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Crunch time

Getting the most out of your panel in an emergency

BY JULIE K. BOATMAN

The clearance comes from La Guardia Tower. "Bonanza 7236W, cleared for takeoff, Runway 4, fly runway heading, climb and maintain 2,000 feet." I read back heading, altitude, and the runway I'm released from, and push the throttle forward. As I accelerate off the ground, the cockpit shudders around me as the tires leave the pavement, and I raise the gear. Approaching 200 feet agl, I raise the flaps from the takeoff position, and the sky and sea tilt to the right. I reach back for the flaps—but they don't retract in time. The world goes gray.

As flight instructor Richard Kaplan restarts the simulator, he says, "Let's try that again."

It was my second time through the scenario in the flight-training device at Flight Level Aviation at the Greene County Airport in Waynesburg, Pennsylvania. The first time the "airplane" departed my control, I sat there dumbly—I might as well have put my hands in my lap to watch the screen as I twirled into the drink. The second time through, not really comprehending what was happening but acting on the principle, "If you do something and it screws up the airplane, undo it," I put the flaps back into the takeoff position. Unfortunately, because I hadn't followed procedure (waiting until 300 feet agl to raise the flaps in the first place) I couldn't recover the airplane before it smacked, in a simulated fashion, into the bay.

The third time's the charm—I wait till 300 feet on the next try, raise the flaps, feel in the controls that the left flap stays down, and then put the switch back down again. But it doesn't end there. Kaplan wants me to restore the asymmetrically deployed flaps to their failed position and try other ways to control the airplane. The first suggestion, to reduce the power to 15 inches, renders the airplane barely controllable. I declare an emergency with La Guardia Tower and request vectors back to the airport, right turns only.

Then Kaplan shows me a simple situational awareness trick: Combined with the tower-delivered surface winds, the winds aloft vector on the Garmin GNS 530's map page could help me ask for the runway that allows me to land with a crosswind from the right, making my landing task that much easier. Similar information can be accessed on any GPS unit with an air data sensor.

Flight Level Aviation's flight training device is a hybrid—a traditional FTD on a motion base. Visual displays increase realism for training scenarios.

Kaplan, an FAA aviation safety counselor and master CFI (as designated by the National Association of Flight Instructors), began flying more than 11 years ago, and he started instructing in his Cessna P210 after he recognized that few 210s were available for instruction for transitioning pilots. After finding his niche, he looked into acquiring a flight-training device (FTD) to supplement the training he did in his airplane and those of students. He ended up helping to develop, with Aviation Simulation Technology, of Lenexa, Kansas, a hybrid between one of the company's digital AST-300 FTDs and a motion-based flight simulator—the sim being prohibitively expensive for a relatively small operator, and the FTD not quite offering the level of intensity that he desired in the training. To create the new device, AST put its AST-300 on a motion base produced by Moog (a worldwide company whose North American operation is in East Aurora, New York), and Flight Level Aviation's new classroom was born.

And while Kaplan has found a lot of value in creating classic emergency scenarios such as the one in the opening of this article, he has also discovered that pilots have an even greater need in the area of advanced avionics training. So he installed in the FTD actual off-the-shelf units representing three of the

PHOTOGRAPHY BY JON LISBON

Finding the right data to aid you in an emergency starts with having the right setup—and knowing how to use your tools efficiently. For an engine-out instrument letdown, you can use both the extended runway centerline and vertical speed required features of the Garmin GNS 530 to help you find the runway safely. As long as the descent required is more than your vertical speed in the glide, you can manage the situation to arrive at the runway threshold at the appropriate altitude.

most popular GPS navigators on the market today: the Garmin GNS 530, the Honeywell Bendix/King KLN 94, and the Garmin AT Apollo GX50, along with a Sandel SN3308 electronic horizontal situation indicator. And a *new* niche was born. Flight Level Aviation's two-day programs, covering emergency procedures and advanced avionics training, typically run at $500 each day, with flight time in the P210, if you don't bring your own airplane, billed at a reasonable $125 an hour, in addition to the $500 base rate (which includes whatever ground instruction and sim time is desired). You can also pair with another pilot to shave the base rate to $375 a day per person.

Into the zone

Kaplan hands me a list of the possible subjects and scenarios I will encounter during our session; during a two- or three-day course he says that he covers perhaps one-third of those lessons in the FTD. The list looks so benign in black and white, but each sedate line could sow the seeds of an accident if dealt with improperly. Some of the scenarios are avionics-specific, such as operations particular to each of the navigators and tips for getting the most out of each box—like deriving localizer DME when the procedure is not in the database. Others remind the pilot of what to do if the boxes don't work—including an alternator failure leading to total electrical failure.

