



EyeFlyMD.com

Chandelles

Commercial Flight Maneuver

Background

- From the French *chandelle* for candle
- French pilots in WWI described *monter en chandelle* (to climb vertically) for an attack and evasive maneuver
- A maximum performance 180° turn with a climb

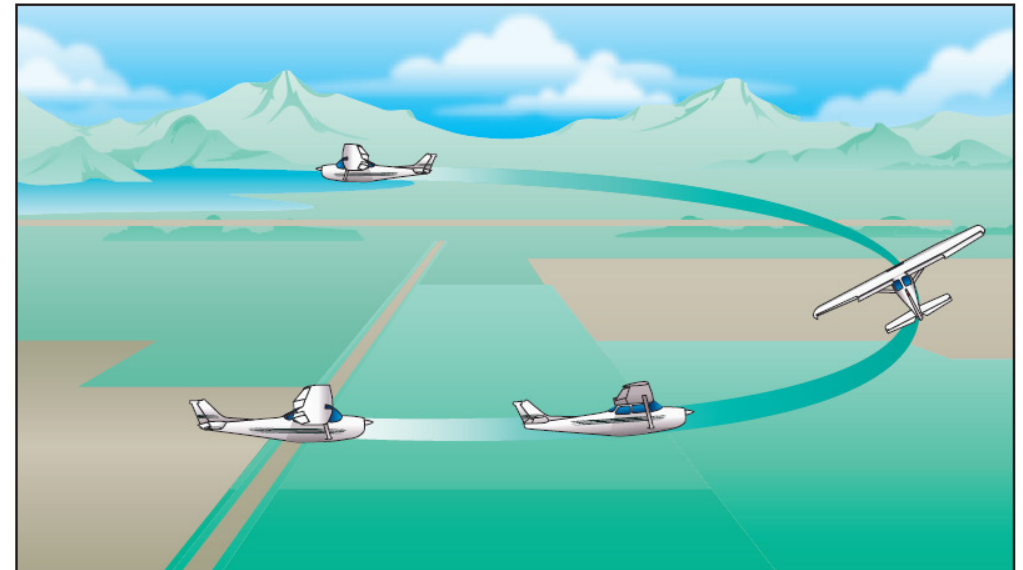


Figure 9-3. Chandelle.

Objectives

- Achieve a maximum performance climbing turn from straight-and-level flight to 180° wings level, nose high at Minimum Controllable Airspeed (MCA)
- Continue developing the skills of energy management and flight by visual references
- Maintain coordination and orientation
- Appreciate the dynamic factors of the maneuver (changing pitch and bank) and how they relate to energy



Steps Overview

- Prepare for maneuvering (clearing turns, communication, etc.)
- Pick a 90° reference point off the left wing
- Smoothly roll into 30° of left bank
- Smoothly apply full power
- Begin gradually pitching up, achieving matching pitch up attitude at the 90° reference point
- Maintain attitude while slowly rolling out bank
- Place the right wing on the 90° reference point when aircraft has made a full 180° turn
- Repeat in the other direction

Steps Overview

- Prepare for maneuvering (clearing turns, communication, etc.)

Constant Bank Changing Pitch

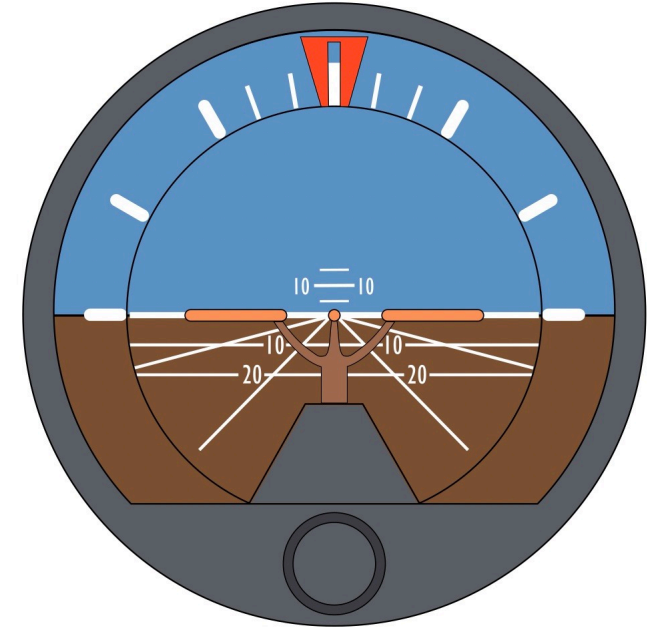
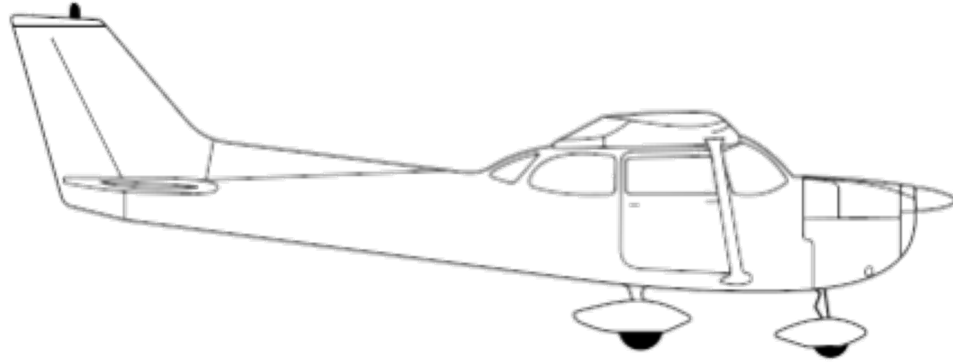
- Pick a 90° reference point off the left wing
- Smoothly roll into 30° of left bank
- Smoothly apply full power
- Begin gradually pitching up, achieving matching pitch up attitude at the 90° reference point

Changing Bank Constant Pitch

- Maintain attitude while slowly rolling out bank
- Place the right wing on the 90° reference point when aircraft has made a full 180° turn
- Repeat in the other direction

