

ADVANCED FLYING

Performance and Ground Reference Maneuvers

Performance Maneuver: Constant Attitude Turn

Objective: Use your throttle to maintain altitude ± 100 feet. Roll into and out of turns on same heading. Turn once to left then to the right (or vice versa). Plan the maneuver so that you never fly lower than 200 ft AGL. CLEAR the area first before you start your turns.

1. Pick out a point on the horizon in an area clear of obstructions.

Hint: This isn't a ground reference maneuver so don't pick a point on the ground. Pick a mountain peak, or some sort of mark on the horizon as your starting and ending point.

2. Slightly increase your throttle and start your turn. Adjust the amount of throttle per the sharpness of your turn and whether you're flying solo or tandem. Maintain your altitude while making a constant rate turn. Roll out of your turn early enough to be finished when you are aiming right at your starting point on the horizon. Immediately start the opposite turn and follow through just like the first turn.

3. Upon finishing your turns, reduce throttle to straight and level and maintain your heading towards your marked point.

Ground Reference Maneuvers include turns around a point, rectangular patterns and S-turns. They are described below. The main point in doing these maneuvers is to fine tune your rudder control, keep your attention moving from instruments to back out into

the flying environment, and to account for wind drift while flying. An understanding of these elements enhances your flying skills which increases the FUN!!!

Turns around a point. See figure below.

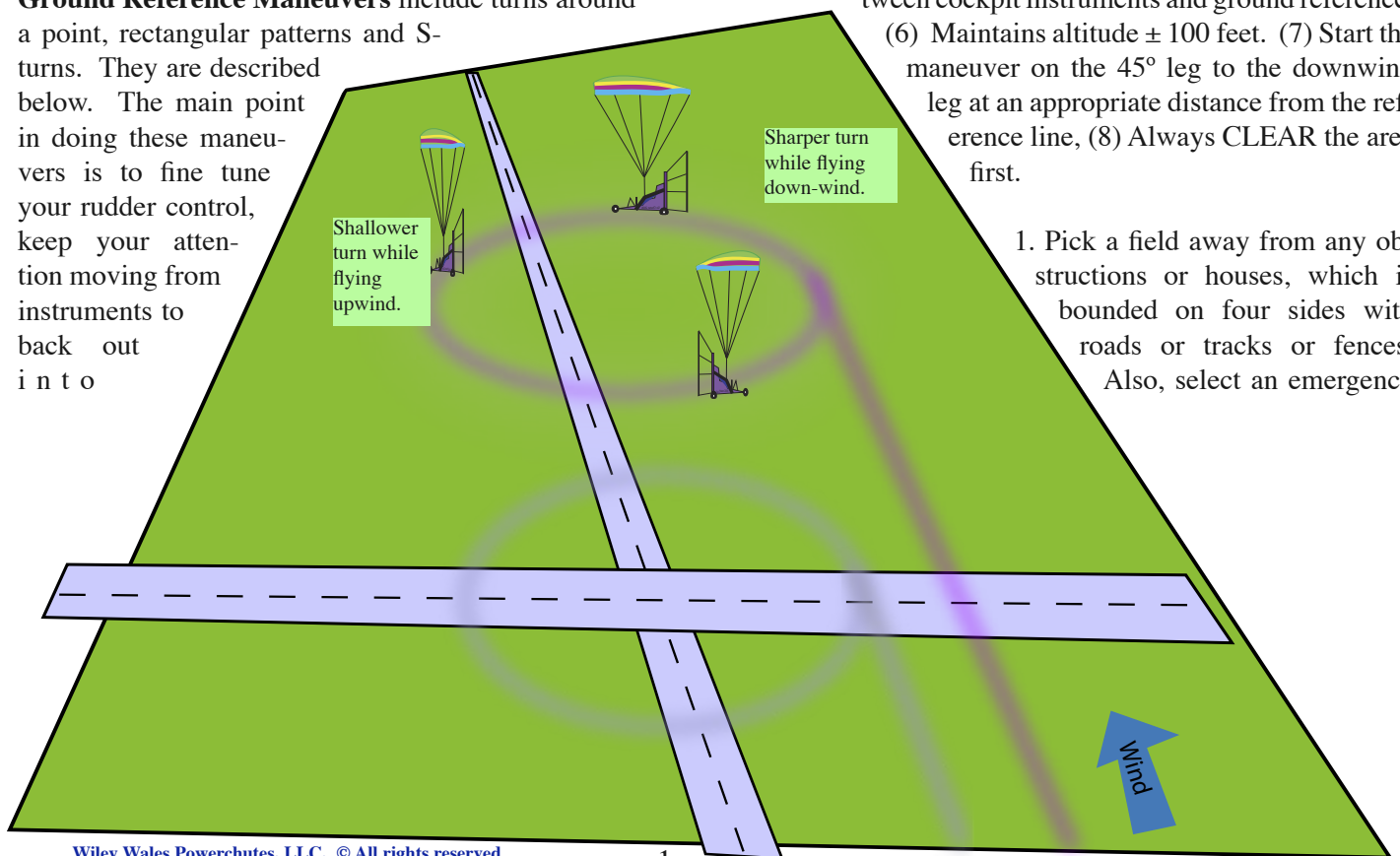
Objective: (1) Know the elements related to turns around a point. (2) Select a suitable ground reference point. (3) Plan the maneuver so that you never fly lower than 200 ft AGL. (4) Apply adequate wind drift correction. (5) Divide attention between cockpit instruments and ground reference. (6) Maintains altitude ± 100 feet. (7) Always CLEAR the area first.

