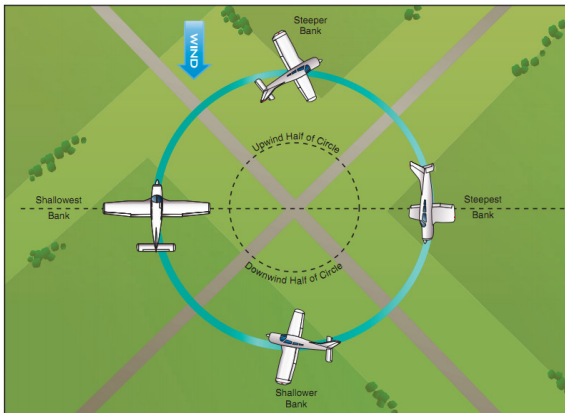


Turns Around a Point

Objective	
<p>To ensure the applicant learns the purpose of and can exhibit a clear understanding of the Turns Around a Point maneuver and how to perform the maneuver properly.</p>	
Purpose	Equipment
<p>The Turns around a Point maneuver is a more advanced ground reference maneuver, demonstrating how wind greatly affects turn radius, and requiring the pilot to vary bank angle to maintain a desired ground track as the relative wind direction changes. It also builds skills related to aircraft coordination through a wide range of bank angles.</p>	<ul style="list-style-type: none"> • n/a
Schedule	Instructor Actions
<ul style="list-style-type: none"> • Ground Lesson: 15 minutes • Initial <ul style="list-style-type: none"> ■ Flight 1: 40 minutes - <i>Introduction to Maneuver</i> ■ Flight 2: 40 minutes - <i>Improve Proficiency (Dual)</i> • Solo <ul style="list-style-type: none"> ■ Flight 3: 20 minutes - <i>Improve Proficiency</i> • Pre-Checkride <ul style="list-style-type: none"> ■ Flight 4: 20 minutes - <i>Demonstrate Proficiency</i> • Debrief: 10 minutes (<i>per flight</i>) 	<ul style="list-style-type: none"> • Deliver the ground lesson (below). • Demonstrate the maneuver in flight. • Debrief after each flight.
Student Actions	Completion Standards
<ul style="list-style-type: none"> • Ask any questions, receive study material for the next lesson. • Watch linked video. • Review listed references. 	<ul style="list-style-type: none"> • Ground: Student can explain the purpose of the maneuver and how to execute it properly. • Flight: Student can perform the maneuver to the applicable ACS standards. <ul style="list-style-type: none"> ○ See expanded Completion Standards below.

References

- ERAUSpecialVFR - "Turns Around a Point"
 - YouTube - https://www.youtube.com/watch?v=YzNSBTxH_Cs
- FAA-H-8083-3B (Airplane Flying Handbook) - Chapter 6, Page 8-10 [Maneuver Description]
- FAA-S-ACS-6B (Private Pilot ACS) - Area V Task B Skill 3c
- FAA-S-8081-6D (CFI PTS) - Area X Task C

Ground Lesson Outline

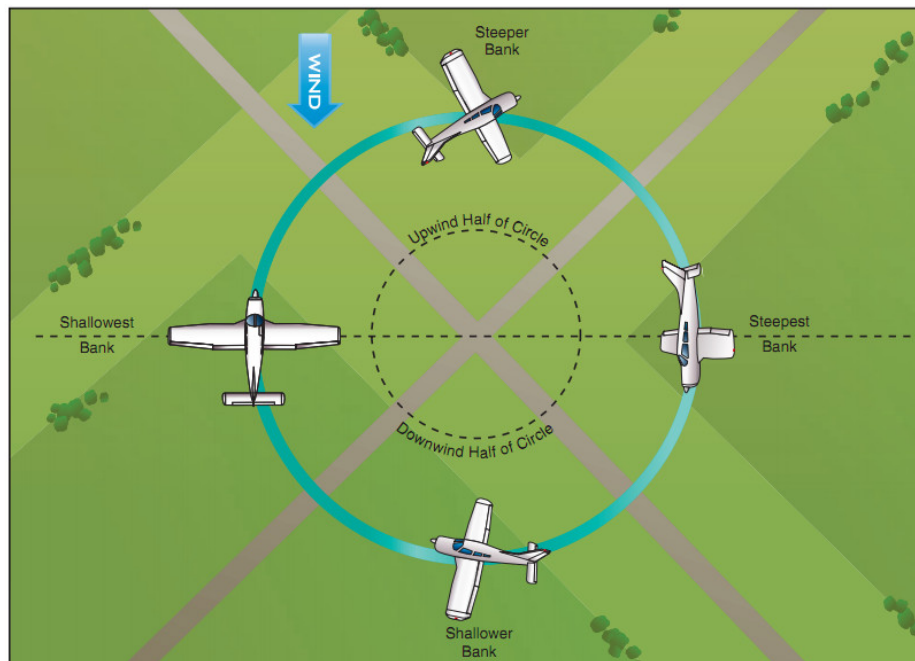
- Turns Around A Point
- Wind, Bank, and Rate of Turn
- Ground Reference Maneuvers
 - Selecting a point
- Two Halves
 - Upwind
 - Downwind
- Symmetry
- Coordination
- Safety considerations
 - Use of checklists
 - Emergency Landing Area
 - Visual traffic scanning
- Maneuver Description - step-by-step
 - Entry position, airspeed, etc.
- Expanded Completion Standards

