again into your horizontal line. Think of it as one extended pass from left to right with a few bothersome interruptions. Keep flying slow and level. As you approach the right edge, you can call "OUT".

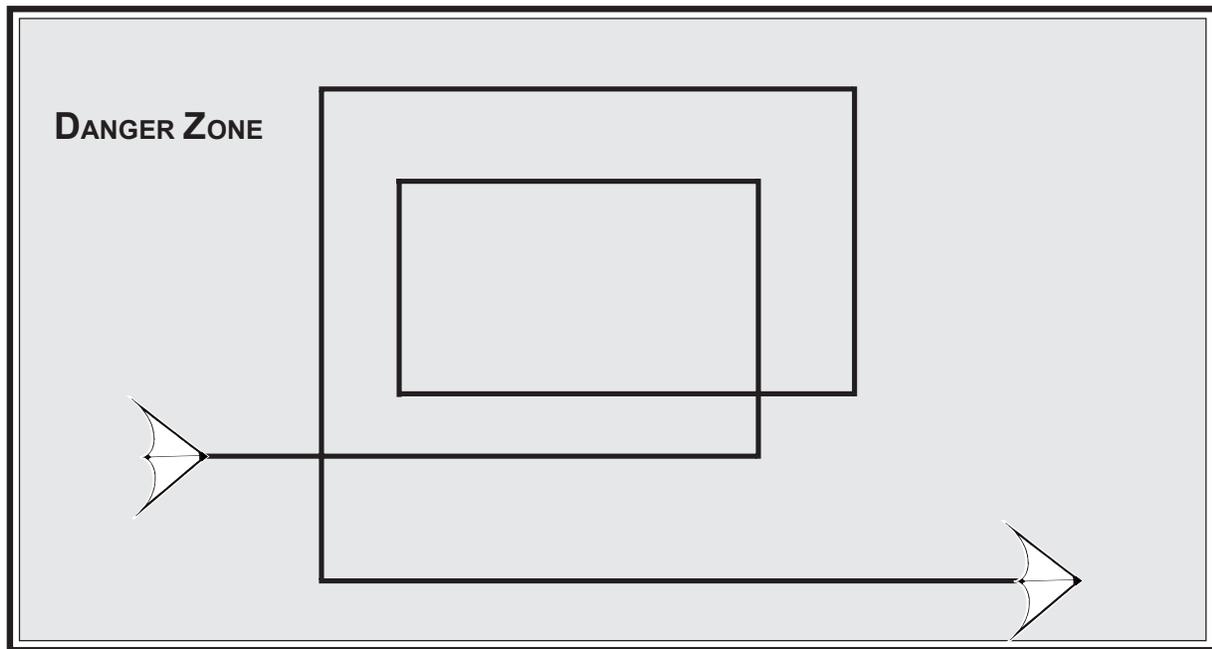
### 31. HEARTBEATS



**Competition Spacing:** All horizontal lines are at fifty percent altitude. IN is called eighty percent left of center. The first diagonal begins sixty percent left of center and rises at a sixty-five degree angle. The diagonal line ends forty percent left of center. The second diagonal begins forty percent left of center and ends at twenty percent.

Vertical lines are both forty percent from center. They extend from ten percent to ninety percent altitude.

The third diagonal begins twenty percent right of center. The final diagonal ends sixty percent to the right. OUT is called twenty percent from the right edge.



**Danger Zone:** Finally, we get to do a maneuver that is easier than it looks.

Start in a vertical dive along the left edge. About one-third of the distance from the ground, push-right to turn left. As soon as you establish a straight horizontal line, call "IN".

Use the first line of the maneuver to set the pace you will use throughout. Focus on flying parallel to the ground, and get ready for your first ninety degree turn.

