

# IFR Training Tips for Aircraft Control

From "[Instrument Procedures Training Manual](#)" at RealCFI.com

- 1) **Climbs, descents, leveling off**. Once aircraft is trimmed for straight and level flight, **make all climbs, descents, and LEVEL OFF with power**. Once at new altitude, return power to the same settings and no further trim changes will be required.
- 2) **In a complex aircraft, 1" of manifold pressure drop= 100ft/min descent**. If you want to descend 500 ft/min, decrease MP by 5", for 800 ft/min, decrease by 8 inches. **For fixed pitch prop**, 300 to 400 RPM decrease will produce a 500 ft/min descent.
- 3) **Descent rate on most ILS and STARS** are a 3-degree gradient. The **descent rate required to stay on glide slope is 5 times the ground speed**. If approaching at 100 kts, your descent should be 500 ft/min on a glide slope, and slightly faster on a step-down approach i.e., 800 ft/min
- 4) **On use of the attitude indicator**-Fly for several miles with all other instruments covered so student learns how to use and depend on attitude indicator with small adjustments
  - a. Standard rate turns use attitude indicator- see below
  - b. Hold altitude and heading with attitude indicator on white line, wings level
  - c. Vy climb on runway heading- 7 degrees pitch up (most GA aircraft) and wings level
  - d. Climbing turn – 7 degrees pitch up and 15-degree bank (most GA aircraft)
- 5) **A standard rate turn using attitude indicator: can be made by banking 10% of air speed + 5 degrees**. If cruising at 100 kts, a standard rate turn would be a 15-degree bank. The turn coordinator can be generally ignored so aircraft control is simplified
- 6) **Air speed indicator**- I use this as a reminder to put gear up when I notice I am climbing poorly or cruising slowly. Otherwise, I only reference on short final. If you trim, configure and set power appropriately, you should not need to use this instrument much.

- 7) **VSI**- mostly helpful in smooth air to help with descent rates on approach. If bumpy, no help. May also cause anxiety if used to verify climb performance on hot day or near high terrain.
- 8) **Timer**. This is often forgotten. A habit can be made to **reset the timer after completing any turn or passing a fix**. Even if timing is not needed, it will develop the habit, so it is not forgotten entering a hold or passing the FAF to determine the MAP.
- 9) **Holds. Turn, Time, Call**. When entering hold remember to: Turn to entry heading, Timer reset, call ATC. Turn, Time, Call.
- 10) **Holds or procedure turns. On entry, fly outbound 90 seconds**. This will give you time to re-intercept course inbound, compensate for winds and allow you to determine your WCA. Triple WCA outbound to a max of 30 degrees help keep you on protected side of hold
- 11) **WCA in Holds**. Once you determine WCA in bound, just remember how many degrees left or right. When you fly outbound, make your WCA opposite the inbound. **If WCA to right inbound, it will be to the left outbound**. Save yourself from math.
- 12) **Inbound vs Outbound in Holds**. Fly the heading bug outbound and leave it there. Turn inbound and capture the navigation signal inbound. When you transition to using the autopilot, just toggle between HDG and NAV mode and it will fly the hold for you. **Head out. Nav in**.
- 13) **Intercepting a course, VOR radial, or LOC** . Turning to intercept depends on distance from VOR and Intercept Angle, LOC, or phase of GPS (ENR, Term, Aprch)
  - a. If more than 10 miles from VOR (or enroute GPS), and less than 45<sup>0</sup> intercept, wait till needle is Halfway deflected to start turn, then turn in half the intercept angle. Turn in another half when need is ¼ deflected. Make final turn on course when needle centers.
  - b. If 5 miles or less from VOR, terminal GPS, LOC , or greater than 45<sup>0</sup> intercept, start turn as soon as needle is active.
  - c. Alternately, when the needle comes alive, turn to a heading that matches where top of the needle (deviation bar) intersects a course. As the needle moves to center, continue the turn following the top of needle.

**14) VOR radial or course intercept tips.** Under turn an intercept, overturn crossing VOR. Set OBS precisely. Errors multiply.

