

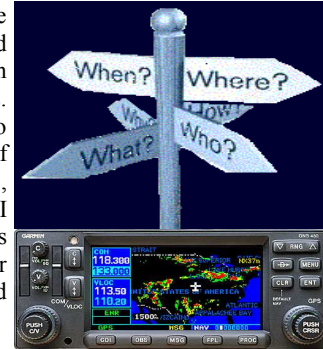


THE WEEKLY PLOG—TRAINING NEWS FROM HANGAR 4

Which Way Do I Go?

30 October 2007

New technologies are changing our aviation industry. Today we have glass cockpits, satellite weather links and the ability to fly higher and faster than ever before. In fact, technology can offer a lot of information to a pilot, thus improving decision making and situational awareness. Herein lies the challenge: is it possible that some pilots have become so dependant on technology that they have lost or refused to learn a lot of basic flying skills in the process? This article will focus on the GPS, which is quite a capable navigation unit. Being an experienced pilot, I can appreciate what GPS can do for me, but I see it as a tool that helps me with flying. Today, I am seeing more pilots use GPS as a crutch for their flying because the basics of navigation were not taught, not learned or were forgotten.



WHICH DIRECTION ARE YOU LETTING THE GPS TAKE YOU?

On a recent flight in our Cirrus SR20, I observed a pilot program the GPS for a three legged cross country: Battle Creek - Alma - Hillsdale - Battle Creek. The pilot finished pushing buttons and twisting knobs but didn't realize that the flight plan was in the wrong order: Alma - Battle Creek - Hillsdale - Battle Creek. We now had two legs in the flight plan. Lesson number one; *know your GPS*. Garbage in equals garbage out. When the flight plan page was opened, the Battle Creek airport was already on it. The pilot moved the cursor to the wrong spot while entering the other airport identifiers. The GPS was programmed to begin the cross country at Alma and fly to Battle Creek. If you enter the information incorrectly, the GPS will not warn you, it will simply plot a course and tell you which direction to fly. Here comes lesson number two; *double check your entries*. If you understand the basics of navigation, then you probably have written down your route and course (or you know it in your head) and can compare it to the GPS flight plan order, courses and distances. In this example, the GPS figured that it was already at the Battle Creek waypoint, so it sequenced to the next waypoint (Hillsdale to the southeast). Remember, the student wanted to go to Alma, which is northeast of Battle Creek. Lesson number three; *check the map*. The moving map in the cockpit will display each leg and color code the active leg. Zoom out and make sure all the legs are there and which one is active. In this airplane, the moving map on the MFD is not a VFR Sectional Chart. Compare the moving map course lines to the sectional chart course. Here is a chance to catch potentials errors, before they become a problem after takeoff.

Students need to be taught the basics before using the electronic devices in the cockpit. In regards to cross country navigation, the absolute minimum that a pilot needs to know before getting into the airplane is the direction and altitude to fly, en route time and how much fuel is needed. In the flat lands of this country, you probably will not get in much trouble if you ignore the basics. But other parts of this country have terrain or obstacles that rise to great heights. Imagine flying in the clouds, not being able to see what is ahead of you and you have no idea where the GPS is flying you to. This could get you in trouble quickly; the mountain or obstacle will always win.

Back to my student with the GPS flight plan problem. I love scenario based training and how errors are allowed to play out (until the safety line is crossed). My student departed on Battle Creek's northwest runway and activated the autopilot at 1000' agl. The autopilot was set to navigate via the GPS course and the student expected a right turn to go to Alma. But the autopilot made a left turn because the GPS course was to Hillsdale. My student was a passenger at that moment. He allowed the airplane to turn 120 degrees the wrong way before disconnecting the autopilot. Lesson number four; *when automation does something unexpected, get rid of it*. Take control and hand fly the airplane where it should go. Don't sit and wait for the autopilot to sort it out; there could be a mountain, building or airplane in the way. Not to mention the fact that ATC is expecting you to follow a certain course and turn a certain way.

Navigating, in my opinion, still comes down to the basics of knowing where you are, where you want to go and figuring out how to get there. GPS, autopilot and moving maps are tools to help you fly. You should still be able to fly and navigate without the assistance of these devices. The issue that many pilots could face in their training and/or flying is a lack of knowledge of basic skills and/or dependency on technology. If the technology fails and a pilot does not have or use the basic skills needed to fly and navigate, then the pilot will likely fail and the NTSB can add one more to the accident list.

THE BACK SIDE

Plogs

If you were the pilot of the airplane pictured here, you would probably be searching for a new job. What happened here is that too much weight was removed from the front of the aircraft or too much weight was added to the rear. A simple weight-shift problem could have been used to determine how much weight could be added or removed safely. During Commercial Pilot End of Course Checks, I have the applicant perform a weight-shift. Most pilots have not practiced this task so it takes them quite some time to perform it.



PILOTS NEED TO TAKE WEIGHT SHIFT PROBLEMS SERIOUSLY.

Let's review the weight shift techniques that pilots may have to demonstrate on either the FAA knowledge exam or practical exam. There are three ways to tackle the weight-shift problem: the really hard way, the hard way, or the formula way. The practical test standard does not specify how a pilot accomplishes this, but the sooner that you get it done on a check ride, the sooner you get to go flying.

Weight Shift—The Really Hard Way

Get out a new weight & balance form and start from scratch. Although you will eventually get the answer, this will not impress the examiner since it takes so long to do.

Weight Shift—The Hard Way

This is the table method. Not quite as hard as a redo, but it is logical and easy to remember.

	Weight	x	Arm	=	Moment
Old #'s					
Item(s) to add/subtract or move					
New #'s					

Weight Shift—The Formula Way

This is quick and easy, but I find that the law of disuse is prevalent here. Two flavors here: Weight Shift and Weight Change. The basic premise is little weight over big weight = little distance over big distance.

$$\frac{\text{Little Weight}}{\text{Big Weight}} = \frac{\text{Little Distance}}{\text{Big Distance}}$$

Weight Shift Formula

$$\frac{\text{Shifted Weight}}{\text{Total Weight}} = \frac{\text{Dist CG Moves}}{\text{Dist Weight Shifted}}$$

Weight Change Formula

$$\frac{\text{Weight Change}}{\text{New Total Weight}} = \frac{\text{Dist CG Moves}}{\text{Dist between weight \& old CG}}$$

If solving for distance CG moves, then make sure to add or subtract it to the old CG. The formulas can be used to solve for any part of the equation.

Quiz Time

Since your DC-10 is sitting on its tail. How much weight would you need to add to the forward cargo hold at FS 250" to move the CG to FS 575"? The aircraft currently weighs 40,000 pounds and the current CG is at FS 625". *Note: The numbers are fictitious and may not represent an actual DC-10.*

The answer is online at <http://homepages.wmich.edu/~nicolai>