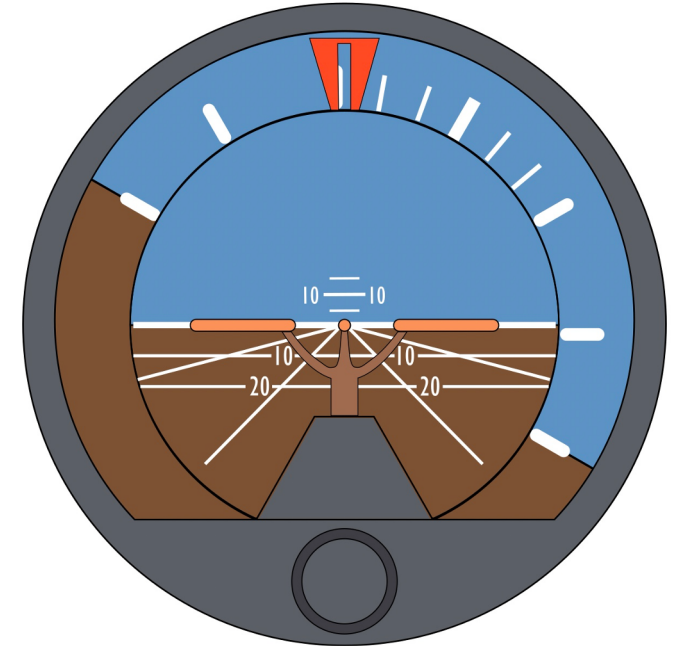
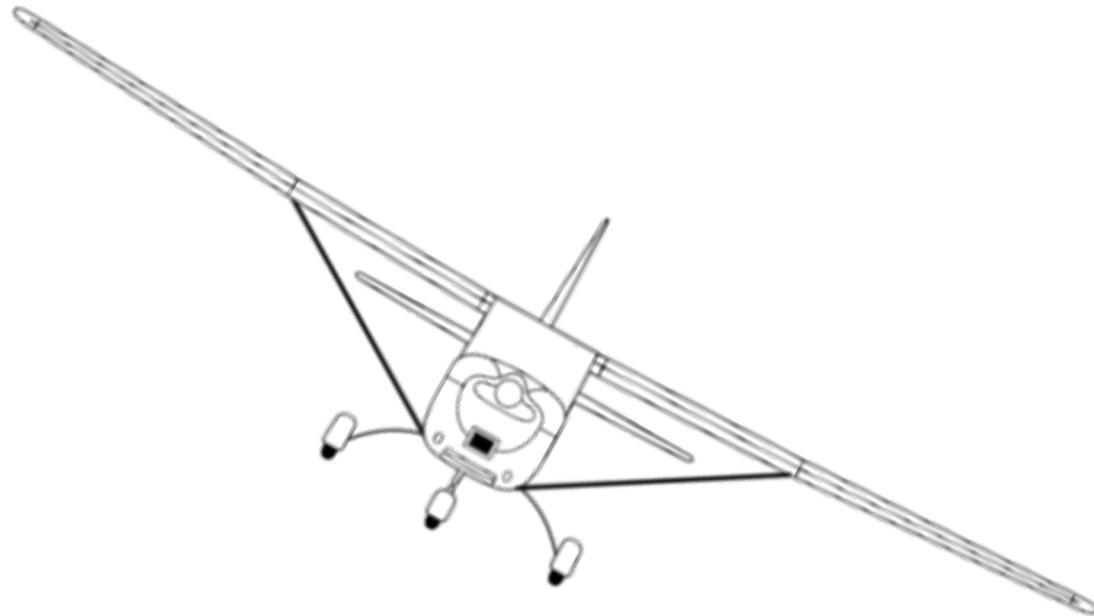
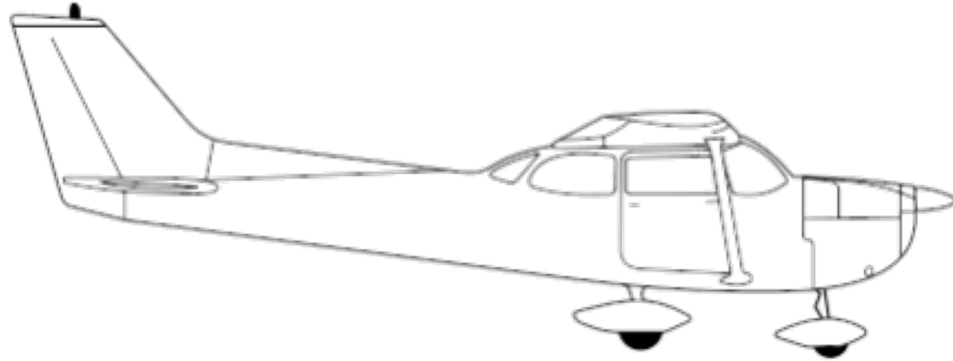


1. Trim for Maneuvering Speed



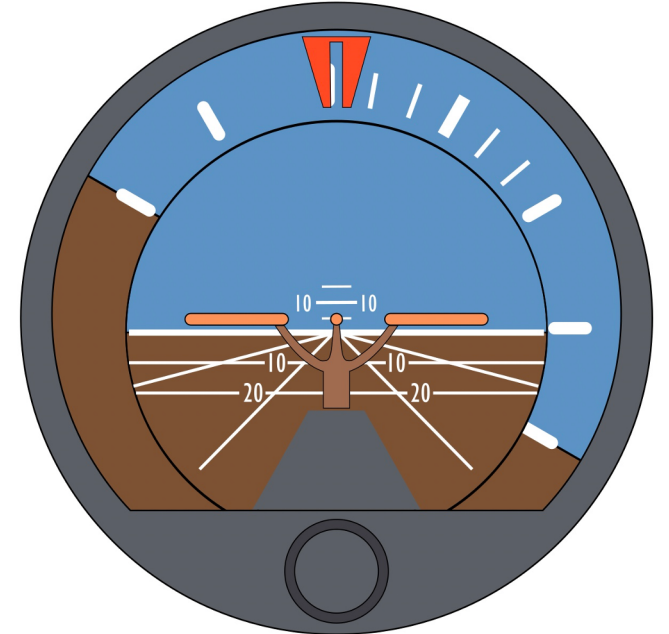
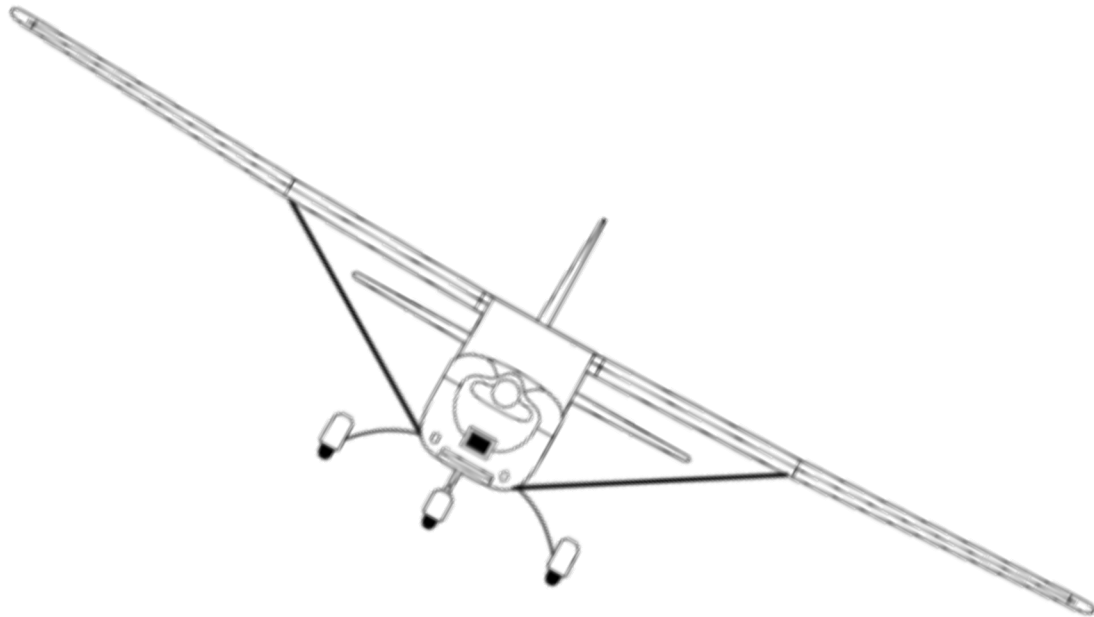
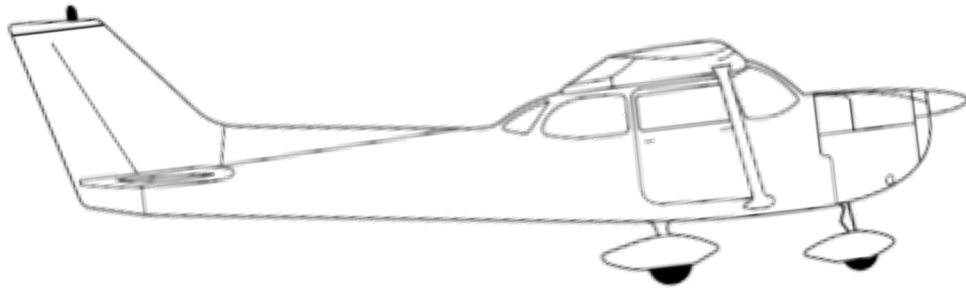


