GNS430 Clinic: Programming the User Waypoint for IFR Clearances that make you say, "Huh?"

By Richard Bertoli, CFII

The following clearance was issued to a pilot friend of mine for an IFR flight to San Diego, departing runway 21 at the Santa Monica Airport (SMO) near Los Angeles:

> *Fly runway heading until crossing LAX 315° radial, then right turn to heading 250°.. Radar vectors SMO.. SMO 125° radial to intercept V64.. V64 to V363 to DANAH.. V23.. then as filed.*

Dubbed by this pilot as "the most complicated IFR clearance ever," he somehow managed to get through this without any problems, but this was most likely due to receiving a much simpler instruction from ATC after take-off… *"I was about halfway to Hawaii and trying to figure out how many NASA forms I could fit into a single envelope when I was told to fly direct SMO, depart SMO on a 090 heading, expect vectors to V23. After passing SMO, I was told to fly direct to DANAH."*

Explaining the purpose of this confusing clearance and others like it is beyond the scope of this article, but by exploring some under-utilized features of the Cirrus cockpit we can tame this unruly clearance into a simple point-to-point flight plan.

Referencing the IFR enroute chart excerpt on the last page, follow me as I construct a step-by-step guide to programming this clearance into submission…

On Departure…

First, we need to figure out the best way to reference the LAX 315° radial in order to know when to turn to heading 250° on the climb out. In this particular scenario, the simplest method would be to dial in the LAX VORTAC frequency in the #1 NAV radio and assign VLOC 1 to the Bearing Pointer (the hollow blue needle) on the PFD. On departure, fly the runway heading until the tail of the blue needle passes 315° (or the head through 135°), then turn to the assigned heading of 250° and await radar vectors to SMO. In this instance, we are using the blue needle for reference only, which is its intended use; it is not an instrument to navigate a course with, unless your NDB tracking skills are sharp… let's keep it real, folks.

For those who feel overly challenged without some sort of moving map reference to fly by, an alternative set up would be this: Enter LAX as the first waypoint in the Garmin flight plan (FPL) after KSMO. Make sure LAX is the active waypoint and your CDI is in GPS mode (<u>not</u> VLOC), then press the OBS button on the front of the Garmin 430 panel. Grab the left knob on the PFD and dial the head of your CDI needle (the green one) to 135°, the reciprocal of 315°. Toggle the OBS button again and a magenta line depicting the 315° radial from LAX should appear on the MFD moving map. Once you've crossed the line, turn to the assigned heading of 250° and await

radar vectors to SMO. In anticipation of the next ATC instruction, now would be a good time to make SMO the active waypoint by high-lighting it on the FPL page and programming "Direct-To."

… SMO 125° radial to intercept V64…

Now, things begin to get interesting. The clearance calls for the pilot to fly outbound from SMO, southeast bound on the 125° radial to intercept V64. The detail that makes this and the next piece of the clearance problematic for the Cirrus pilot is that these intersections are not charted – they don't exist as named waypoints in the GPS database. While it would be possible to configure the avionics to fly this using the bearing pointer, OBS mode, and a lot of fancy finger work while airborne, there is a much simpler way to program this while safely on the ground using the User Waypoint function of the GNS430.

Let's begin building our flight plan by creating the first user waypoint following KSMO and SMO. The first user waypoint that we're going to create, named FIRST, will define the point where the SMO 125° radial intercepts V64. This will allow you to fly from SMO to the intercept point on V64 without performing any digital acrobatics while airborne in the busy LAX airspace.

After "typing" the word FIRST in the FPL and pressing ENT, you should see the prompt shown in Figure 1. With "Yes" highlighted, press ENT, and you will be automatically directed to the User Waypoint page, located on the last page of the GNS430 WPT group.

Figure 1

Using the VOR radials that define this intersection, Santa Monica (SMO) 125° and Seal Beach (SLI) 251°, we enter the data in the boxes as depicted in Figure 2. This is accomplished by manipulating the cursor with the right side outer large knob on the GNS430, changing the highlighted value with the inner right knob, and pressing ENT after each step and "Create" when the data entry is complete. It's easier than it sounds. (Note that distance is automatically calculated after the VOR radials are entered.)