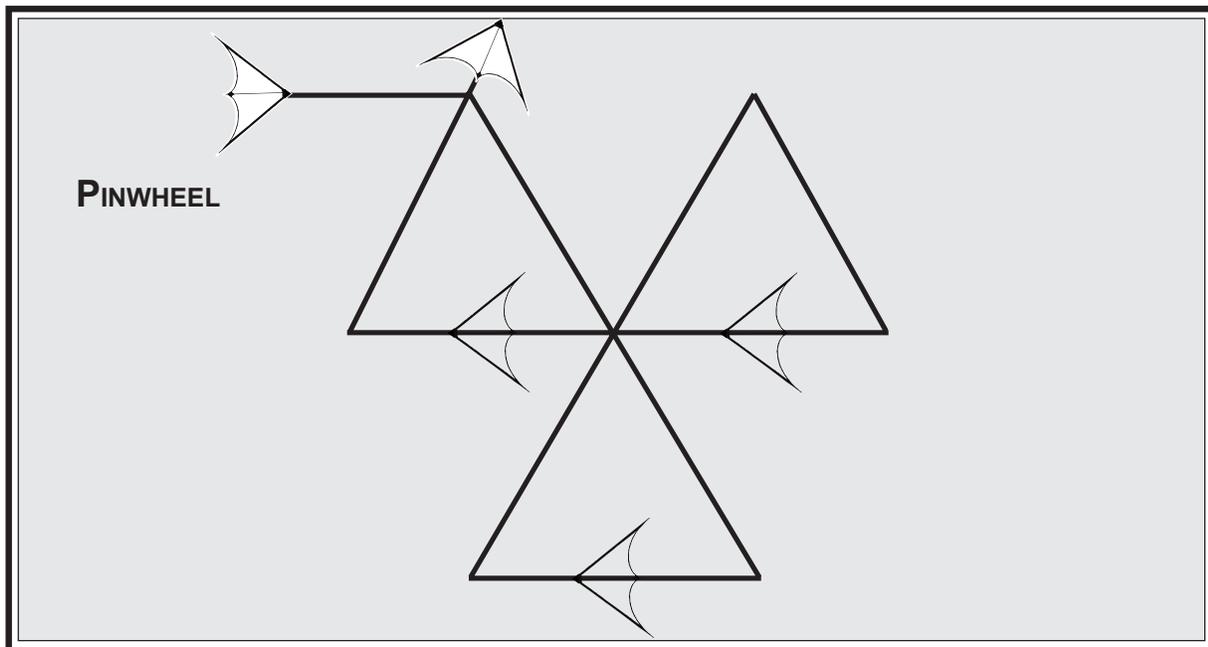
A quarter of the way past center, push-right to turn up. Move back to maintain speed in the vertical climb. Then, three-fourths of the way up from the ground, push-right again and go horizontal.

You're half way through the "inside" box. Obviously, the box is wider than it is tall. But also notice that the vertical center of the window divides the box in half. This means that, as you fly left, the distance from your turn in to the center, is the same as the distance from the center to the next turn down. Prepare yourself, and put that next ninety-degree push in exactly the right place.

The vertical dive will be a short, quick one. Move forward to slow down. Don't make the common mistake of crossing over your first horizontal and flying too low. The turn toward center comes just below the horizontal center of the window.

Push-right again and fly level with the ground. Take your kite out beyond the inside box. Another common mistake is to turn up too soon. As you approach the middle of the right side of the window, turn up and go vertical. Remember to move back as you climb.





**Pinwheel:** The first thing you notice about this maneuver are all the angles. Actually, there aren't as many as you think. You can complete the Pinwheel in just five pivot turns, but each of them is a full one-hundred-twenty degrees.

Look closer. What can you see that will help you to fly the figure better?

Notice that all three of the longest lines intersect in the very center of the window. Mark that spot in your mind. This centerpoint is also the middle of each of the lines, so balance the figure around it.

Notice too, that each short line parallels one of the longer lines. And finally, notice that the tops of the two upper triangles are immediately above the outside corners of the lower triangle. And those outside corners are precisely a quarter of the way out from center. These are the kinds of things that judges will be looking for.

Start in a horizontal line from the top left corner of the window. Halfway back toward the center, call "IN".

Now is the time to establish the speed you will use through the entire maneuver. Continue straight and level flying, and when you have come three-fourths of the way back toward center, push-left to angle down at sixty degrees.

Your target on this first diagonal is a spot on the ground, a quarter of the way right of center. Along the way, you will pass through the centerpoint of the window. When you get to the target, push-left to pivot to the right.

Fly parallel to the ground, past center and twenty-five percent of the way out to the left. Then pivot-right again. Your next target is the top of the window, directly above the first pivot point, which of course is twenty-five percent right of center. This will take you through the centerpoint a second time.