2. Smoothly Roll into 30 ° of Bank

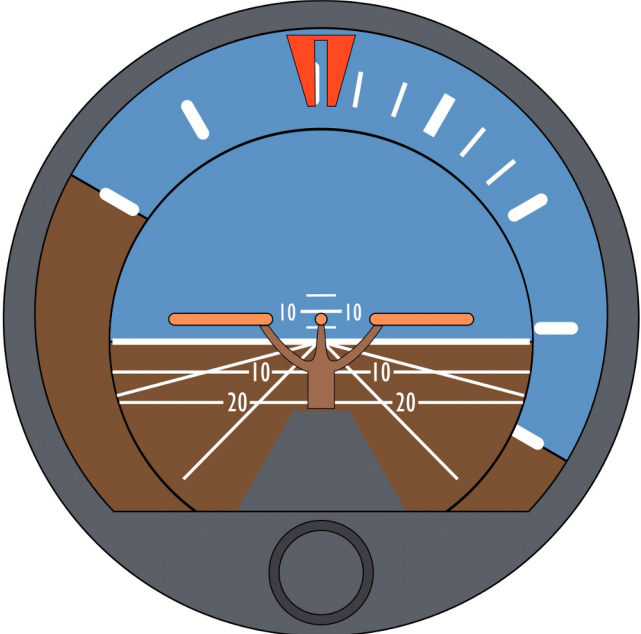
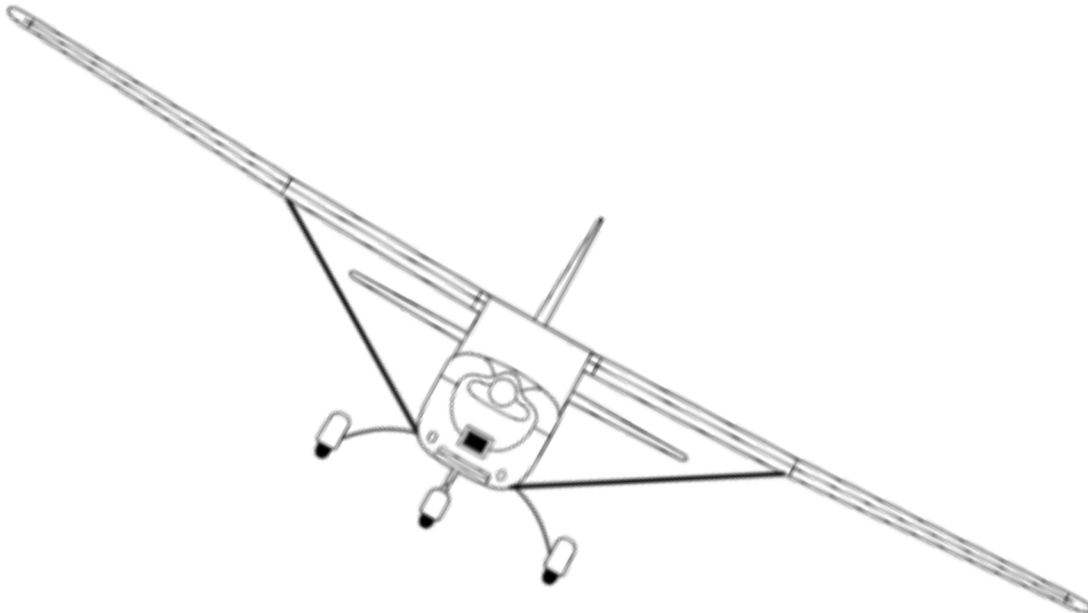




