Keeping Up With Your Boxes:

Database Management Keeps Them Legal

BY DAVE HIGDON

Microprocessor-driven avionics continue to grow in the cockpits of general aviation aircraft at a wondrous rate. New production aircraft today — from light sport to large-cabin business jets — increasingly employ equipment driven by microprocessors and helped along by increasingly affordable memory chips and digital liquid-crystal displays.

Thanks to the development of scores of affordable, suitable aftermarket options, even the oldest airworthy aircraft can be retrofitted with virtually all of these advances. And what advances they are: primary flight and multi-function displays; digital radios and transponders; communications and navigation VHF radios; global positioning system navigators.

Additionally, today's modern, digitally driven options include a host of systems designed to improve utility, efficiency, situational awareness and, most importantly, safety, including terrain avoidance and warning systems; enhanced ground-proximity warning systems; traffic-alert and collision-avoidance gear; and weather sensor and avoidance hardware.

The most visible evidence of this revolution might be the brightly colored displays in the panels. But it's the hardware behind the displays where the work occurs and the fine processing takes place.

For GPS, EGPWS and a newly arriving generation of flight-management gear to function properly and deliver their promised utility, they need to have their brains refreshed periodically.

This refreshing process is what we call database updates — when, through one sort of feed or another, the memory banks of the box receive new information reflecting new data once solely the province of paper charts, plates, facilities manuals and Notoms.

For many of the boxes, their highest level of performance and legality for IFR operation depends on the hardware possessing a current edition of the data.

For others boxes, such as portable non-IFR GPS navigators, database updates, at first blush, seem

merely to assure the accuracy of incidental features, such as airport and facility directories. But for a pilot who depends on map information, such as towers and obstructions, an out-of-date database can leave the pilot exposed to potential problems not visible on the screen.

The manufacturers of most of these boxes offer methods for managing and updating the data of its boxes on a cycle comparable to the IFR plate-update cycle: 28 days. For others — terrain and ground-proximity boxes, in particular — the update cycles typically are a year in length.

Regardless, for the pilot using one or several data-driven boxes in the cockpit, the issues of managing the update cycles and performing the update properly stand as safety-of-flight issues with serious implications for those who fail to adhere.

For example, airport and airspace information changes constantly. Air traffic system radio frequencies, standard instrument departures, standard terminal arrival routes and instrument approach procedures, RNAV routes, obstacle heights and locations, even the terrain information needed for TAWS and synthetic vision can change over time.

While some of this information changes very little and very slowly — such as terrain and obstacles — other pieces of information change so often the Federal Aviation Administration issues updates on a 28-day cycle.

Personalized Tools & Techniques

Some pilots fly behind the highest-technology, state-of-the-art panels in modern personal and business-turbine aircraft, while the panels of some other pilots range from a combination of newly upgraded equipment and old-style gauges to panels of the minimalist school.

Along with various equipment levels, there also are a variety of approaches employed by pilots to keep up with their database-update needs.

While professional pilots might benefit from an equally professional management structure — one that handles maintenance and, as part of this responsibility, database updates — the pilots still remain ultimately responsible for the airworthiness of their aircraft. With few exceptions, they can count on the boxes they use — whether GPS navigators, terrain or multi-function displays — to let them know when they're about to launch with out-of-date software informing the equipment.

In fact, with few exceptions, pretty much everything from the most modest portable GPS to the most sophisticated panel-mounted gear requires a human button push to acknowledge the software is out-of-date — a message often accompanied by legalese stating the now advisory-only nature of the out-of-date data. An IFR-level navigator generally will prevent the user from loading any instrument approaches, SIDS or STARS that depend on up-to-date data working with the GPS.

From this mix, pilots in charge of doing their own updating employ a variety of methods for staying up-to-date — from the sophisticated to the simple.

The Mailbox Reminder

One pilot friend of mine employs a third-party, chart-and-plate service, which includes an annual pur-

chase of the entire National Charting Office collection of instrument approach procedures.