When you reach this next target, pivot-right again. Fly downward on a line parallel to your first diagonal. Plan to make your next turn halfway between the ground and the top of the window. Wait for the right moment, and then pivot back to the left in a horizontal pass parallel to the ground.

This long horizontal will take you through the centerpoint a third time. Remember that when you get to the center, you have flown half of the line. Continue an equal distance to the left, and then pivot one final time. The kite should now be on a diagonal line parallel to the sides of the other two triangles. Your target should be the first angle you used to fly into the maneuver. Coincidentally, this intersection should be directly above the left corner of the bottom triangle.

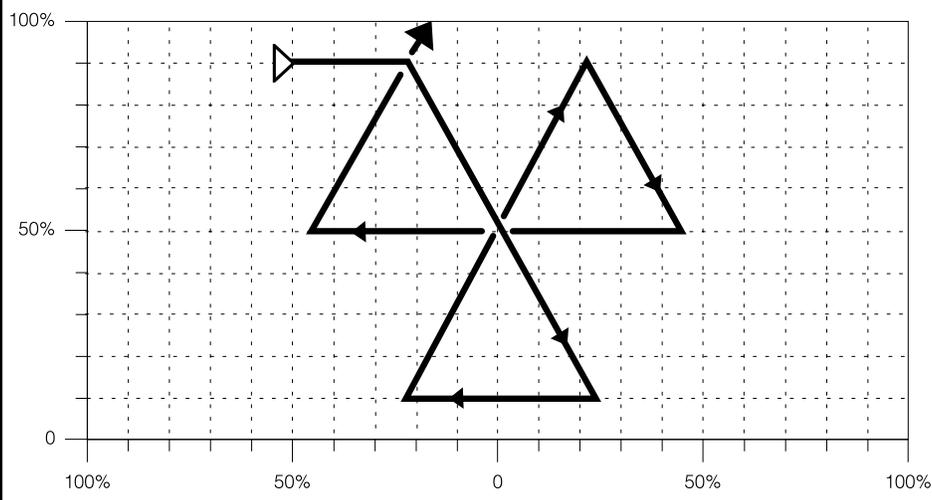
Fly up to the very top of the window and call "OUT". It's easy when you have all these ways to measure!