Common Errors

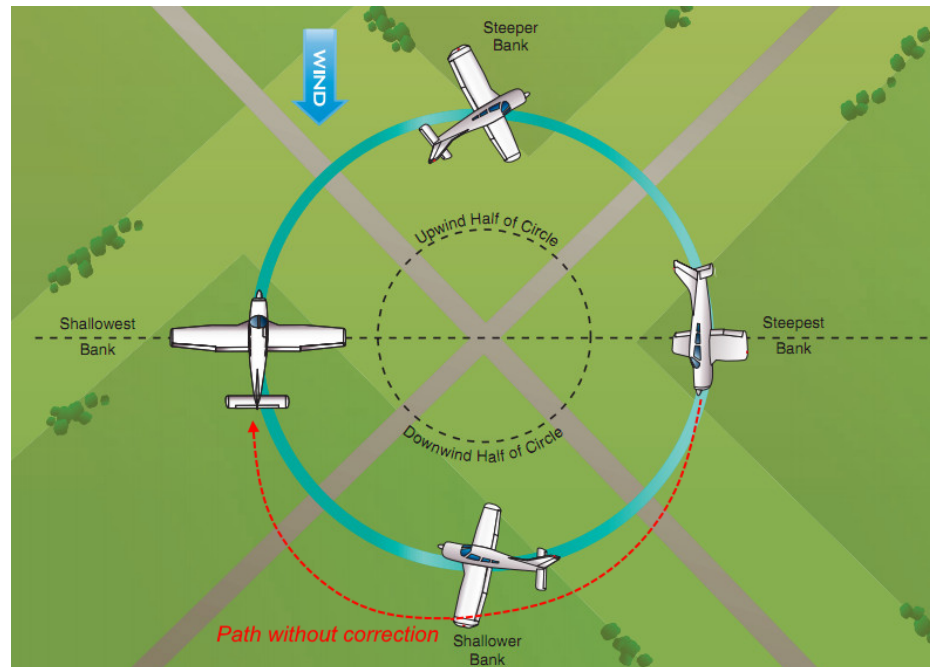
- Failure to adequately clear the area above, below, and on either side of the airplane for safety hazards, initially and throughout the maneuver.
- Selection of a ground reference where there is no suitable emergency landing area within gliding distance.
- **Failure to properly assess wind direction.**
- Failure to establish a constant, level altitude prior to entering the maneuver.
- **Failure to maintain altitude or airspeed during the maneuver.**
- Failure to manipulate the flight controls in a smooth and continuous manner.
- **Failure to properly divide attention between controlling the airplane and maintaining proper orientation with the ground references.**
- **Uncoordinated use of flight controls.**
- **Improper correction for wind drift.**

Ground Lesson Content

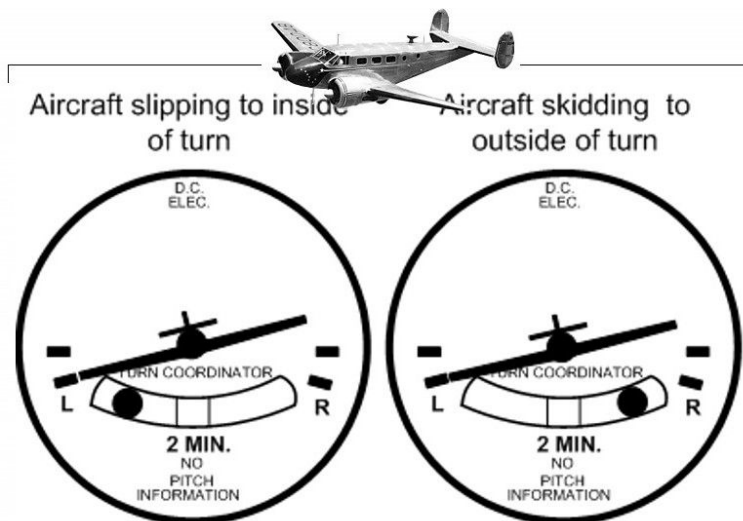
- Turns Around A Point** - The Turns around a Point maneuver is a more advanced ground reference maneuver that mainly demonstrates that correcting for wind in turns requires adjusting the *bank angle*. The object of the maneuver is to fly a circle of constant radius, essentially just a 'perfect circle' around some prominent point on the ground.