3. Smoothly Apply Full Throttle

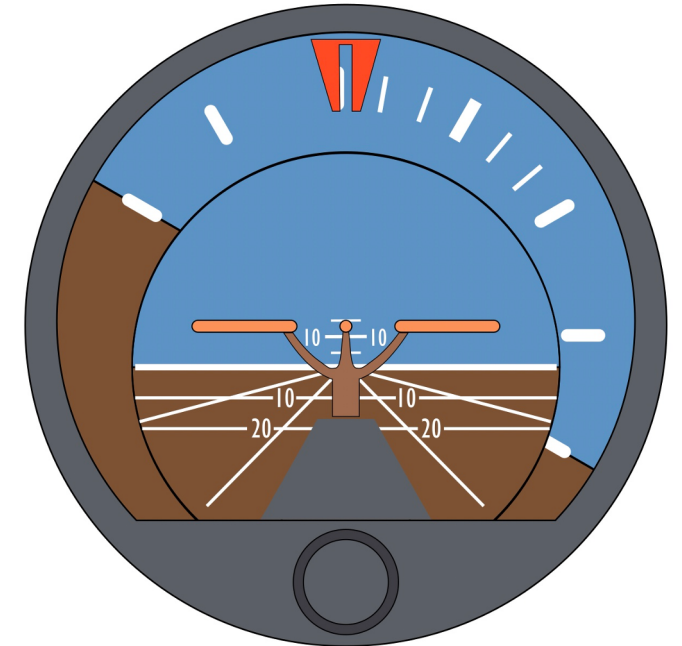
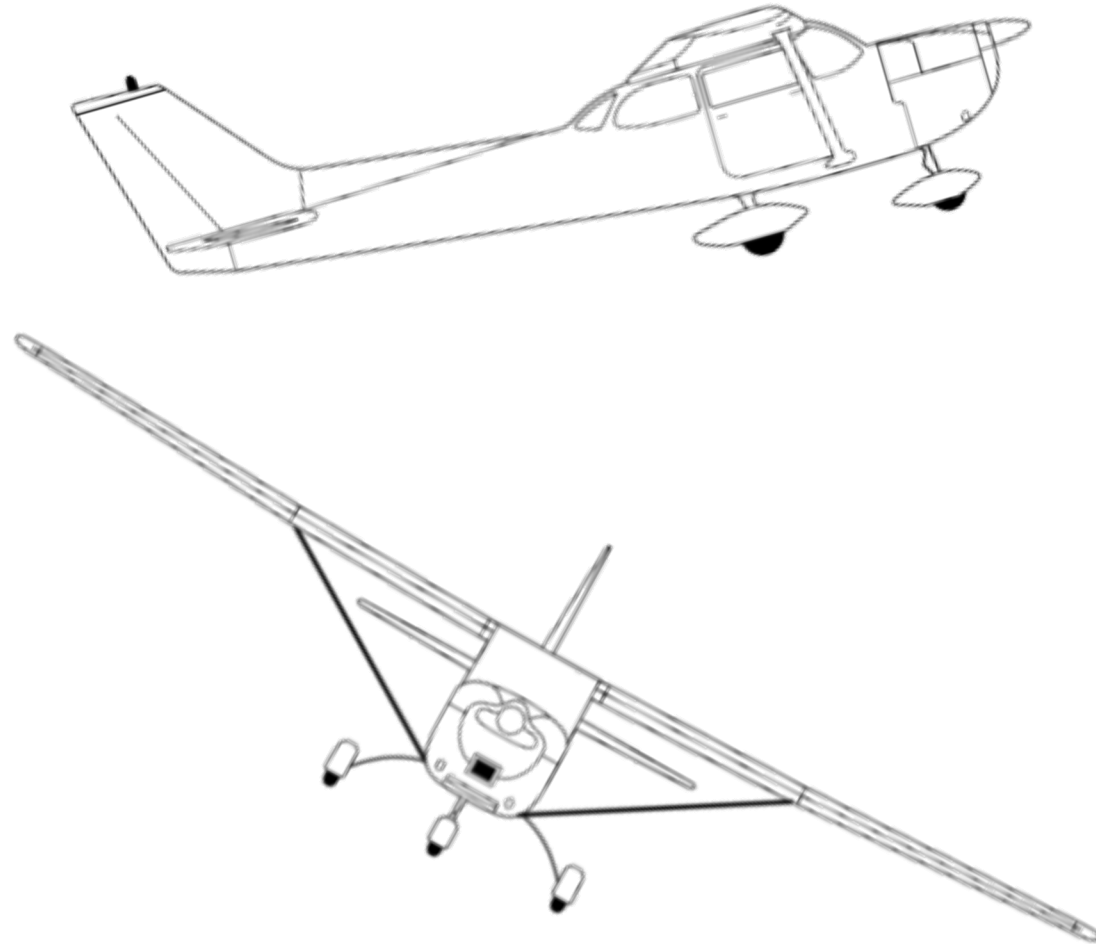


4. Gradually Increase Pitch





5. Increase Pitch through 90°

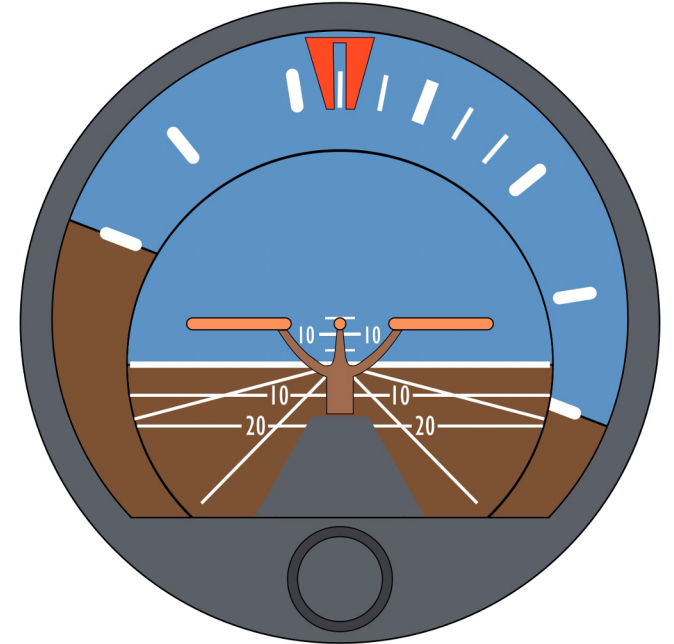
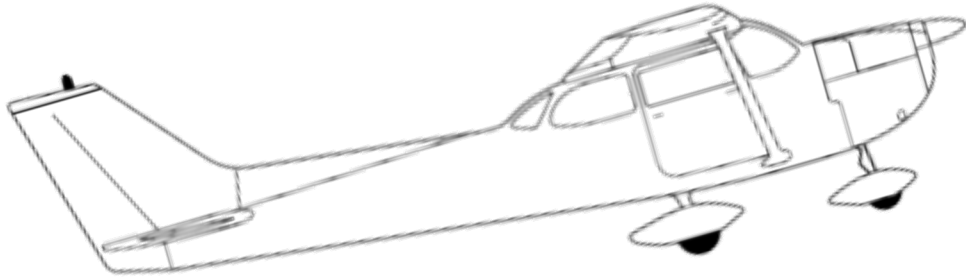




