

Lesson 3: Ground Reference Maneuvers Part 1

Scenario

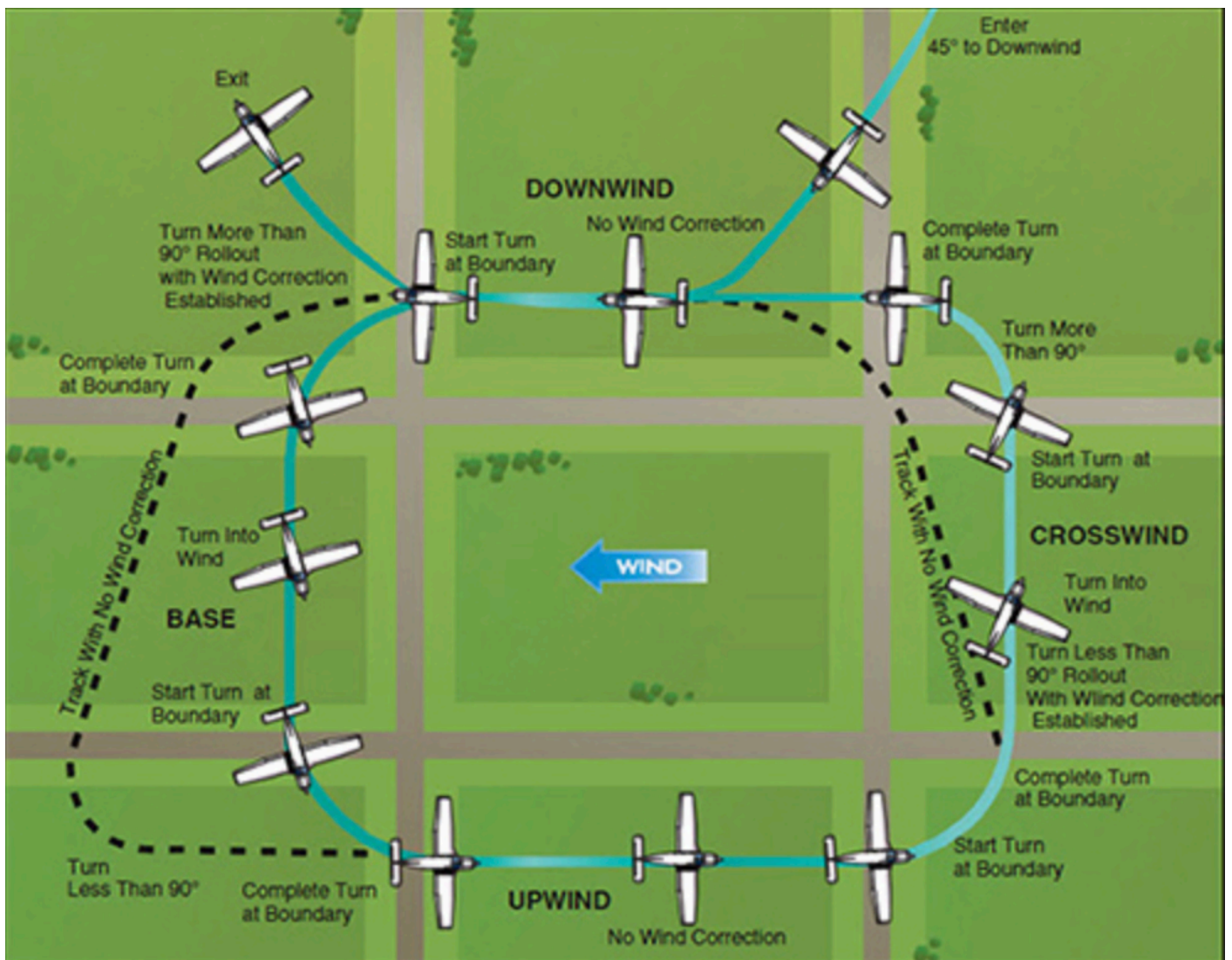
Imagine that you're scouting a area of a solar farm. A hailstorm recently passed over one of your customer's fields. You plan to take them along on a short flight to survey the damage from the air.

Like the previous lessons, this scenario doesn't involve emergencies or complicated decision trees. However, it helps you apply and combine some of the basic flying skills that you've practiced as isolated, abstract skills.

Objectives

The primary goal of this flight is learning about the rectangular course, an important ground reference maneuver. The rectangular course (sometimes called the "rectangular pattern") tests your ability to fly precisely while dividing your attention between flying a specific path over the ground and monitoring altitude and airspeed (see Figure 16-1).

Figure 16-1: Flying a rectangular course, as shown in Figure 6-4 of the Airplane Flying Handbook



The Airplane Fling Handbook describes the rectangular course as follows:

The rectangular course is a training maneuver in which the ground track of the airplane is equidistant from all sides of a selected rectangular area on the ground. The maneuver simulates the conditions encountered in an airport traffic pattern. While performing the maneuver; the altitude and airspeed should be held constant.

Like those of other ground track maneuvers, one of the objectives is to develop division of attention between the flightpath and ground references, while controlling the airplane and watching for other aircraft in the vicinity.