1. Pick a point on the ground and draw an imaginary circle around it, to follow while flying.
2. Add in some throttle so as to not descend when you make your turn.
3. Tighten your turn when you are turning downwind to account for your increased ground speed.
4. Ease up on your turn when flying into the wind. This is due to the slow ground speed.
5. Finish the maneuver when the instructor indicates that you've shown enough of the maneuver.

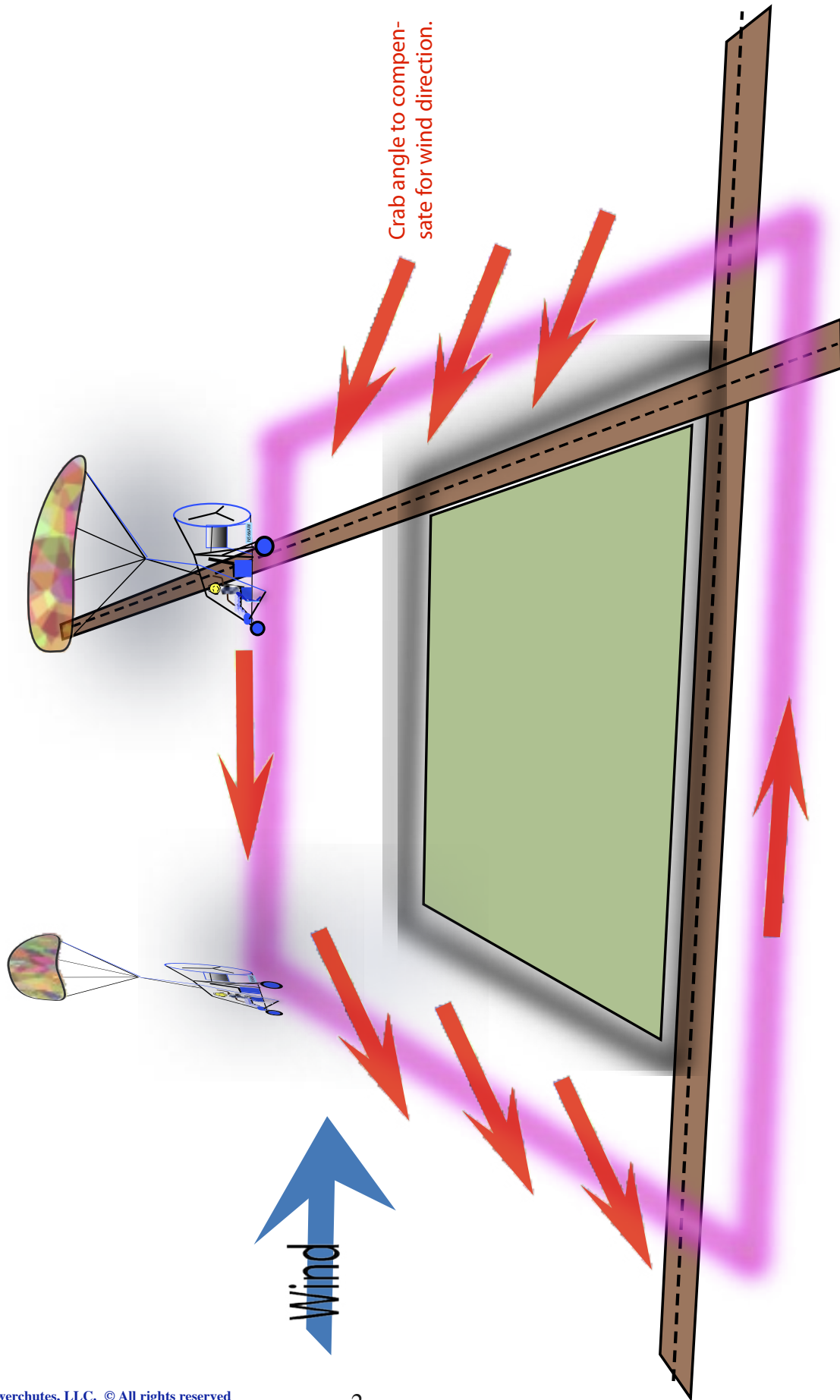
Rectangular Course. See page 25

Objective: (1) Know the elements related to a rectangular course. (2) Select a suitable ground reference area. (3) Plan the maneuver so that you never fly lower than 200 ft AGL. (4) Apply adequate wind drift correction. (5) Divide attention between cockpit instruments and ground reference. (6) Maintains altitude ± 100 feet. (7) Start the maneuver on the 45° leg to the downwind leg at an appropriate distance from the reference line, (8) Always CLEAR the area first.

1. Pick a field away from any obstructions or houses, which is bounded on four sides with roads or tracks or fences. Also, select an emergency



Objective: Develop skills to compensate for the effects of wind and fly a uniform traffic pattern by visual reference to the ground. Plan ahead and use varying amounts of rudder input to make your turns the proper distance from the line of reference.



landing area in case of an engine out. (*Continued on next page*)

2. Upon entering the rectangular course from the 45° leg, fly parallel the field boundary.
3. When you near the corner, anticipate the turn and the wind correction needed and start your turn to crosswind. Crab into the wind in you need to (making your turn more than 90°).