N91PA

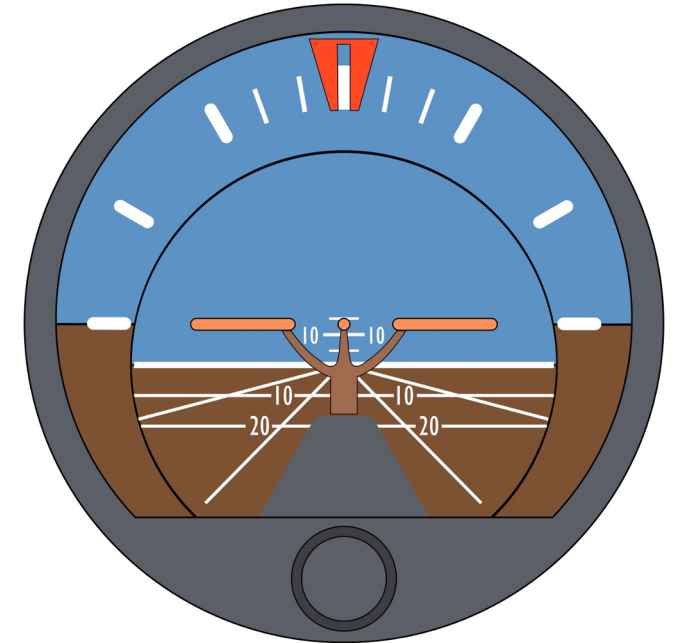
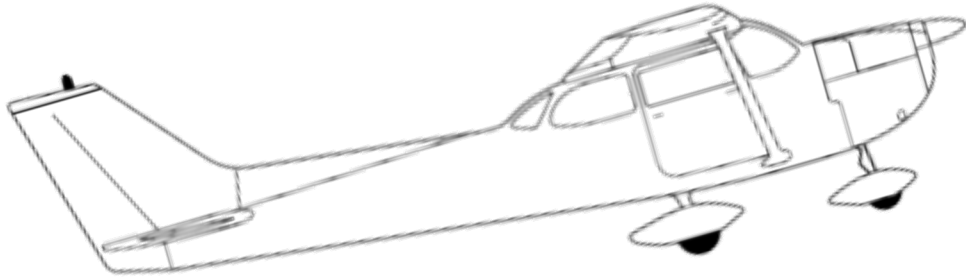
NAV GPS OPS

6. Hold Pitch, Decrease Bank



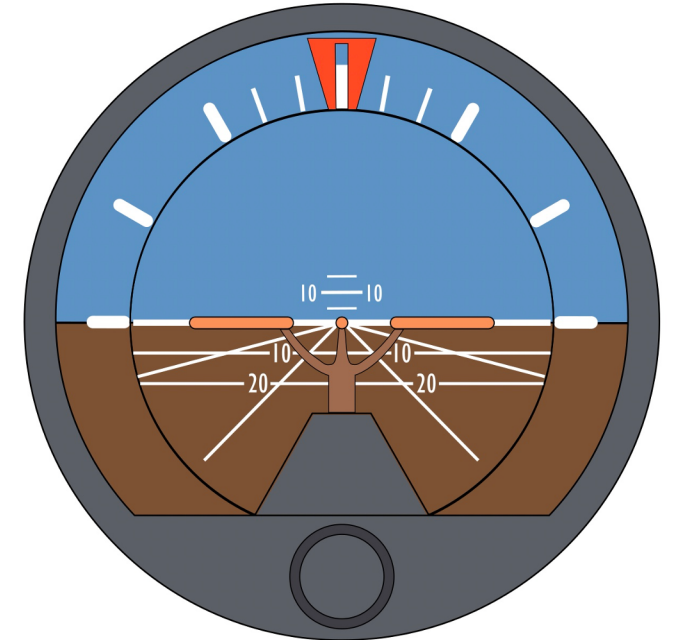
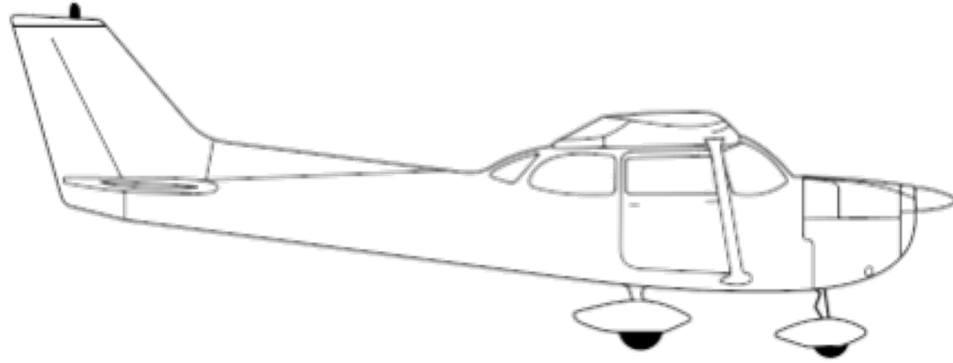


7. Wings level at 180°



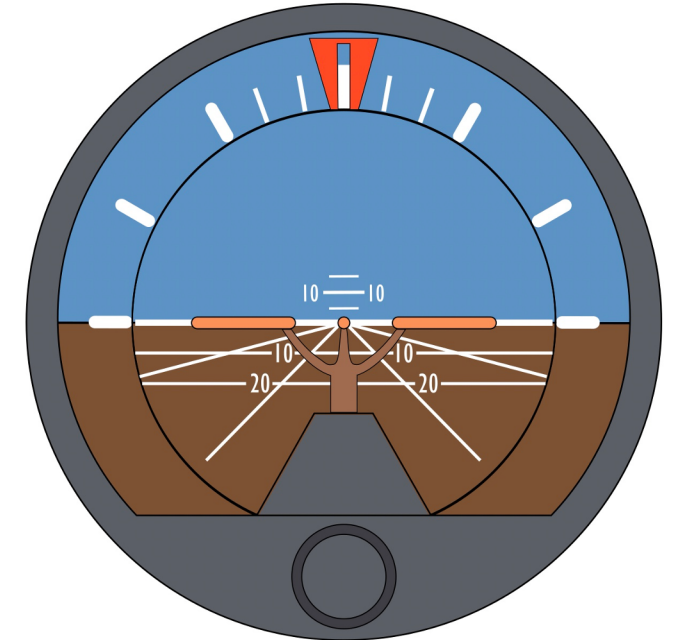
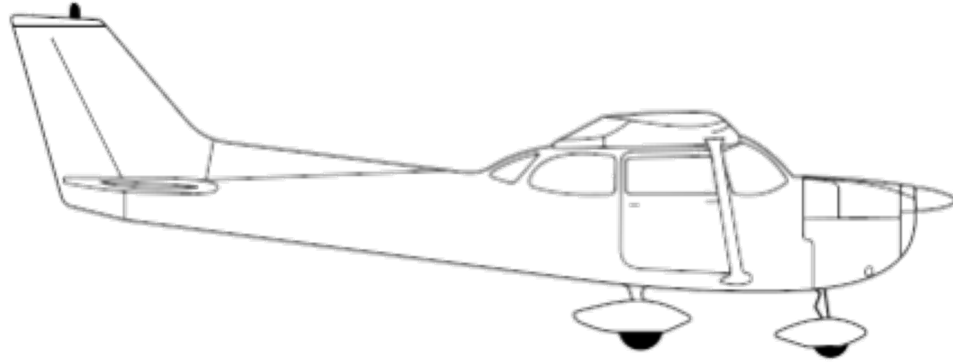