EACH TURN IS  
120 DEGREES



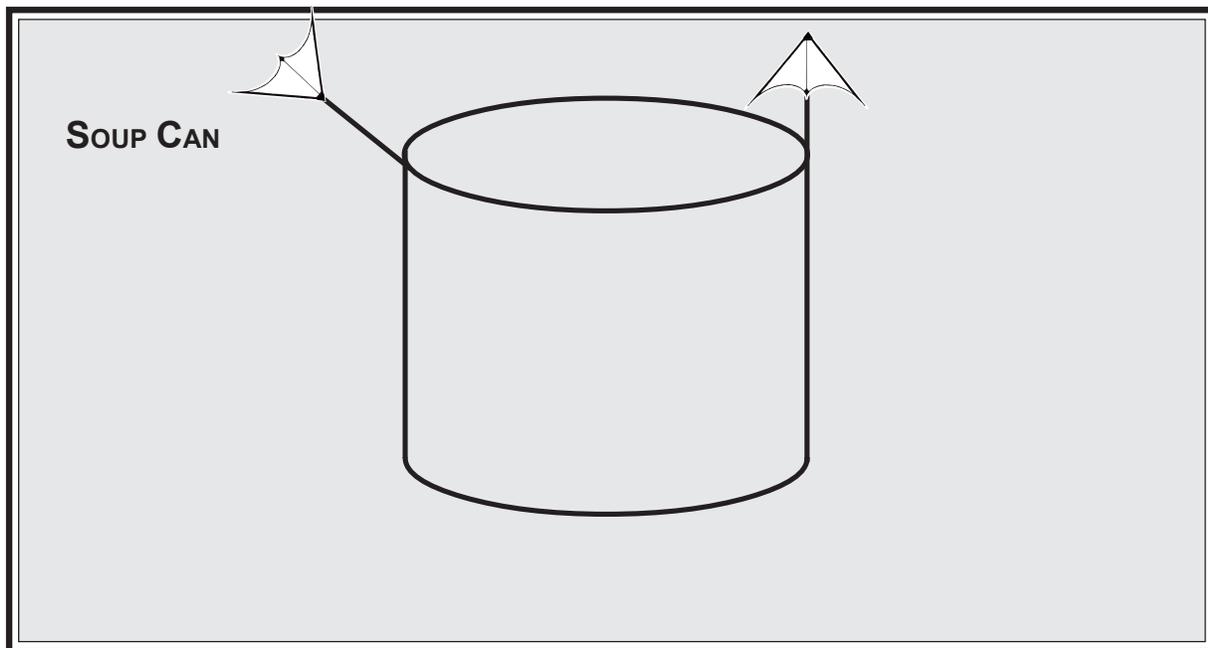
TRY A PUSH-TURN  
OR A COMBINATION

### 35. PIN WHEEL



**Competition Spacing:** *IN* is called fifty percent left of center at an altitude of ninety percent. Upper triangles peak twenty-two percent left and right of center. The base of the upper triangles extends forty-five percent to the left and right.

The base of the bottom triangle is twenty-two percent left and right of center at an altitude of ten percent. *OUT* is called twenty percent left of center at an altitude of ninety-five percent.



**Soup Can:** For our final figure, let's try something a little different. Instead of angles or circles, let's combine straight lines with ovals.

What things have you noticed that will help you fly the maneuver better? The overall shape is nearly square and is centered in the wind window. The lower curve of the "lid" exactly mirrors the bottom curve of the can. And finally, the vertical climb that finishes the figure flies straight up toward the right edge of the lid.

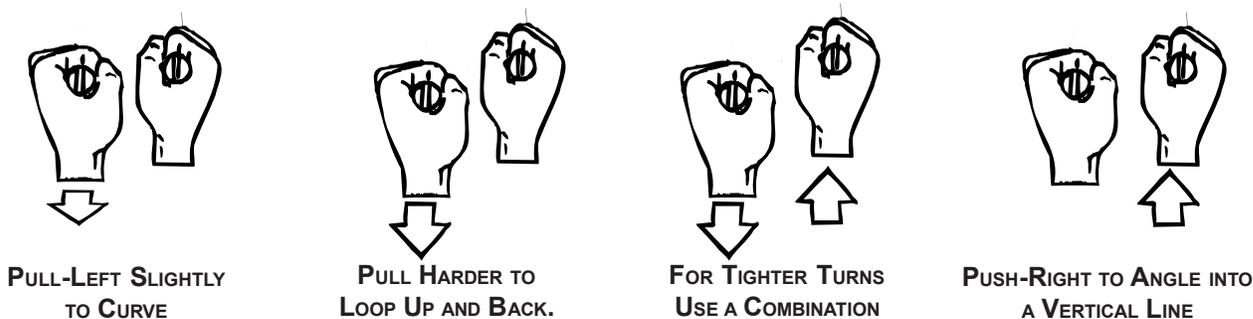
Start high on the left side of the window. Fly straight across the top, and about half way out from center, turn down at a forty-five degree angle. Call "IN" right away.

You need to fly a long horizontal oval now. Steer so that your flight path curves slightly and you come exactly parallel to the ground as you pass through the center of the window. Then curve gently back up toward the top.

A common error is to make the oval too narrow so that the figure is tall and thin. The right edge of the oval should be about one-third out from center.

Pull-left to loop up and back. Make sure the turn is rounded, rather than angled. Then fly the top half of the oval. Space it so you will cross over the path of your entry line about one-third left of center. At exactly that point, push-right to angle down. Make this a definite angle that changes you from curved flight to a vertical dive. Now move forward to slow the kite's descent.

As you approach the bottom of the window, prepare another angular turn. Push-right to turn forty-five degrees. Immediately switch to curving flight again.



Make the bottom of the maneuver look exactly like the curving line that you used to start the figure. Plan to go horizontal as you cross the center of the window. Be careful not to let the momentum of your flight take you too close to the ground.

One-third right of center, angle straight up. This turning point should be directly below the outside edge on the upper oval.

Now all you need to do is fly straight to the top of the window and call "OUT".