4. When you near the next corner, anticipate the turn to upwind and follow the rectangular pattern outlined by the field. This turn should be less than 90° due to the crab angle you just had, to maintain your ground track.
5. Make another turn to crosswind (at the airport this would be your base leg). Then another to downwind. Adjust for wind.

S-Turns. See page 27.

Intended to improve your ability to account for wind drift. When turning downwind a sharper turn is required due to increased ground speed. When turning upwind, while the turn needs to start immediately as you leave the road or line, it should be started gently so as to be able to finish your 180° turn before you come back around to the road. Otherwise, you'll have shallow, flat 1/2 circles on the upwind side of the road and long, loopy 1/2 circles on the downwind side.

Objective: (1) Know the elements related to S-turns. (2) Select a suitable ground reference line. (3) Plan the maneuver so that you never fly lower than 200 ft AGL. (4) Apply adequate wind drift correction while making equal 1/2 circles on either side of a road or line. (5) Divide attention between cockpit instruments and ground reference. (6) Maintains altitude ± 100 feet. (7) Always CLEAR the area first.

1. Pick a point on the ground and draw an imaginary circle around it, to follow while flying.
2. Add in some throttle so as to not descend when you make your turn. Start on the downwind leg as this will determine the size of your 1/2 circles.
3. Tighten your turn when you are turning downwind to account for your increased ground speed.
4. Ease up on your turn when flying into the wind to account for the slow ground speed.
5. Start your turns immediately after crossing the mid point of the road or line. Finish your turns just as you approach the midpoint of your line. Then go right into the next turn. See pictures on the following pages.