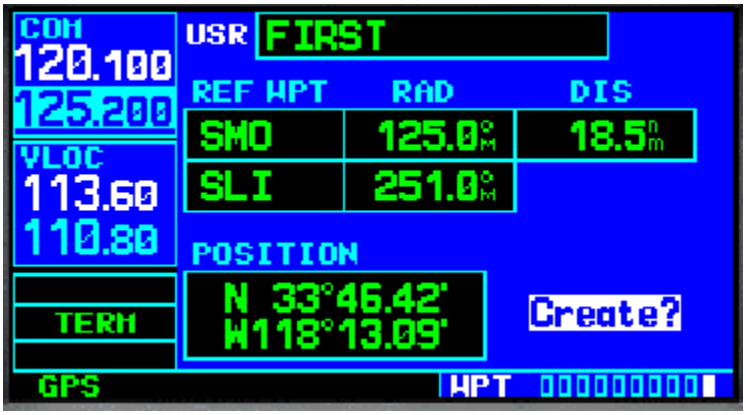

Figure 2

The next waypoint in the flight plan after FIRST will be the Seal Beach VORTAC (SLI). At this point, your FPL should look like what is shown in Figure 3.

Figure 3

We will be intercepting V64 between the WILMA intersection and SLI. Then we will proceed eastbound on V64 crossing SLI, towards TUSTI, shortly thereafter intercepting V363, but again you will see no named intersection where these two airways cross. Why? I don't know, but we can fix that. Read on…

… then V363 to DANAH…

The next user waypoint we will create, SECND, will define where V64 intercepts V363; in other terms, where the SLI 080° radial intercepts the El Toro (ELB) 325° radial. See Figure 4 to view what this user waypoint data looks like.

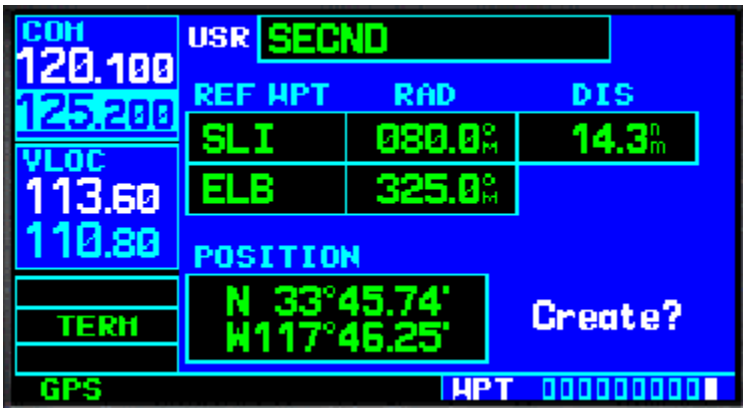

Figure 4

From SECND, the course takes a right turn towards El Toro (ELB), then on to DANAH intersection, then V23 to the Ocean Side VORTAC (OCN) and onward. This section of the flight plan is shown in Figure 5.

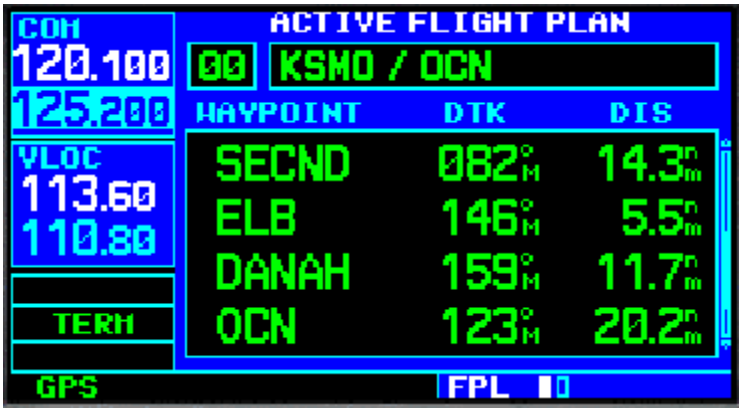

Figure 5

How do I know if I've programmed the clearance correctly?

The best way to verify the flight plan (FPL) programming is to take a look at the course on the moving map display and cross-check it with your chart *BEFORE* departing. Figure 6 shows what this flight plan is supposed to look like. You can see how we've created a simple point-to-point, GPS navigable sequence making single-pilot IFR a breeze, leaving all the drama on the ground back in LA where it belongs.

Figure 6

Practice

Practice using the features I've mentioned with an instructor or in a Cirrus simulator. Next time you get one of these doozy clearances, just smile and know that you've got the tools to fly it right.

Extra Credit

Try programming the following route clearance into your desktop Garmin Trainer, available for download here. This clearance is standard issue for a low altitude aircraft flying IFR from the Caldwell-Essex County Airport (CDW) in Fairfield, NJ to the Farmingdale-Republic Airport (FRG) on Long Island, NY.

> *Cleared to the FRG airport.. On departure, turn left heading 180°.. Radar Vectors to the Bridgeport (BDR) 248° radial to intercept the Calverton (CCC) 285° radial inbound to CCC.. direct Deer Park (DPK).. direct to destination.*

Feel free to contact me with questions. Fly safe!