9. Pitch for Cruise





10. Repeat in Other Direction



Summary

90° Reference

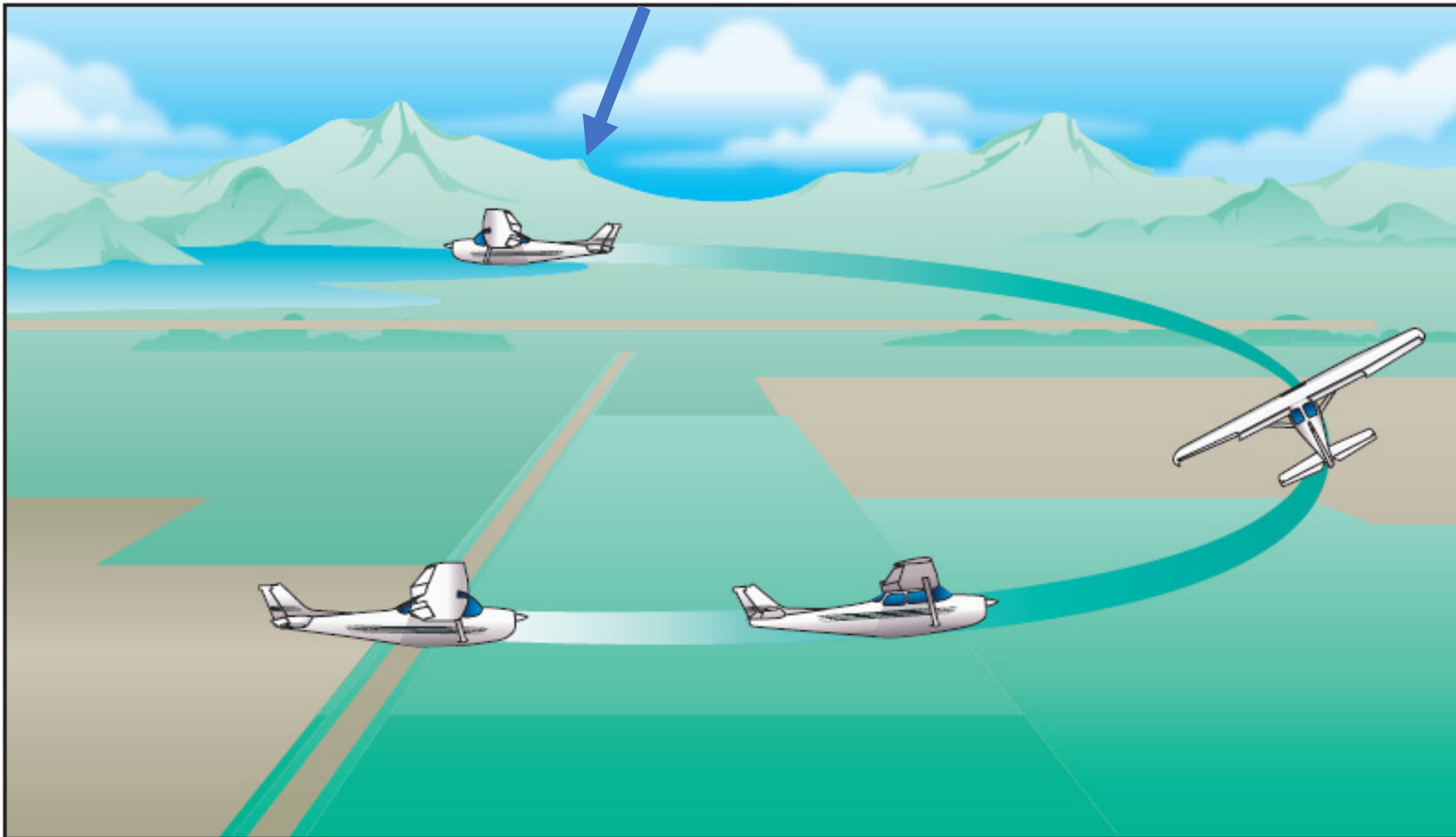


Figure 9-3. Chandelle.

Summary

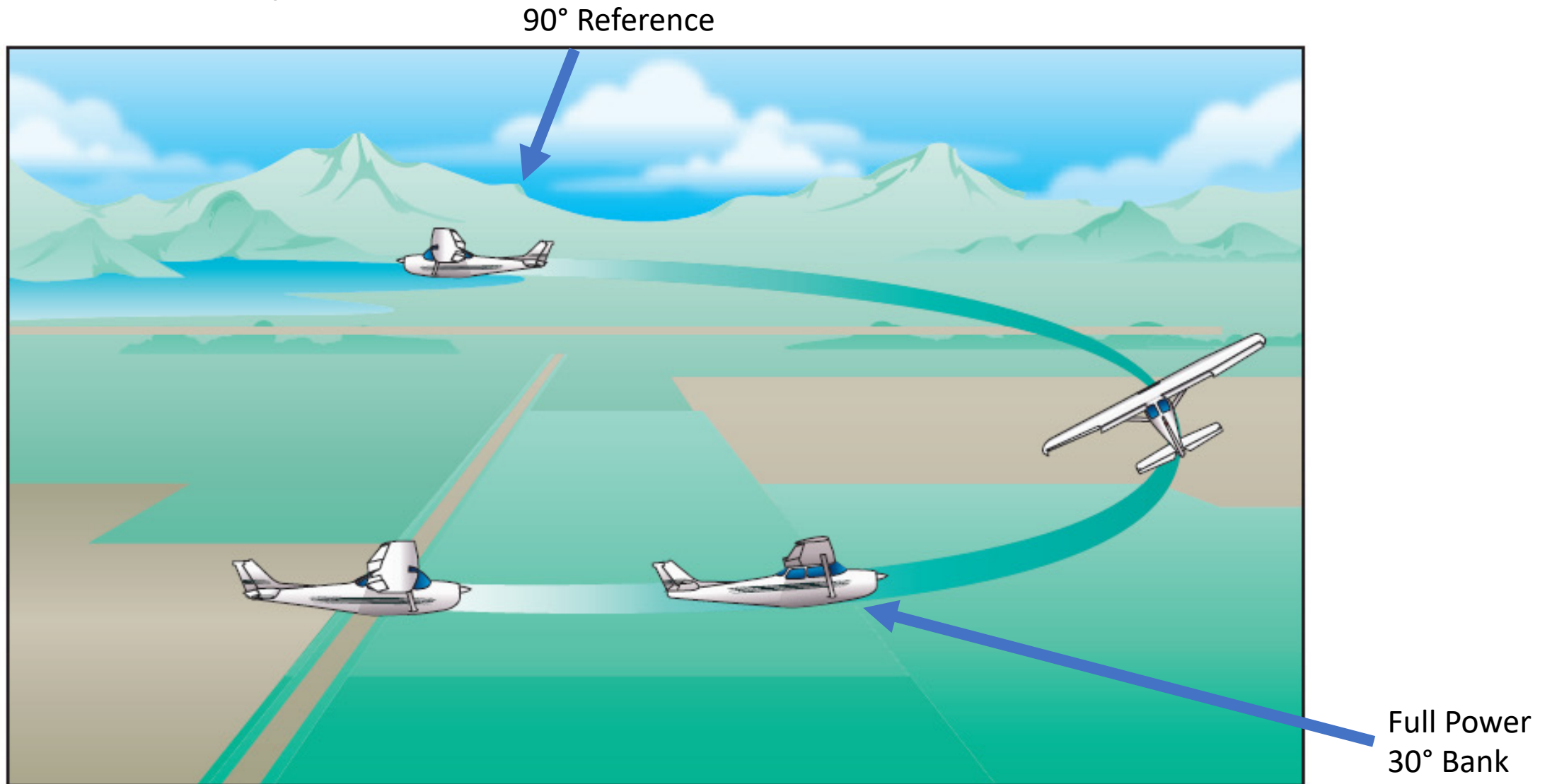


Figure 9-3. Chandelle.