- Wind, Bank, and Rate of Turn** - During straight-and-level flight, an airplane can correct for the wind by flying at a *wind correction angle*, however during turning flight, this tactic doesn't work. Instead, the **rate of turn**, and therefore the bank angle, is used to keep the airplane flying on the desired ground track.
- As the airplane flies into the wind, or **upwind**, it flies slower over the ground, and therefore needs *less* rate of turn. As the airplane flies with the wind, or **downwind**, it needs *more* rate of turn. An airplane which does not correct for the wind during turns will instead fly a spiral:



- **Ground Reference Maneuvers** - The maneuver is a **ground reference maneuver**, meaning it is performed by reference to a prominent point on the ground. For this maneuver, any prominent point on the ground can be chosen, as long as it is in a relatively unpopulated area. Because the maneuver will be flown close to the ground, it should be chosen within gliding distance of an emergency landing site.
- Before the maneuver can be started, the wind direction needs to be determined. Look for smoke, flags, or other indications of wind on the ground. The maneuver is started on the *downwind* portion, meaning the airplane is flying *with* the wind.
- The airplane should begin far enough away from the point so that it can be flying straight and level, directly downwind, and will pass approximately $\frac{1}{4}$ mile away from the point. The point will be to the right for a right-turning circle, and to the left for a left turning circle.
- **Two Halves** - The maneuver can be broken into *two halves*:
 - **Downwind** half - Initially a **steep bank angle** is required, with the bank angle gradually reducing as the airplane approaches the 180 degree point, heading back upwind.
 - **Upwind** half - Initially a very **shallow bank angle** is required, with the bank angle gradually increasing as the airplane returns to the downwind portion, completing the circle.
- **Symmetry** - The progress of the turn should be monitored visually, continuously glancing between the reference point and the flight instruments. The goal is to maintain the $\frac{1}{4}$ mile distance from the point (making a symmetrical circle) by continually changing the bank angle, and to maintain the same altitude and airspeed as at the beginning of the maneuver.
- Any normal cruise airspeed below *maneuvering speed* (V_a) can be chosen, and the maneuver is normally flown in the clean configuration.
- **Coordination** - Because this maneuver is flown close to the ground and involves turning, it is important to pay close attention to flying with proper coordination. As the airplane rolls into and out of turns, the rudder must be used to keep 'the ball' in the center. This avoids *slips* and *skids*, which create the risk of a stall or spin. The turn coordinate is shown below:



- **Safety Considerations**

- **Checklists** - Pilots should complete a pre-maneuver checklist before beginning the maneuver.
- **Emergency Landing Area** - Due to the risks involved with maneuvering at low altitude, pilots should select a suitable emergency landing area.
- **Visual Traffic Scanning** - Pilots must remember to keep up their traffic scan throughout the maneuver.

Maneuver Description

- **Selecting a Ground Reference** - Select a prominent point, which is easy to identify. It should be in an unpopulated area and clear of hazards on the ground. A road intersection is usually a good choice. Do not choose things like houses or other structures as references, as this could cause a nuisance. *Because this maneuver is performed so close to the ground (below 1,000ft AGL), make sure that the chosen ground reference is near a suitable emergency landing area, as gliding distance will be almost zero.*
- **Entry Position and Heading** - First, the wind direction should be identified. Look for smoke, flags, or other signs of surface wind direction. If none are available, the ATIS or METAR of a local airport can be used to estimate. Plan to enter the *downwind* portion of the circle, about $\frac{1}{4}$ mile abeam the point.
- **Altitude** - This maneuver should be performed at **600 to 1,000ft AGL**.
- **Bank** - Since this maneuver involves maneuvering at low altitude, the bank angle should be *less than 45 degrees*. It will be necessary to bank more when heading downwind, and less when heading upwind. Maintain a constant radius circle over the point.
- **Airspeed** - The maneuver must be started at less than **V_a** (maneuvering speed). Choose a normal level cruise flight airspeed and power setting, at least 5-10 knots below V_a.
- **Coordination** - The entire maneuver should be flown in coordinated flight. The varying bank angle will require more or less rudder throughout the maneuver. Attention should be given to proper rudder input during turns.
- **Recovery** - After completing the maneuver, usually at least 2 circles, recover to straight and level flight.
- **This is a visual maneuver!** Eyes should remain outside the cockpit as much as possible to scan for traffic and ensure proper tracking of the ground references. *In particular, this is a very low altitude maneuver. Keep a careful watch for obstructions or other ground hazards.*

Expanded Completion Standards

- The pilot can explain the purpose of the Turns Around a Point ground reference maneuver and how the various factors affect the performance of the maneuver.
- The pilot can perform the maneuver to the following standards:
 - Pilot clears the area, performs a pre-maneuver checklist, establishes a speed *below* **V_a**, and selects an appropriate altitude for maneuver entry, **between 600 and 1,000 feet AGL**.
 - Pilot selects a suitable ground reference point, free from any ground hazards.
 - Pilot enters the maneuver approximately ¼ mile from the reference point.
 - Pilot applies proper wind correction by continuously adjusting the bank angle to maintain a constant radius circle directly around the reference point.
 - Pilot flies two circles around the point.
 - Pilot divides attention between accurate, *coordinated airplane control* and outside visual references.