This transaction includes a subscription service that generates two mailers with updated information alternating on their own 56-day cycles. This means the pilot receives one of the two update reminders every 28 days — to which he synchronizes his database updates from Jeppesen for the Garmin 530 installed in his high-performance piston single.

He's actively on a quest for a suitable electronic flight bag to end his dependence on paper, which means he'll need a new tool to remind him when he's due to buy an update for the Garmin database.

"The box itself lets you know when the database is current, and when it's out-of-date and not legal for IFR use to file 'Slash Golf,'" he said, referring to his use of the unit for filed-direct IFR operations. "So, there's pretty much zero chance of me using the unit illegally."

If he's on the road, he might miss the snail-mail spurred reminder, but only during the period between when the update becomes available and when the loaded data expires. Then he, like many, can use any available high-speed connection to download the update and install it.

"Unfortunately, not everywhere I fly offers high-speed where I stay, so on the road I try to also pay attention to the screen message telling me when the data expires so I can seek out someplace with high-speed, a coffee shop, for example."

Cellular Reminders

Another pilot friend employs Honeywell equipment in the panel of his turboprop, a KLN 89B. Although he subscribes to the same paper-chart service as the piston-single user, his approach is a little more sophisticated.

He programs a reminder into the calendar function of his sophisticated cell phone — a reminder he updates upon each 28-day reminder, as opposed to doing all 13 reminders once a year. He also sets it to alarm twice: the day an update becomes available and again two days later as an added reminder.

He downloads at his office, transfers to one of three cards he owns, and swaps in the new data on the new card upon his next trip to the airport.

"I almost always have a card handy on the desk, another in my pocket and the one in the navigator, so they all get rotated," he said.

A Higher-Tech Approach

A pilot new to my acquaintance flies a piston single with one of the new boxes from Avidyne. He's on his com-

puter every single day as part of his work and he uses a personal manager program, which synchronizes with his personal digital assistant.

"It's easy," he said. "I get the annual update-cycle calendar, enter the appropriate dates into my personal calendar, and it alerts me daily that an update is available until I mark it as a completed item."

Because it synchs to his PDA, it matters not whether he's working at his main office or on the road.

"On the road, my notebook and PDA both let me know; so, I download to the notebook, pop in the two thumb drives I use, copy the two files and put 'em in my pocket.

"When I get into the airplane the next time — usually on my way back home from a trip — I pop in the two drives and, one-two, the system installs the updates. It takes less than 10 minutes usually," he said. "And since it really doesn't matter where I'm located to download the update from Jeppesen, there's never a worry about being without the needed database."

No High-Tech for Low-Tech Pilot

Still another pilot friend flies either of two LSA-compliant antique taildraggers on days when he's not flying business jets professionally. One of his antiques boasts a minimalist electrical system and slightly less panel space for the front-seat pilot-in-command; the other flies sans electricals.

This pilot's approach to managing his database updates is as simple and low-tech as his two airplanes: he uses a sticker on a paper calendar. "It works for me," he said.

Because he regularly flies the Aeronca cross-country, as well as in and around Class C and Class B airspace, he believes keeping up the database in his AV8OR is a must; the navigation data, airports directory, obstructions and terrain data are fresh with every software update.

Tried & True Still Works

Every pilot employs an approach geared to how they live and they fly.

For one pilot friend, his update arrives on a CD, which he puts into his notebook and takes to the airport where he plugs the computer into a dataport.

For another friend, getting his updates requires a data-card swap. The new card arrives and he pops it into the navigator, then he sends back the old card with a prepaid return envelope.

In both cases, their subscriptions serve as their own reminders because the envelopes arrive every 28 days.

Manufacturers employ the methods produced out of its own engineering and software departments. Your avionics shop should know how the various manufacturers manage updates so you can share this valuable information with your customers. ❏