Summary

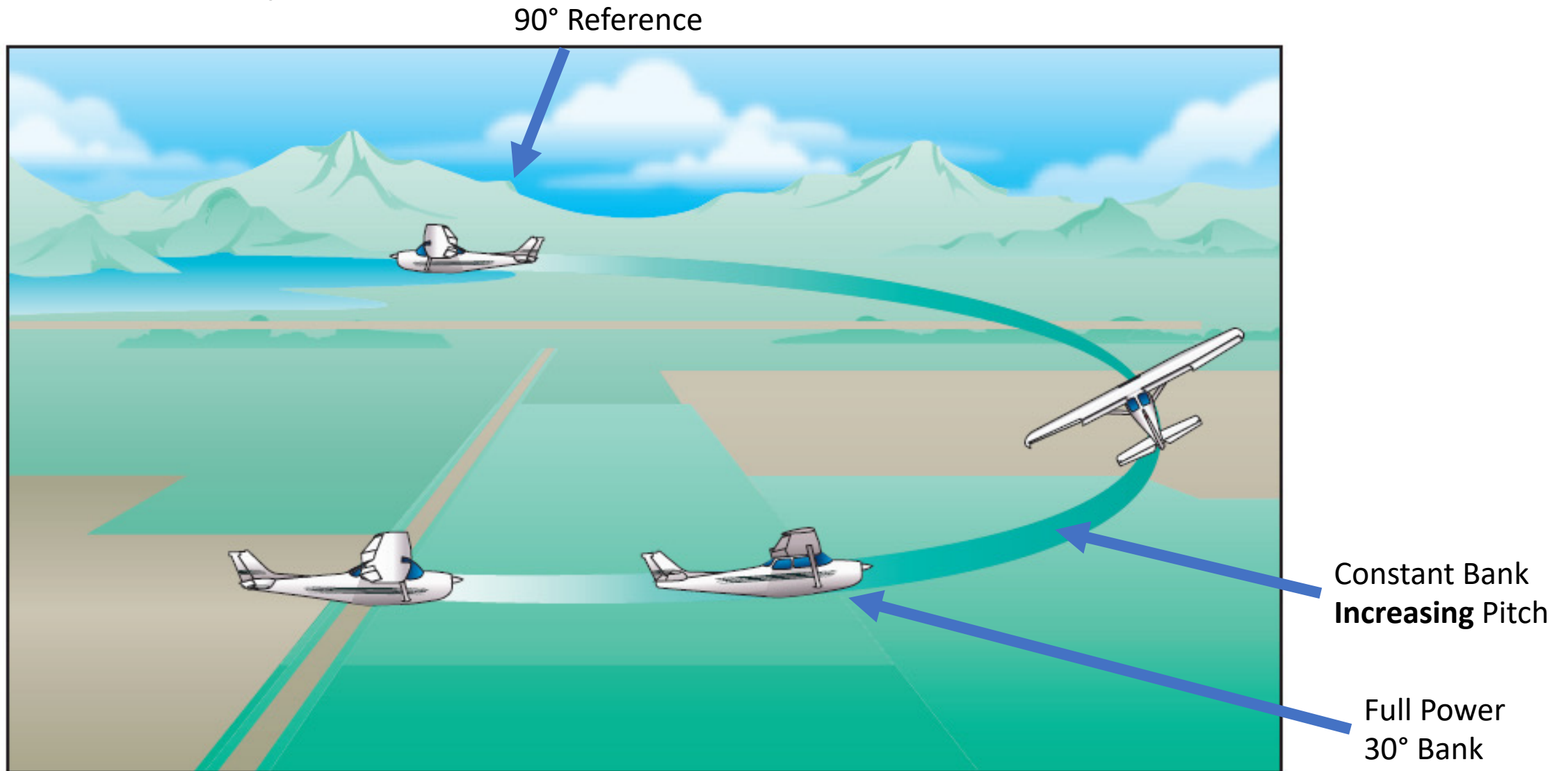


Figure 9-3. Chandelle.