- a. **Intercepting a radial or course** Under turn  $10^0$  to  $15^0$  to gradually intercept, do not fly through course or oscillate around course like a dufus.
- b. **When crossing a VOR** to a new radial (without GPS anticipated turn) you will have to fly past VOR to ID the zone of confusion. Then Overturn about  $20^0$  to intercept the new radial.
- c. **UNDERTURN an intercept, OVERTURN crossing a VOR.**

**15) Set Heading bug to new course BEFORE you turn**

**16) To maintain a VOR or LOC course:** Once course is intercepted, Fly the HEADING BUG. For deviations from the course, **use the 1-2-3 rule**

- a. STD rate turns for count of three (using attitude indicator) toward needle (**9 degrees correction**).
- b. WAIT (count to 10)! See if the CDI needle starts to return to center.
- c. If needle stays stationary, make another 1-2-3 turn. Then WAIT!
- d. **Once needle starts to center, turn back with the 1-2-3 rule so you do not keep flying through the course.**
- e. After centering CDI and syncing your heading bug, you find you are off course by needle deflection, **always turn back to the heading bug** (parallel to course) **first before making a 1-2-3 sec correction** toward the deflected needle.
- f. **On an ILS or within 5 miles of a VOR make  $\frac{1}{2}$  STD rate turns x 1-2-3 to avoid over correcting, (or just count faster)**

This is very mechanical technique, which you can smooth out with practice. This technique helps keep your attention on the Attitude indicator, keeps you from over correcting with increasing oscillations till you peg out the CDI. Additionally, for a partial panel approach, this technique will diminish the need for the DG (which may not be working anyway).

**17) Glide slopes and glide paths.** Set descent rate with power reduction, then make small pitch changes between 0 and  $-5^0$  degrees to stay on GS. IF you reduce power the proper amount, attitude indicator will settle about  $2.5^0$  down. *Only change power small amount if have large deviations from GS).*

- a. If low, pitch up no more than to level ( $0^0$ ) till GS re-centers, return to  $2-3^0$  down
- b. If high, pitch down to  $5^0$  till GS re-centered then return to  $2-3^0$ .
- c. If you must pitch higher than  $0^0$  add some power, or lower than  $5^0$ , then reduce power!

**18) Situational Awareness:** USE YOUR DG (HSI)

- a. **Inbound course on approach = name of approach. ILS 32-**  
inbound course is going to be approximately 320.
- b. **If flying outbound (reciprocal)**, do not calculate, look at bottom of DG from 320 and fly that heading.
- c. **Procedure turn.**
  - i. **set hdg bug 45** degrees left from present course fly out bound 1-2 minutes
  - ii. **Set heading bug 180** degrees from current hdg and make right turn. This will give you 45-degree intercept to final approach course.
- d. Stop doing unnecessary math and fly the aircraft!
- e. **If you remember the inbound course, you can find all other headings by looking at the DG or HSI.**

19) **Situational awareness. “Virtual HSI”** When given a vector for a final approach course or approaching an airport, look at your DG and imagine the course on the DG (course is 045), draw a mental line from 045 directly across center of DG and that will give you your relative position and how much you have to turn to intercept the new course or runway.

20) **Chair fly. Chair fly with your instructor, Chair fly by yourself.** Pick a route and approach. Start with initial climb, work through level off, descent, how to intercept a course, each segment of the approach, going missed, entering hold. For each think if degrees pitch up/down, power settings, flap configurations. Practice ATC instructions with your instructor for vectors to final, full approaches and other instructions. Chair fly unpublished holds. Flying a chair is cheaper.

21) **Partial Panel flying.** Timed turns at STD rate: 60 sec=180 degrees, 30 sec= 90 degrees. Everything else is a fraction of those and can be estimated. Reference compass once level from turn to fine tune.

22) **Partial panel unusual attitudes: Check air speed first.**

If slow- pitch down, add power.... Then correct bank with turn coordinator

If fast- reduce power, level wings.... Then pitch up slowly to not stress aircraft

**Level pitch is first indicated by REVERSAL of VSI (not Zero).** Then use Altimeter to fine tune pitch. Partial panel unusual attitudes simulate loss of gyros. The CFII should put in extreme trim changes to simulate run

away trim from autopilot so student can get used to large yoke forces to control aircraft.