

IX. AREA OF OPERATION: BASIC INSTRUMENT MANEUVERS

NOTE: The examiner shall select task E and at least two other TASKs.

A. TASK: STRAIGHT-AND-LEVEL FLIGHT (ASEL and ASES)

REFERENCES: FAA-H-8083-3, FAA-H-8083-15.

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to attitude instrument flying during straight-and-level flight.
2. Maintains straight-and-level flight solely by reference to instruments using proper instrument cross-check and interpretation, and coordinated control application.
3. Maintains altitude, ± 200 feet (60 meters); heading, $\pm 20^\circ$; and airspeed, ± 10 knots.

- 1) Maintain straight and level attitude with the attitude indicator.
- 2) Double check straight-and-level attitude with the Altimeter and VSI
- 3) Set power to maintain an airspeed that is below maneuvering speed in case turbulent air is associated with the weather conditions
- 4) Trim the aircraft to relieve control pressure and maintain the desired airspeed

Attitude Indicator:

- The primary flight instrument for the control of altitude of the airplane
- used to maintain the pitch and bank attitude of the airplane

Heading Indicator:

- Check it frequently to determine if a straight flight path is being maintained

Altimeter:

- lets you know when a constant altitude is being maintained

Vertical Speed Indicator:

- indicates the rate at which altitude is changing
- can be used in lieu of the attitude indicator
- Since there is a lag in the indication, trying to obtain an immediate zero indication usually results in overcontrolling.

Airspeed Indicator:

- Can be used like the VSI to maintain level flight
- Like the VSI it has a lag in it's indication and should not be chased

B. TASK: CONSTANT AIRSPEED CLIMBS (ASEL and ASES)

REFERENCES: FAA-H-8083-3, FAA-H-8083-15.

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to attitude instrument flying during constant airspeed climbs.

Used if altitude must be gained to assure obstacle/terrain clearance, or to climb above a layer of fog, haze or low clouds.

Entry

- 1) Increase power using the following rule of thumb: 100 rpm decrease for each 100 ft/min desired rate of descent (when trimmed for a specific airspeed at cruise flight, by decreasing power the airplane will pitch down to maintain the trimmed airspeed)

Note: If the airspeed must be reduced, maintain level attitude after the power is reduced until the desired airspeed is attained then pitch the airplane down using the attitude indicator (1/2 to 1 bar width below the artificial horizon) and descend at the desired airspeed.

- 2) Control pitch with the attitude indicator using a half to one bar width indication **Level-Off**

- 1) Lower the pitch to level attitude using the Attitude Indicator

- 2) Decrease power back to cruise power setting *Power:*

- Should be advanced to climb power *Attitude Indicator:*
 - The nose should be raised to a pitch of approximately a half to one bar width *Airspeed Indicator*
- Climb speed should be one that results in a positive rate of climb but that is well above the stall speed.



Geoffrey Hatcher AGI, MEI, IGI, CFII

1915 Biscayne Little Rock, AR 72227
 (501) 680-7283 www.geoffhatcher.com
 geoff@geoffhatcher.com

2. Establishes the climb configuration specified by the examiner.
3. Transitions to the climb pitch attitude and power setting on an assigned heading using proper instrument cross-check and interpretation, and coordinated control application.
4. Demonstrates climbs solely by reference to instruments at a constant airspeed to specific altitudes in straight flight and turns.
5. Levels off at the assigned altitude and maintains that altitude, ± 200 feet (60 meters); maintains heading, $\pm 20^\circ$; maintains airspeed, ± 10 knots.

C. TASK: CONSTANT AIRSPEED DESCENTS (ASEL and ASES)

REFERENCES: FAA-H-8083-3, FAA-H-8083-15.

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to attitude instrument flying during constant airspeed descents.

If altitude must be lost if you are trapped above a layer of clouds or haze so you can get to visual conditions below.

