

Deal With GPS Flubs

Eventually—if you haven't already—you'll misprogram the box. On an obstacle DP through the mountains is no place to ponder your mistakes.

S by Scott C. Dennstaedt
 Some pilots think that GPS stands for “Going Perfectly Straight.” Or what usually pops into my head from time to time is “Getting Progressively Stupid.” Pilotage? Dead reckoning? What are those? Ah, that’s right, those are the *backup* for GPS. You gotta love redundancy.

Whether panel mounted or handheld, most of the time the GPS is our friend. Go ahead, admit it, GPS is wonderful; you can zip around the country without holding a single piece of paper in your hands or even seeing the ground. Not only can you find the nearest airport using the GPS’s database, but you can also find the nearest Denny’s restaurant just in case

you get that itch to divert for a Grand Slam breakfast. Think about it: No map folding, no small print, no timing, no need to identify any nav aids.

But hold on there a minute, partner. No need to identify any nav aids? Blasphemy. With a GPS, there isn’t a traditional way to verify that your CDI is tracking to the appropriate waypoint like you’re used to doing with the identification feature of a VOR. Unless of course, you double-checked to see that your knob twisting resulted in the right alphanumeric, and that you entered them in the right order—details, details.

What happens when you fail to catch your dyslexic tendency? Most of the time it means that ATC will have something to say as you eventually stray off course headed to some waypoint unbeknownst to you or the controller. A sharp controller will pick up on it before you get off the airway and will likely save your pilot deviation butt.

Consider a scenario where you’re above mountainous terrain in IMC and the

controller doesn’t notice your mistake until ATC separation between you and another aircraft or terrain is lost. What then? That’s just what happened to a friend of mine. He accidentally transposed two simple letters on the GPS resulting in two separate low altitude alerts from the same controller. Due to his mistake, he was headed off course and toward higher mountainous terrain.

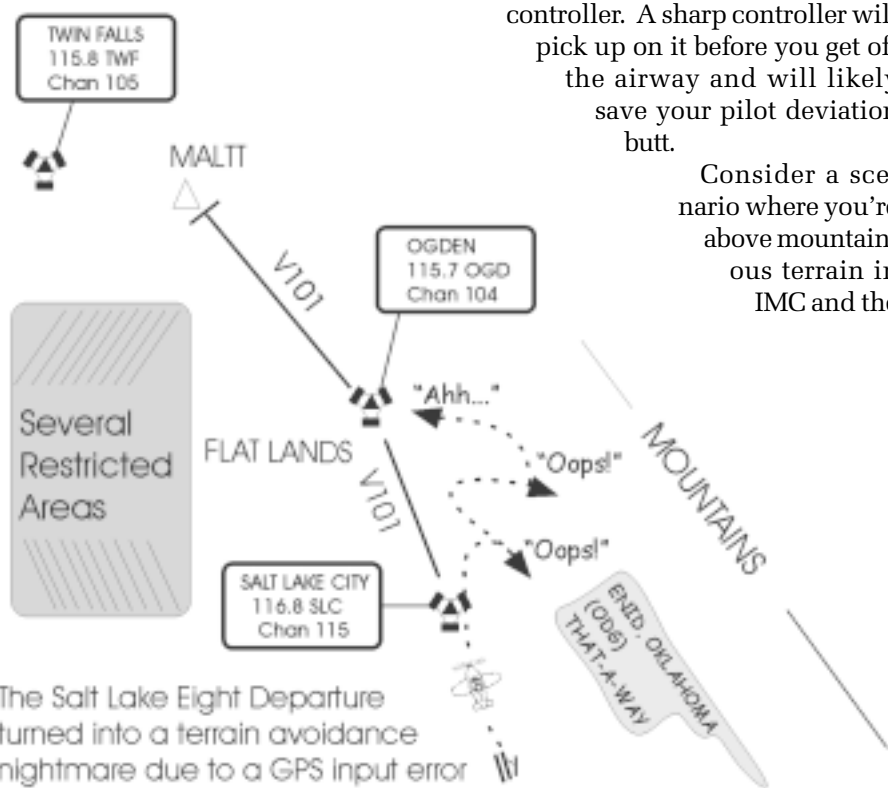
Already A Bit Nervous

This was Bob’s first departure out of a Class B primary airport (names and tail numbers have been changed to protect the guilty). Obviously, a little nervous about departing from such a busy airport, he contacted Salt Lake clearance delivery and received his IFR clearance to the northwest. The clearance wasn’t anything special and included the Salt Lake Eight departure to join V101, MALTT, direct Twin Falls, then as filed. He was cleared to 10,000 feet as required by the departure procedure. Bob programmed the route into his Garmin 430 and departed runway 35.