Summary

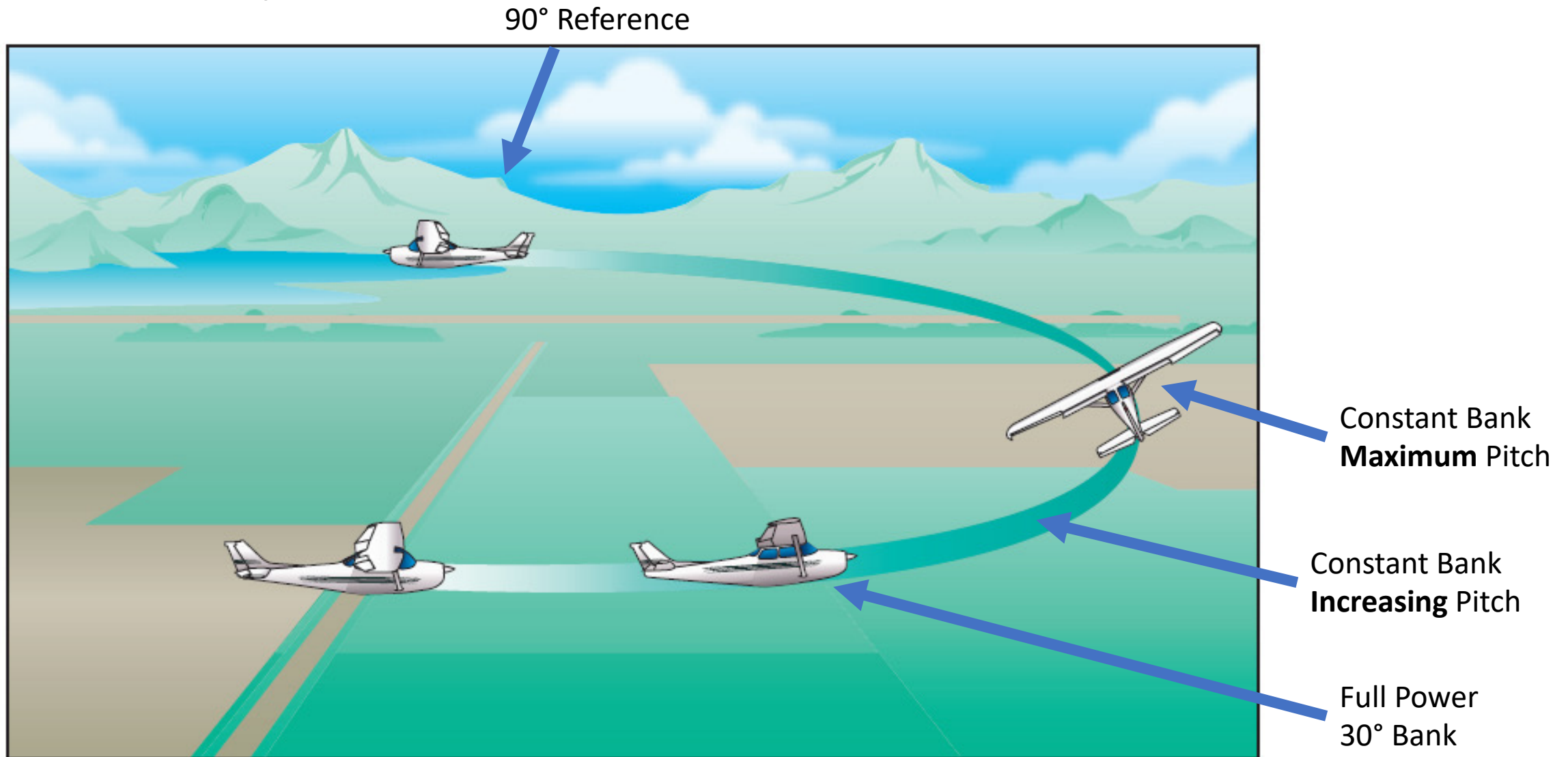


Figure 9-3. Chandelle.

Summary

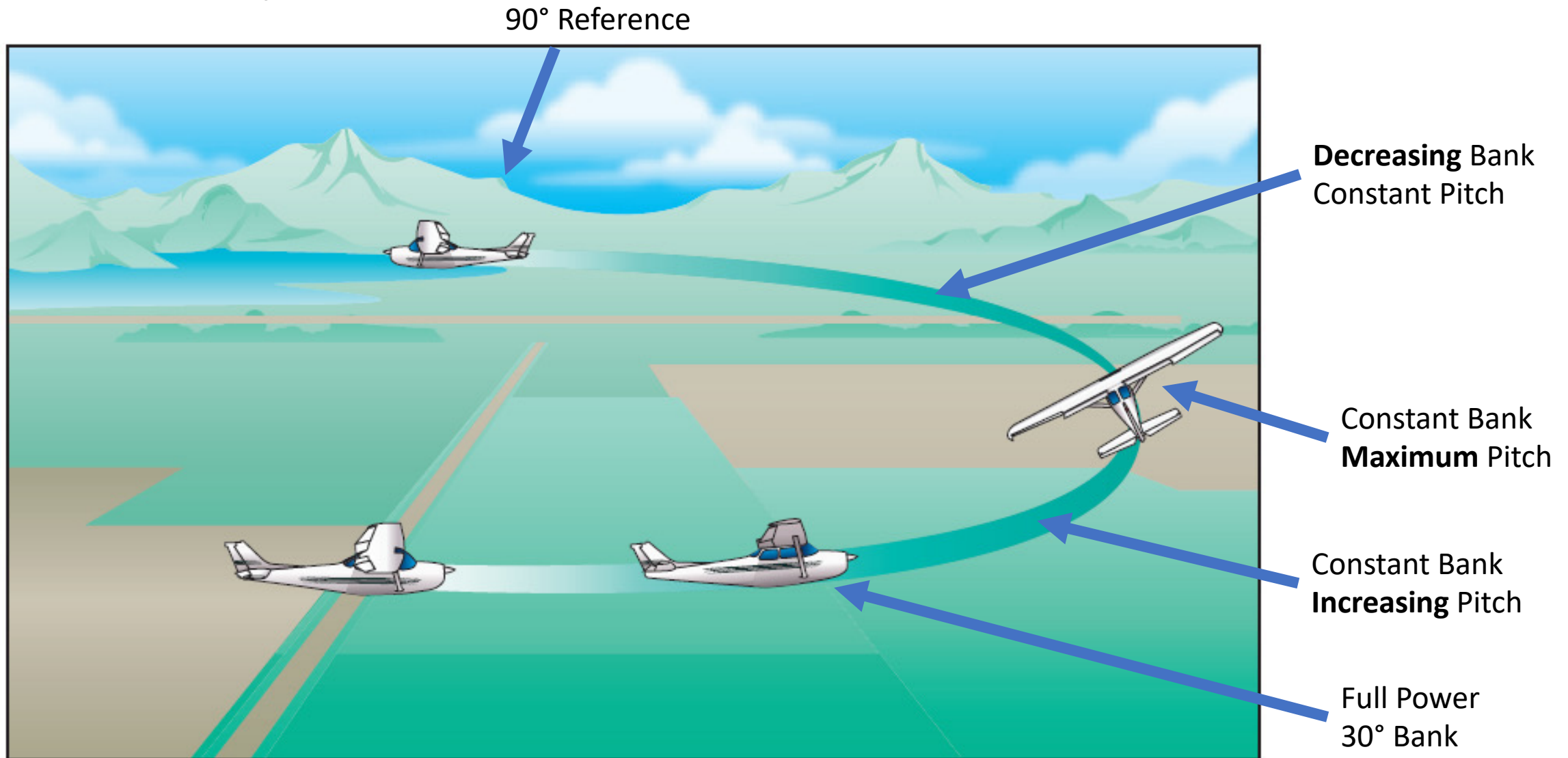


Figure 9-3. Chandelle.

Common Errors

- Factors the result in less than maximum performance
 - Overbanking → reaching 180° too quickly
 - Underbanking → stalling before reaching 180°
 - Removing all the bank before 180°
 - Too little pitch → suboptimal climb
 - Too much pitch → stall before 180°
- General Concerns
 - Failure to clear the area or scan for traffic
 - Reliance on instruments
 - Poor coordination (slipping or skidding)

Completion Standards (per ACS)

- Select an altitude that will allow the maneuver to be performed no lower than 1,500 feet above ground level (AGL)
- Establish the appropriate entry configuration, power, and airspeed.
- Establish the angle of bank at approximately 30°.
- Simultaneously apply power and pitch to maintain a smooth, coordinated climbing turn, in either direction, to the 90° point, with a constant bank and continuously decreasing airspeed.
- Begin a coordinated constant rate rollout from the 90° point to the 180° point maintaining power and a constant pitch attitude.
- Complete rollout at the 180° point, $\pm 10^\circ$ **just above a stall airspeed**, and maintaining that airspeed momentarily avoiding a stall.
- Resume a straight-and-level flight with minimum loss of altitude



Questions?