Another objective is to develop recognition of drift toward or away from a line parallel to the intended ground track. This will be helpful in recognizing drift toward or from an airport runway during the various legs of the airport traffic pattern. The airplane should be flown parallel to and at a uniform distance about one-fourth to one-half mile away from the field boundaries, not above the boundaries.

In addition, this scenario introduces you to:

- Basic navigation - pilotage
- Information about airports on a sectional chart
- The standard airport traffic pattern

The flight back toward the Pullman airport also gives you an opportunity to practice and apply the fundamental flight maneuvers that you practiced in previous lessons.

Completion Standards

The detailed goals for this lesson are outlined in the table at the end of this chapter.

At this point, you should be comfortable looking around and using the basic controls in the cockpit. When flying the fundamental maneuvers, you should be at the Perform level in the FITS grading standards - that is, able to fly consistently within the limits established by the practical test standards. Don't worry, however, if you need more practice flying rectangular patterns.

You should also be able to use the heading indicator, the sectional chart, and the interactive map in X-Plane to help you return to the vicinity of the Gooden Airpark airport (RJD).

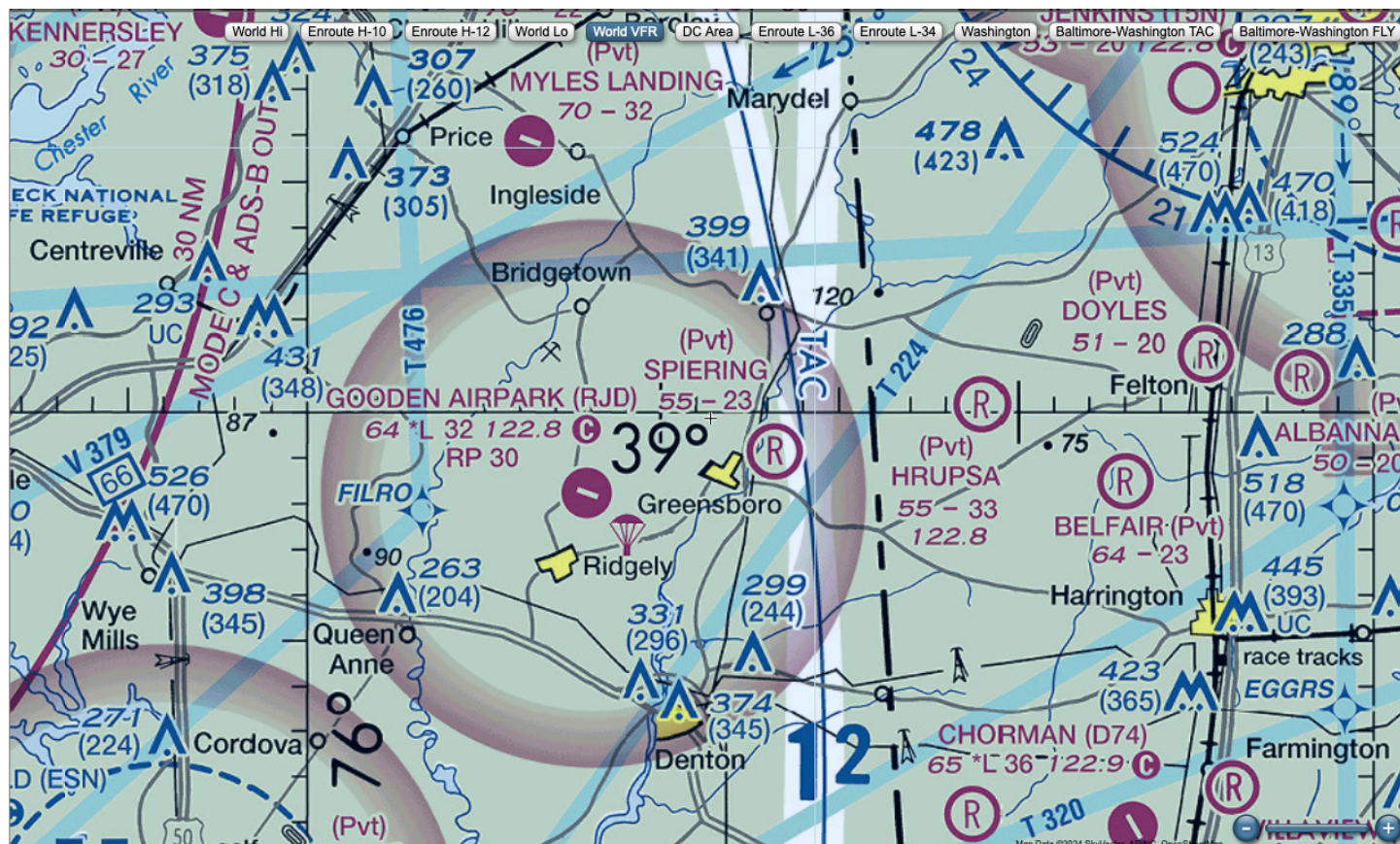
Using the descriptions of airport symbols and information blocks in the Aeronautical Chart Users Guide, you should be able to describe the basic features of the Gooden Airpark airport (see Figure 16-2), including the following:

- Official three-letter identifier for the airport
- Runway type, orientation, and length
- Airport elevation above mean sea level
- Basic airport type - whether it is home to a control tower or it is an airport with common traffic advisory frequency (CTAF)

This lesson is complete when the PT is able to meet the desired outcomes listed in the learning objectives table below, when the PT

- (1) can track a straight line and conduct traffic pattern procedures with instructor guidance,
- (2) is able to conduct normal checklist procedures with little input from the instructor,
- (3) is able to maintain directional control at all times during the takeoffs and landings with instructor guidance,
- (4) is able to identify and avoid areas of possible wake turbulence and wind-shear with instructor guidance,
- (5) maintains continuous vigilance for other aircraft with extra precautions taken in areas of congested traffic,
- (6) is able to maintain altitude ± 250 feet, airspeed ± 20 knots, heading ± 30 degrees and roll out on headings within ± 30 degrees of that desired while conducting fundamental flight maneuvers.

Figure 16-2: Detailed view of the Gooden Airpark airport on the Washington sectional chart



References and Resources

To prepare for this lesson, review the following references and resources. The AOPA Air Safety Institute publications are valuable supplements to the official information in the FAA references.

Title	Chapter/Section	Topic/Notes
Pilot's Handbook of Aeronautical Knowledge	Chapter 15, "Navigation"	Introduction (p. 15-1) and Sectional Charts (p. 15-2)
Airplane Flying Handbook	Chapter 6, "Ground Reference Maneuvers"	Purpose and Scope and Maneuvering by Reference to Ground Objects (p. 6-1), Drift and Ground Track Control (p. 6-2), and Rectangular Course (p. 6-4)
	Chapter 7, "Airport Traffic Pattern"	Review this chapter in preparation for later lessons.
Aeronautical Chart Users Guide	VFR Aeronautical Chart Symbols	Aeronautical Information: Airports (p. 11)
Private Pilot Practical Test Standards	Ground Reference Maneuvers	Task VI: Ground Ref- Rectangular Course (p. 1-22)
AOPA ASI Safety Advisor Operations at Nontowered Airports	-	-
AOPA ASI Safety Advisor Maneuvering Flight - Hazardous to Your Health?	-	-

Preflight Briefing

This lesson begins in the air over the fields north of Gooden Airpark, MD (RJD). You're in position to select a field and turn to start flying a rectangular course (see Figure 16-3). Fly the first couple of laps to the left before trying a right-hand pattern. The autopilot is on in heading and altitude hold modes to ensure a stable start to the flight. Turn it off when you're ready to start flying.

Figure 16-3: View of the area where you should fly the rectangular pattern.



The practical test standards specify that you should fly ground reference maneuvers at 600 to 1,000 ft. above ground level (AGL). The area north of Gooden Airpark is generally at an elevation of about 65 ft. above mean sea level (MSL). For this lesson, you should fly the rectangular course at 1,100 ft. as shown on the altimeter (generally speaking, your altimeter displays the airplane's altitude above MSL).

Practice as many laps as you like, left and right, around the pattern, before you climb to 3,000 ft. and turn to a heading of about 160 degrees to fly back toward the Gooden Airpark airport. The goals of this lesson don't include landing. It's sufficient for you to get to the vicinity of the airport and consider how you would fly a standard traffic pattern.

Location and Weather

The lesson begins in the air near Gooden Airpark, MD (RJD), as shown in Figure 16-4. The skies are mostly clear with light winds from the west.

Figure 16-4: The area around Gooden Airpark, MD, on the Washington sectional chart as shown on SkyVector.



Tips

Here are a few suggestions to help you get the most from this lesson:

- Shrink or hide the instrument panel for most of this flight. Check your altimeter occasionally to verify that you remain at 1,000 ft. (within ± 100 ft.) during the rectangular course.
- Practice flying the rectangular course with both left and right turns. It's usually harder to fly ground reference maneuvers with right turns, because you must look across the cockpit.
- When you are ready to fly toward RJD, compare the view from the cockpit and the indications of the compass and heading indicator with your aircraft's position as shown on the interactive map in your simulation. In addition, compare that display with the area around Gooden on the Washington sectional chart (available as a PDF file at this book's website or online at <http://SkyVector.com>).

Aeronautical Decision Making

This is another short flight, but flying a ground reference maneuver can distract you. Try not to obsess about the rectangular pattern. In addition, consider the following:

- What are the best procedures to follow if you become disoriented and need to return to the vicinity of the Pullman airport?
- What should you do if another airplane approaches the area where you're practicing? Aerial applicators (usually known as "crop dusters") frequently operate in rural areas.

Objectives and Desired Outcome

Scenario	Activities	Desired Outcome
Practice flying rectangular course, one of the ground reference maneuvers		Preatice
Learn the basic features of a sectional chart.	Identify and describe the information provided about RJD	Discuss/Expain
Learn how to orient yourself and practice basic navigation by comparing the view of the scenery with other sources such as Google Earth	When you're ready to return to Gooden, use the heading indicator and the interactive map and the Washington sectional to help you navigate to there air[port.	Preatice