While climbing to his altitude limit on the required 340-degree heading, it became obvious that 10,000 feet would put him in a cloud deck. At 9500 feet Bob entered the clouds and was given the clearance to proceed direct to the Ogden VOR and join V101.

Using his Garmin 430, Bob hit the Direct To button and entered O-D-G followed by a press of the enter key. A couple more buttons on the autopilot, and like magic, Bob was turning toward the Ogden VOR—or so he thought. The identifier for the Ogden VOR is OGD not ODG.

As he was in the turn, Bob checked in with the Salt Lake approach controller, level at 10,000 feet. Something was awry; the controller immediately picked up on it and said, “Verify, ah, are you direct Ogden at this time, Ogden VOR?” Bob immediately responded, “Just turned direct Ogden VOR, was hoping to get to get to twelve thousand, got some clouds here between ten and eleven thou-



The Salt Lake Eight Departure turned into a terrain avoidance nightmare due to a GPS input error

sand.” The controller then gave Bob the bad news, “Maintain one-zero thousand, ten thousand, and I’m going to have to keep you at that altitude for a while due to inbounds for Salt Lake.”

The Confusion Sets In

About a minute later the Salt Lake controller asked Bob to “Turn left, low altitude alert, you’re, uh, heading into an MVA of one-zero thousand seven hundred, turn left heading three one zero immediately!” The controller’s low altitude audible alert could be clearly heard on the audiotape during this transmission. Sounding a little confused, Bob acknowledges the new heading.

With the controller’s audible alert still wailing, the controller asked, “Eight Alpha Bravo, do you have the terrain and obstructions in sight?” Following this transmission was that gut-wrenching long pause on the frequency with no response from Bob. Once again, the controller, now even more concerned, barked, “Eight Alpha Bravo, approach?” Again, there was another long pause with absolutely no answer. At this point the controller suspected a little bit of panic, “Eight Alpha Bravo, you got a stuck mic, do you have all the terrain and obstructions in sight?”

The stuck mic was because Bob had his finger firmly planted on the push-to-talk switch. Finally, Bob broke the silence, sounding unusually calm while indicating that he was unable to see the terrain and was turning to a heading of 310 degrees. The controller then directed Bob to “Expedite turn, turn left heading two niner zero.” Bob calmly acknowledged.

With all the emphasis on higher terrain and vectors away from higher terrain, you would think Bob would have figured it out by now. Just to be sure, the controller in that parental, one-word-at-a-time voice directs, “November Eight Alpha Bravo, turn right, heading three one zero, when able proceed direct the Ogden VOR, resume own navigation, victor one zero one.” A little perplexed and a trifle

annoyed by the controller’s insistent tone, Bob read back the controller’s instructions.

Still Clueless

By now, Bob should have discovered his mistake. Instead, he was doing exactly what his GPS was telling him, even though it didn’t make any sense to the rest of the world. A minute or so later, the controller with that frustrated, one-octave-higher voice said, “November Eight Alpha Bravo, turn left two niner zero, a left turn immediately. You are heading back into the higher terrain sir.” Highly frustrated at this point, the controller needed to get the bottom of this and asked, “Are

“Due to his mistake, he was headed off course and toward higher mountainous terrain.”

you familiar with where the Ogden VOR is?”

Bob stumbled, “Alpha Bravo, roger direct, uh...” and failed to read back the controller’s instructions. Like an exercise out of an ATC training video, once again the controller warned Bob of a second low altitude alert and reiterated, “November Eight Alpha Bravo, low altitude alert, the MVA in your area in about one mile is one zero thousand seven hundred, turn left heading two niner zero immediately!”

At this point Bob was a little bit shaken by what was happening. His immediate reaction was to climb as he asked the controller, “Alpha Bravo, two niner zero. I’d like to climb to one two zero and I’d be above all this stuff.”

His reaction to climb was completely normal. After all, from a decision-making standpoint, the pilot heard that his altitude was causing all the grief. In Bob’s world, a simple climb should’ve solved the problem.

Not a bad idea, but the controller’s world was a wee bit more complicated and becoming even more complicated by the minute due to a single aircraft. The controller asked an aircraft checking in to standby and didn’t hear another VFR pilot’s response to a callout of traffic. The controller was quickly becoming consumed.

Let’s Summarize

Bob had two strikes, so it was time to sort this whole thing out and be done with it. The controller made the best decision and decided to take 10 steps backwards and requested, “November Eight Alpha Bravo, ah, verify, you have the Ogden VOR dialed in, sir, is that correct?” And of course Bob assumed this was true as he responded, “Alpha Bravo, I do have it dialed in to the GPS, correct.”

The controller needed to somehow strike a cord with the pilot to find his mistake. Next he provided the pilot with a little history lesson, “November Eight Alpha Bravo, okay, the last two times you turned eastbound, the Ogden VOR is now at your one o’clock and six miles, ah, is that what you are showing on your GPS?” Finally, Bob did what he should’ve done all along and responded, “Alpha Bravo, let me just check this a second.” Just to throw more information Bob’s way, the controller reminded Bob of the Ogden VOR frequency.

