

WHICH KNOB DO I TURN NEXT?

All GPS boxes will get you there, but non-standard knob-twisting makes transition from one aircraft to another challenging.

by Harry Kraemer

It has been 70 years since Jimmy Doolittle made the first "blind" zero/zero flight from takeoff to a landing using just a homing beacon and a fan marker.

Looking back on that flight, it's amazing to think just how much of an accomplishment that was in 1929 — considering that with all of today's automation and glass cockpit technology, our landing minimums still are higher.

By the late 1930s, airlines were advertising and using a new system called Air-Track, which was similar to the current-day ILS.

And today, 70 years later, on the millennium's edge, artificial stars and global positioning technology have made it possible for personal aircraft to fly "blind" from departure to destination and conduct very precise "non-precision" approaches to thousands of airports with highly accurate position information.

GPS receivers are unaffected by weather, unencumbered by vacuum tubes and relatively easy to install and maintain, and they feature nearly intuitive operation.

Without standard button functions, however, today's GPS units make transition from one airplane to another a challenge. The days of jumping from one cockpit to another and feeling proficient and comfortable with standard navigation equipment have come to an end — at least for now.

So different is the knob-twisting that flight instructors have come to offer specialized training for specific GPS installations. Students shop for Garmin or Northstar specialists.

And students and instructors alike have learned that without proper and specific training with familiarization flights in VFR weather, a pilot may find it almost impossible to fly a GPS approach with an unfamiliar box.

To see how different each GPS can be, let's review the procedures for the GPS for Runway 5 at Frederick Municipal Airport (KFDK) in Frederick, Maryland, using the Bendix/King KLN90B, the Garmin GNS 430 and the Northstar M3.

The GPS to Runway 5 at KFDK is a standalone GPS approach, meaning that the approach only can be flown using GPS.

Bendix/King KLN90B

The pilot accesses approaches two ways with the 90B. First, go to the airport page (APT) on the right side and use the large knob to select an airport. Press CRSR on the right side to highlight the airport identifier or use the right side large and small knobs to enter the airport identifier, KFDK.

Once you have the airport identifier entered, press the CRSR button to turn off the function and use the small knob to go to page 8. By pushing the CRSR button on the right side and using the large right-hand knob, you will be able to highlight the GPS 05 approach.

Press the enter button. A window will appear allowing you to select MRB (Martinsburg VOR) as the IAF using the large right knob. Press ENT. The unit then will ask, "Load in FPL (flight plan)?" Answer with ENT. You then will be asked, "Approve?" Again answer with ENT.

The next step is to use the large knob on the left side to go to FPL (flight plan) and small knob on the left side to go to the FPL 0 page. By using the CRSR button on the left side and the large left-hand knob, highlight MRB-i and go direct to MRB using the direct button followed by enter.

As long as you are in the leg mode, this action will start the sequencing of waypoints up to the missed approach point. You also can do this from the Super Nav 5 page. Using the small right knob, pull it out and scroll through a list until you find MRB-i and press D (for direct MRB) and then press ENT.

The 90B has an ACT (active) page that shows you the waypoint to which you are currently navigating. If your active waypoint is an airport at which you are going to do a GPS approach, you can access the approach from ACT page 8 using the same steps as stated above.

But once you load an approach into your flight plan from the active page and start the approach, you will not have access to any other approaches unless you go to the airport page and enter the airport identifier.

I recommend that you always have your destination airport in the airport page on the right side. This will give you fast access to all approaches for that airport, plus pages of other useful information for that airport. You can change the approach at any time just by going back to the airport page 8.

As with all IFR-approved GPSs, it is important to keep your database current. The 90B is approved for non-precision approaches only when the database is current. You will receive a message ("Outdated DB") if you select

an approach when the database is out-of-date.

Garmin 430

The 430 gives you access to the approaches from the procedures page. You must have an airport in the flight plan as the final destination (KFDK) or be going direct to the airport (KFDK) using the direct button.

Push the PROC button to display the procedures page. By rotating the large or small right knob, you can choose "Select Approach." Pressing enter (with "Select Approach" highlighted) displays a list of available approaches for KFDK.

Use the large or small right knob to select GPS 05 and press enter. A small window then will appear allowing you

to select MRB as the IAF using the large or small knob. You can select the IAF or a vectors option.

The vectors option provides only the final course segment of the approach, which, of course, allows you to receive vectors to join the final approach course.

Rotating the large right knob will allow you to highlight "Load or Activate" and press enter. Selecting "Load" will add the approach to the flight plan and allow you to continue navigating your original flight plan and still have the approach available for quick activation when you desire.

If you select "Activate," this will override the flight plan and will start the approach (setting up a course direct to the IAF). From the IAF inbound, you then will receive course guidance along the approach.