You might not be perfectly parallel your reference line, because in the ppc, we don't have rudders and ailerons

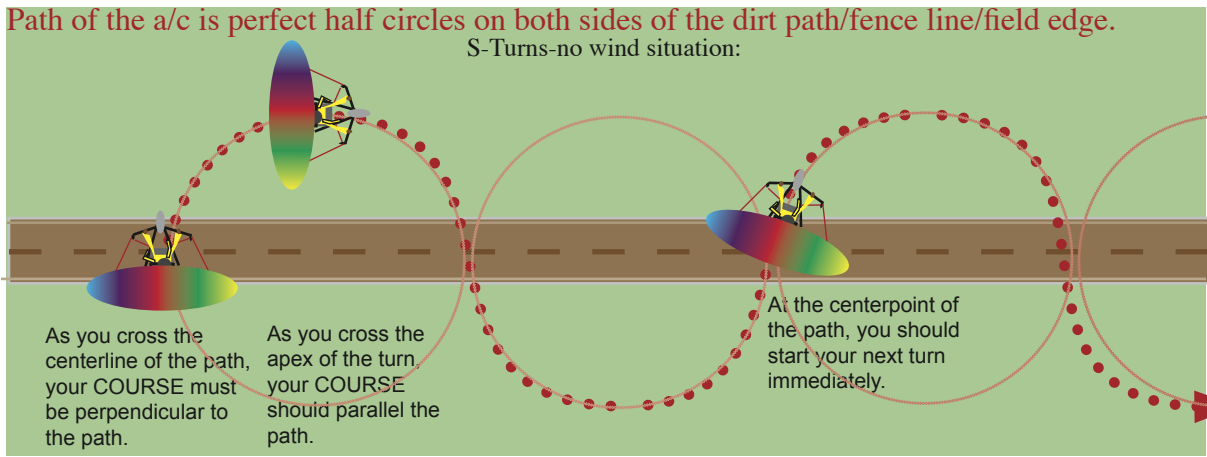
(like a fixed wing aircraft) to keep the a/c parallel, BUT our ground TRACK should be parallel.

Common problems while doing the Ground Reference Maneuvers are several. Accurately assessing the wind speed and how much it will affect your ground track is the biggest problem. Take some time to feel the wind. Make some turns first and watch the ground to see what effect the wind has on your ground track. With practice, you will be able to use subtle foot pressure on the rudder bars to compensate for wind drift in these maneuvers. They take great skill to accomplish well and are part of the check ride you'll do with an examiner in the back seat. The more time you have in the pilots seat ensures that you'll understand the maneuvers and recognize the elements required while performing them. Have fun with it!

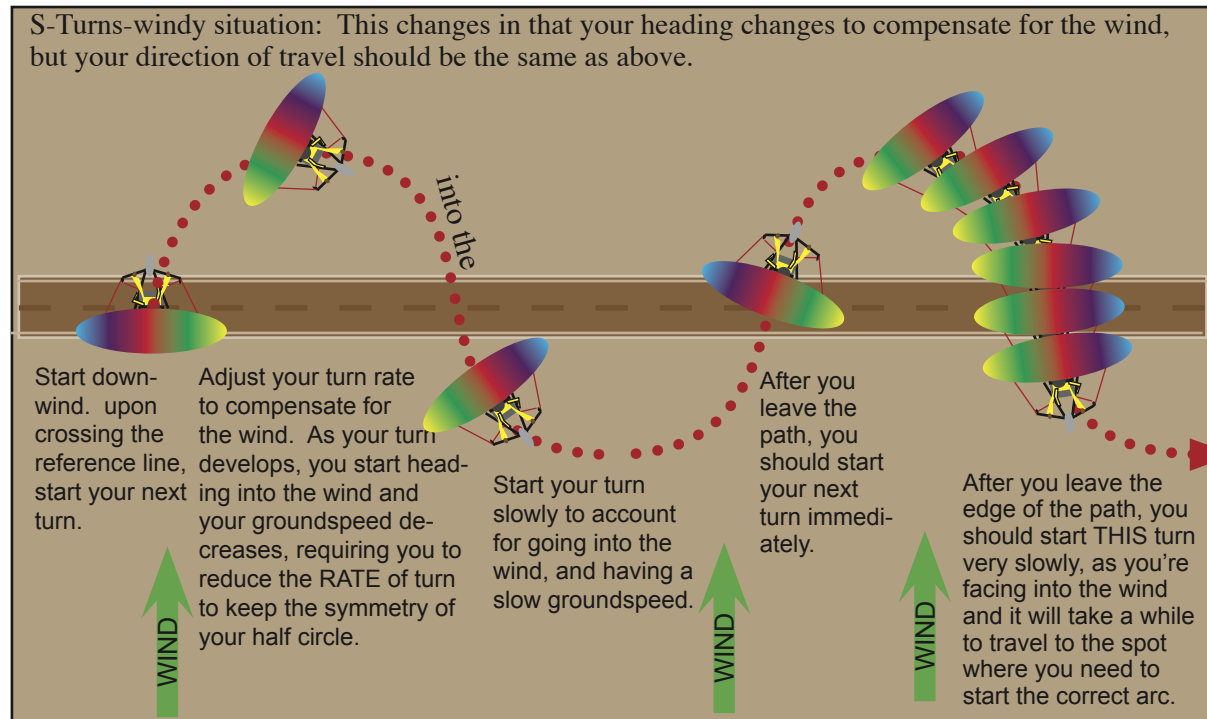
These maneuvers were written up with help from the Jeppesen Private Pilot Maneuvers Book, only because the Powered Parachute Maneuvers Book hasn't been written yet. BUT, the maneuvers are part of the PTS or Practical Test Standards by which pilots are deemed competent.