Ah, now the light bulb popped on as Bob responded in that how-stupid-can-I-be voice, “Alpha Bravo is a little bit dyslexic today, OGD not ODG.” Details, details. The controller not wanting to see a third strike repeated, “November Eight Alpha Bravo, roger, turn right, proceed direct the Ogden VOR—Oscar Golf, Delta—resume own navigation victor one zero one, which should be the three zero two degree radial off the Ogden VOR.”

So where is ODG? ODG is the identifier for the Enid, Oklahoma VOR/DME, nearly 700 hundred nautical miles in the opposite direction of the Ogden (OGD) VOR. A little bit later, Bob was given the news to make that dreaded phone call once he got on the



Above: Obstacle DPs are designed to thread you safely through rising terrain. Don't blindly rely upon a GPS to think for you. You must keep a mental image of what makes sense.

ground. Fortunately for Bob, the FAA gave him a simple slap on the wrist and didn't pursue an enforcement action.

I have to commend the Salt Lake approach controller in this situation, who didn't make assumptions and executed his job to the letter in a calm and cool manner. While he didn't have a clue why Bob was trying to make his life difficult, he did understand that Bob was incapable of navigating to the Ogden VOR. Above all, he was clear about the circumstances of Bob's shortcomings.

Some GPS Tips

The GPS is like any other piece of navigation equipment. While perhaps a bit less rudimentary than your HSI, you still have to respect the fact that you need to stay on top of the big picture.

Most GPS manufacturers still require the pilot to create the route of flight one bloody waypoint a time even though a clearance typically is defined by airways. This aspect is getting better as manufacturers such as UPSAT allow you to enter your flight plan in a way that mimics your clearance (see Joe Shelton's *The Future According To UPSAT* August 2003). Until this is commonplace, we have to struggle with some extra knob twisting and button pushing.

Here are a few tips that might help

cut down on some of the common GPS-induced mistakes we make.

Create the flight plan with a minimum number of waypoints to define your route. There are a lot of intermediate waypoints on an airway that you could add to the flight plan, but what's the point? More chances for mistakes.

When you make a change to the flight plan or enable a direct-to course, a gross check is always in order. Is that new waypoint you just entered in the same hemisphere? Many of the GPS databases contain waypoints from all over the world and the waypoints aren't necessarily unique. Zoom out (if not done automatically by the GPS) and see that your new route looks correct. Make sure there are no sudden jogs to the left or right that would indicate a data entry error.

Even though you work your way through the annoying messages that more or less say—"Do you really want to navigate to South America?"—you should attempt to bring up the GPS flight plan screen and check to make sure the distances between your flight plan legs make good sense. Also check the bearing to the waypoint to be sure it's in the ballpark of what you would expect.

If you're on an airway or direct to a VOR, as much as it may hurt, tune in the VOR and identify it. Use it as a second opinion to determine if you're on course. Have a co-pilot—if so equipped—double-check your work or vice versa. (See page 14 for advice on training co-pilots)

Make use of reuse and cut down on the knob twisting. For example, if ATC issues you a clearance direct to a waypoint on your flight plan, don't

retype the waypoint. Go to your trusted flight plan—that you checked and double-checked earlier—and issue a Direct To from this page. Your GPS may have other shortcuts that would result in the same effect.

Situational awareness is a must anytime you make a change to your flight plan. Don't become complacent and just follow the magenta line (active leg). Locate yourself on those IFR and VFR charts that you should be carrying, or as Ken Holston would say, "Fly the Black line." Also, use the nearest function or map display to crosscheck your location on paper.

Take your time on the ground to program your entire cleared route into the GPS *before* you depart while minimizing the number of waypoints necessary to define your route. Also take this time to verify that the route is correct so that this entered flight plan can now be trusted in the event of off-airway vectoring. Take a moment or two to enter the frequencies of the first two VORs you'll likely encounter. Don't forget to set the proper radial in your HSI or OBS.

Know how to operate your GPS including some of the advanced flight planning and navigation features. In the IFR world you cannot just depend on knowing how to use the Direct To feature.

The scary part is that you can easily convince yourself that you're on course and safely above any obstacle alligators when your primary navigation source is a GPS. Many pilots that succumb to CFIT (Controlled Flight Into Terrain) are probably surprised in that last split second of life; they don't know what hit them largely because of the loss of situational awareness. If you're in radar coverage, ATC should not be your only backup while in the clag. In mountainous terrain, a simple typo can be deadly.

Dennstaedt is a CFII and IFR contributing editor who teaches aviation weather seminars. He can be reached at: scott@chesavtraining.com