Northstar M3

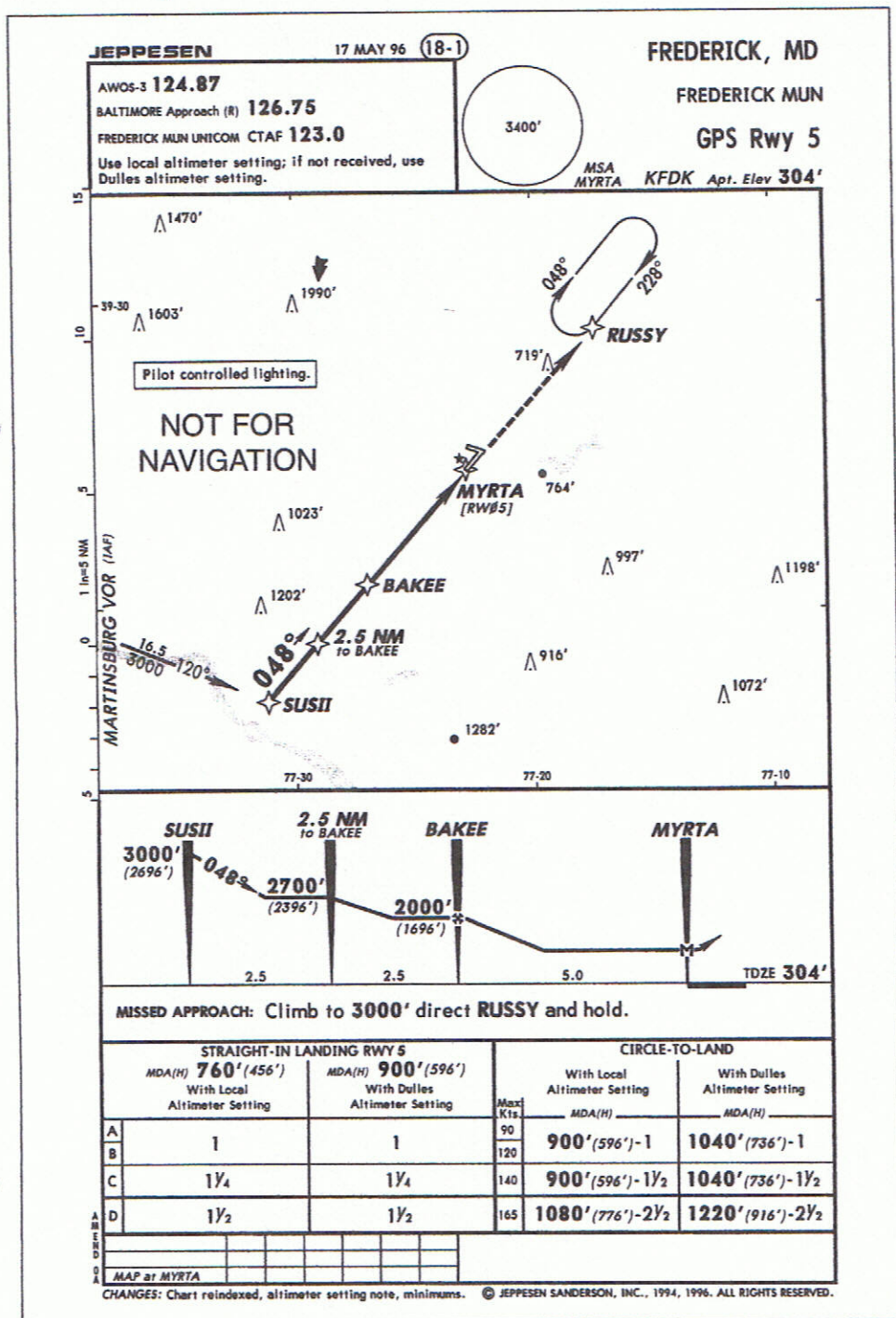
Advertised to produce "fully automatic GPS approaches" and as "hands-off all the way," the Northstar M3 still takes some training and practice. As always, conduct the training in VFR weather.

The M3 determines RAIM (receiver autonomous integrity monitoring) availability before you depart. RAIM prediction allows you to confirm that you will have GPS coverage for the waypoint and time specified.

To do this, twist the large primary knob to APCH. The display should look something like: GAI DEST. ACK? RAIM ?? @05:00Z. If you do not see a readout similar to this, turn the large secondary knob to the left until you do.

Next, turn the small primary knob or use the cursor (CSR) button and the large and small primary knobs to enter the destination airport identifier (KFDK). With the small secondary knob, enter your ETA (in Zulu time), press acknowledge (ACK), which is flashing, and within a few seconds the M3 will determine the RAIM availability.

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Which Knob Next?

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A display as follows should appear: ASSIGN FDK FOR NP APPROACH ACK? Pressing ACK will acknowledge this message.

The small primary knob will allow you to select the approach (GPS RWY 05). The small secondary knob will allow you to select MRB as the initial approach fix. By pressing direct and acknowledge (D and ACK), you will begin to receive course guidance for approach.

The 90B and the GNS 430 will allow you the option to display a moving map while on the approach. I recommend using this feature — it's great for your "position awareness."

For most GPS units, you can purchase a computer training aid to assist in getting familiar with the unit. AVsoftch, (303) 825-0815, offers a program on CD for the KLN90B for

under \$200. The Garmin 400-series GPS units come with a desktop simulator on CD.

In addition to computer training, most units have a "take-home" or simulator mode in which you can practice with the GPS out of the aircraft.

The procedures that I have explained here are not meant to be a substitute for the manufacturer's guide, but an illustration of the knob-twisting differences of three GPS boxes to show you the differences and the basic similarities in units.

Before going into IMC and shooting a GPS approach, you should get some training from an instructor who is familiar with the specific GPS that you have in your aircraft. As you can see, familiarity with one brand of GPS does not mean that you will be familiar with another.

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Before You Go

The approach to be flown must be in the database.

You must first designate the airport before designating the approach.

GPS distance is always from the active waypoint.

For approach activation to occur, you must cross within 2 nm of the final approach fix on the inbound course.

If you are going to cross the same waypoint twice during an approach, the GPS must be placed in a "hold" mode prior to crossing the first time and taken out of the hold mode prior to or as you cross the waypoint the second time.

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