No wind situation.

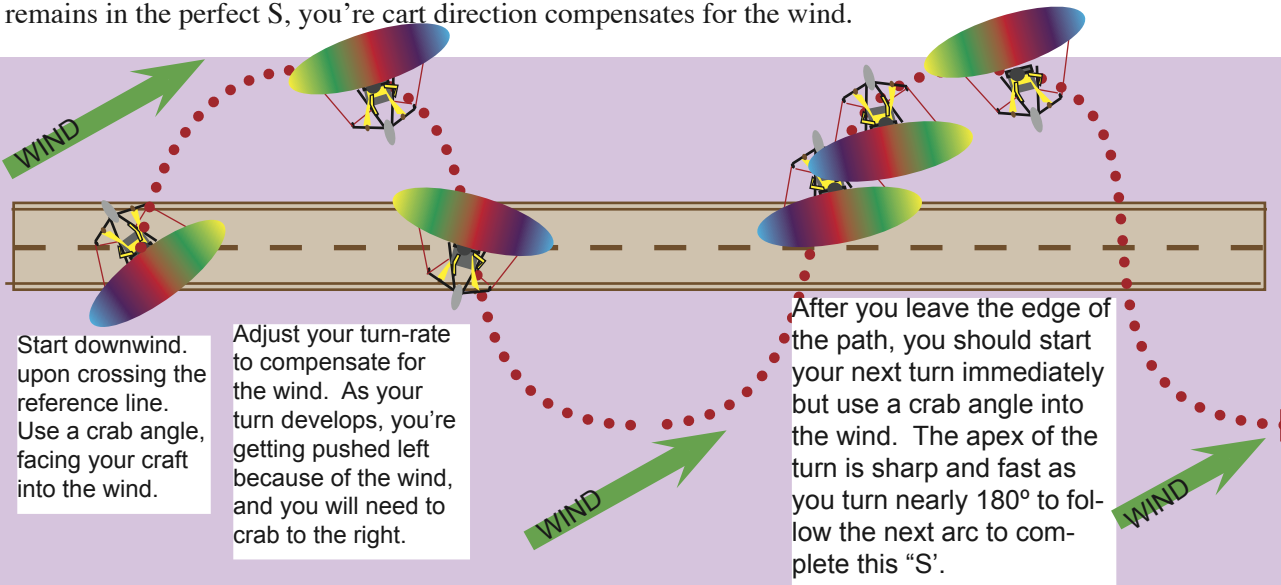


Perpendicular wind situation.



S-Turns-windy situation: This scenario changes in that you need to crab into the wind. So while your path remains in the perfect S, you're cart direction compensates for the wind.

Diagonal wind situation.



*** NOTE: In this wind situation it might be best to choose a road perpendicular to what is shown.**