However, the course truly shines when it combines the two, helping the pilot develop strategies for setting up the avionics to get the best information and for locating information quickly in an emergency situation.

Case in point: a frozen altimeter discovered immediately after an IFR takeoff into the soup. While there are other ways to determine altitude (asking air traffic control for a Mode C readout if it's available), if you have the GPS set up to display its altitude readout—or know how to quickly retrieve it from the System page—the data can be used as an emergency backup. The same goes for a loss of vacuum pressure or directional gyro. The heading (which may be given as your current track) derived by the GPS can serve as a backup to a compass swinging in turbulence or dipping with a turn. While common sense (not to mention the regulations) warns against relying solely on these GPS numbers as a matter of course, in an emergency you take what you can get.

Another interesting use of GPS technology to solve a century-old problem: What to do if the engine quits at altitude? If the problem occurs below 5,000 feet, a punch to the Nearest airport page is perhaps the most helpful your box can be. Or is it? Add in your groundspeed readout, and you instantly have two tools that pilots two decades ago did not.

Kaplan set up this exercise so that I lost the engine at 10,000 feet msl above La Guardia. With a 500-foot ceiling and a mile visibility everywhere within gliding distance, I had to simultaneously prepare for an instrument approach and a power-off landing. Because I was so close to La Guardia, an ILS to that airport made sense. After alerting the Tower, I tried to calculate the altitude at which I needed to pass the outer marker inbound in order to make it to the runway. I planned for an average 1,000-fpm descent, and with the Peths locator 3.9 miles from the threshold, I figured I needed to be at 4,000 feet msl (La Guardia being roughly at sea level) when I crossed it.

All went well, until I decided to bank an extra grand at Peths and start inbound from an altitude of 5,000 feet. I stayed high the whole way down—and to my glider instructor, this would be no surprise. But my fear of the ground worked against me. Let's just say I made the airport property, but not the approach end of Runway 4 that was my aim.

However, Kaplan then showed me the trick: One of the handiest tools on the

COURTESY OF GARMIN

Garmin 530 is its "vertical speed required" (VSR) data field that can be displayed on the main navigation (Nav) page. He recommends setting this data field for everyday use—he doesn't expect you to find the right menu and get it online in the midst of an engine failure.

With the VSR data field set, if you enter an airport waypoint into the 530, the block displays the descent rate currently required to meet terra firma at the airport's reference point, based on your groundspeed and distance from that point. Ideally, though, you hit the Procedure (Proc) button, load an approach at the airport, and sequence to go Direct to the runway waypoint. Rather than having to calculate and correct during this high-stress time, you need only match the VSR to the needle on your vertical speed indicator to come out right.

The motion base simulates turbulence and other aircraft flight characteristics.

As the VSR winds down, you know you need to tighten up your glide in order to make the airport. And, if you see the VSR indicate a descent rate less than your best-glide rate, you will land short. There's no faking this number.

Richard Kaplan equipped his Cessna 210 with TKS for increased weather capability.

Similar vertical navigation features are available on other GPS navigators—it clearly pays to practice this scenario and find out how you might put this tool to use.

Kaplan also keeps up his sleeve a list of personal favorite approaches to test a pilot's creativity in best use of the GPS navigators. In the controlled environment of the FTD, he presents a "problem" approach, such as the VOR/DME or GPS-C approach into Aspen-Pitkin County/Sardy Field in Aspen, Colorado.

The approach charges down the court through a series of stepdown fixes to a slam dunk—a 9.67-degree descent from the final approach fix at Allix, 6 nm from the threshold. (Remember, your garden-variety glideslope is 3 degrees.) The approach also requires two VHF receivers in VOR/DME mode, even if you have the ability to track the Red Table VOR on a GPS receiver—because the PKN localizer is an essential component of what is perhaps the most convoluted missed approach procedure ever created. Kaplan explains how to perform this magic without hitting the rocks.

Another favorite approach is the VOR/DME 15 into Baltimore, Maryland's Martin State Airport. Sure, every instrument student has done time with the DME arc (the truly lucky ones got to use a radiomagnetic indicator (RMI) like those most of us only saw on the written)—but what about flying an arc that makes up the *entire* approach? Though this approach is not approved as a GPS overlay, setting a primary navigation or map page on your GPS receiver with the airport as the destination waypoint helps you track the arc smoothly, and anticipate those turns in a way beyond what an RMI needle can offer.

i Links to additional information about avionics training may be found on AOPA Online (www.aopa.org/pilot/links.shtml) Keyword search: avionics training.

As Kaplan points out, the amount of capability locked into the average IFR-capable GPS box is astonishing, yet most of us fly using only a small fraction of its functions.

So what gold lies buried in your panel? AOPA

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