Entry

1) Decrease power using the following rule of thumb: 100 rpm decrease for each 100 ft/min desired rate of descent (with the airplane trimmed for a specific airspeed at trimmed airspeed) cruise flight, by decreasing the power the airplane will pitch down to maintain the reduced until the desired airspeed is attained then pitch the airplane down

Note: If the airspeed must be reduced, maintain level attitude after the power is and descend at the desired airspeed. using the attitude indicator (1/2 to 1 bar width below the artificial horizon)

2) Control the pitch with the attitude indicator maintaining a half to one bar width above the artificial horizon

Level-Off

2) The pitch attitude will increase to try and maintain the trimmed airspeed. 1) Increase power back to cruise power setting

3) Control the pitch attitude using the Attitude Indicator, maintaining level flight

Attitude Indicator:

- The nose should be lowered to a pitch of approximately a half to one bar width
- Descent speed should be at or below maneuvering speed. *Airspeed Indicator*

Power

- should be decreased o climb power using the following rule of thumb: 100 rpm decrease for each 100 ft/min desired rate of descent

2. Establishes the descent configuration specified by the examiner.
3. Transitions to the descent pitch attitude and power setting on an assigned heading using proper instrument cross-check and interpretation, and coordinated control application.
4. Demonstrates descents solely by reference to instruments at a constant airspeed to specific altitudes in straight flight and turns.
5. Levels off at the assigned altitude and maintains that altitude, ± 200 feet (60 meters); maintains heading, $\pm 20^\circ$; maintains airspeed, ± 10 knots.

D. TASK: TURNS TO HEADINGS (ASEL and ASES)

REFERENCES: FAA-H-8083-3, FAA-H-8083-15.

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to attitude instrument flying during turns to headings.

Used if you are turns are required to get to areas of visual flying conditions.

- Turns should be limited to no more than standard rate
- You should not be concerned about small changes in altitude while turning that can be corrected after rollout

• **Entry**

- 1) Coordinate are roll into a bank using aileron and rudder.
- 2) Apply the amount of backpressure needed to maintain altitude.

• **Roll Out**

- 1) Start rollout when you reach a heading of 10 degrees prior to your desired heading.
- 2) Decrease backpressure to maintain altitude.

- *Power*



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geoff@geoffhatcher.com

tion

- leave to cruise setting, allowing the airspeed to decrease as you make the turn.
- *Turn Coordinator*
- Used to determine a standard rate or less turn
- *Attitude Indicator:*
- Used to maintain bank and pitch orientation.

2. Transitions to the level-turn attitude using proper instrument crosscheck and interpretation, and coordinated control application.

3. Demonstrates turns to headings solely by reference to instruments; maintains altitude, ± 200 feet (60 meters); maintains a standard rate turn and rolls out on the assigned heading, $\pm 10^\circ$; maintains airspeed, ± 10 knots.

E. TASK: RECOVERY FROM UNUSUAL FLIGHT ATTITUDES REFERENCES: FAA-H-8083-3, FAA-H-8083-15.

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to attitude instrument flying during unusual attitudes.

Nose High

Concern: Stalling the airplane *Recovery*

- 1) Lower the nose to the artificial horizon of the attitude indicator.
- 2) Roll bank back to level attitude

Nose Low Concern: Excessive airspeed beyond limits *Recovery*

- 1) Decrease power to idle
- 2) Roll bank back to level attitude
- 3) Bring pitch back to level attitude

2. Recognizes unusual flight attitudes solely by reference to instruments; recovers promptly to a stabilized level flight attitude

using proper instrument cross-check and interpretation and smooth, coordinated control application in the correct sequence.

F. TASK: RADIO COMMUNICATIONS, NAVIGATION SYSTEMS/FACILITIES, AND RADAR

SERVICES REFERENCES: FAA-H-8083-3, FAA-H-8083-15, AC 61-23/FAA-H-8083-25.

Objective. To determine that the applicant:

1. Exhibits knowledge of the elements related to radio communications, navigation systems/facilities, and radar services available for use during flight solely by reference to instruments.

Refer to the following sections within this book:

- 1) **Airport Operations:** Radio Communications and ATC Light Signals
- 2) **Navigation:** Navigation Systems and Radar Services, Diversion, Lost Procedures.

Notes

- According to accident investigations, weather is the most frequent cause in general aviation accidents
- Low-ceilings, rain, and fog are the most common weather related conditions responsible for fatal weather-related accidents.
- Failure to receive a pre-flight weather briefing is a common cause of accidents pertaining to flight into deteriorating weather conditions
- An Attitude Indicator, when available, should be used as the primary flight instrument for control of the attitude of the airplane • Attitude changes should be smooth and small
- The main reason for instrument training during Private Pilot certification is to help a VFR pilot keep the airplane under control while flying to better visual conditions, not to teach precision in instrument flying skills

2. Selects the proper frequency and identifies the appropriate facility.

3. Follows verbal instructions and/or navigation systems/facilities for guidance.

4. Determines the minimum safe altitude.

5. Maintains altitude, ± 200 feet (60 meters); maintains heading, $\pm 20^\circ$; maintains airspeed, ± 10 knots.