Mike Goulian Aviation
Pro Tip of the Month
By CSIP Instructor Greg Walton

### Avionics and Autopilot Sequencing for IFR Approaches

One topic that seems to confuse clients who are learning to fly IFR and more experienced IFR pilots is how to properly sequence an instrument approach in their flight plan and how to program their autopilot/command bars. In this tip, we are going to explore the proper way to sequence your avionics and autopilot/command bars for any instrument approach and hopefully develop more consistency in how you fly your approaches!

There are two main procedures you need to understand when flying an instrument approach. Approaches can begin at a fix or with vectors to final. Each has a specific procedure to follow and we will walk through each of them below. At the end of the tip/lesson, I have added a checklist that can be used to simplify your procedure!

When your approach begins at an Initial Approach Fix or Intermediate Fix

In this scenario, we will be flying from KLCI to KBED. I will walk you through each step of loading an approach, beginning the approach, and sequencing your autopilot panel properly.

As you approach Bedford you listen to the ATIS and hear that IFR arrivals should expect the RNAV GPS23 Approach. This should be your reminder that it is time to LOAD your approach from the closest Initial Approach Fix (IAF) to your current position. In this scenario, we are going to choose EZKOW as our closest fix as we are approaching from the North/North-West and load the RNAV GPS 23 Approach from EZKOW.
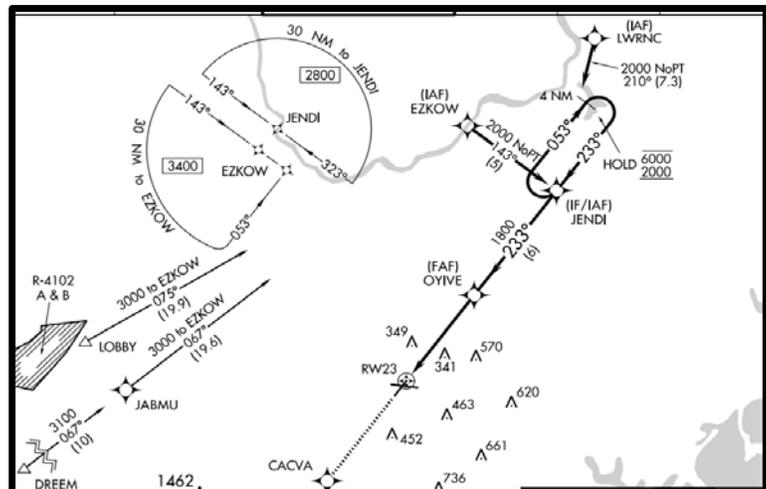
Once you load your Approach, your flight plan page will look like this. You will notice that the approach is in your flight plan, however, your magenta arrow is still indicating DIRECT KBED. This is a good thing as we were not told to do anything different than we were doing before.

Once the approach is loaded there is nothing else for you to do until ATC gives you more guidance. In this scenario, ATC says "Cirrus 128WC proceed Direct EZKOW".

At this point, you should ALWAYS bring your cursor to the fix underneath the approach in your flight plan as seen here. Once the cursor is on the fix, you should press DIRECT (verify that the fix you highlighted shows up) and then hit enter enter.

This is what your screen will show you after you have done that step. The key thing to take away from this is that your magenta arrow (active leg) in your flight plan is underneath the approach you loaded earlier. This means that your flight plan will now sequence through your approach as desired. (EZKOW - JENDI - OYIVE - RW23)

As you get closer to the fix ATC will eventually give you a clearance that will sound something like
"Cirrus 128WC 10 miles from EZKOW, cross EZKOW at or above 3500 feet, cleared for the RNAV23 Approach Bedford"

Once you hear that you should check that your altitude at EZKOW is the correct altitude. In this situation we need to change the altitude to 3500 - so we scroll the cursor over and type 3500. You should also verify that the other altitudes listed for each fix match the altitudes depicted on the RNAV GPS 23 Plate.

After entering that information, your flight plan will look like this. We have verified that all of our altitudes are correct and that the approach is loaded properly. We can now sequence our autopilot panel to follow our flight plan.

The three things we need to do with our autopilot panel at this point are:

1. Bug our FAF altitude, which is 1800ft.
2. Press VNV to tell our plane to follow each leg of the approach vertically.
3. Press APR on the autopilot to tell the plane to intercept the Advisory Glidepath in this scenario or the GP/GS on an ILS LPV or LNAV/VNAV approach.

Once this is done, you should check your scoreboard on the PFD to verify that everything is programmed as desired.

You can see the autopilot is flying GPS for lateral guidance and holding 4500ft with VPTH and GP armed.

You can see the bugged FAF altitude of 1800ft. Next to that, you can see the next altitude for your VPTH to follow displayed in Magenta.

Although this was a rather long-winded way to explain this procedure, it is best to see what it will look like as you read each step. At the bottom of this lesson is a "cheat sheet" to help do this for the first few times. It is always best to practice flying approaches this way in

VFR conditions for the first few times. Or, better yet, do it with one of our instructors in our simulator. If you can get proficient with this flow your IFR flying will become much more fluid.

When you are vectored on to the final approach course.

Vectors to final are typically much easier and there are fewer steps than when you have to fly an approach from an Initial Approach Fix.

When you are going into an airport and you pick which approach you would like, you should load the approach the same way you did above. I recommend always loading your approach from an initial approach fix. You can quickly switch to vectors to final once you are 100% sure you will be vectored.

So, the process for picking and loading your approach does not change. There are only a couple of things procedurally that will change when compared to flying an approach from an IAF.

> **Procedure:**
> - Once ATC gives you a heading to fly, you will bug that heading and press "HDG" on the autopilot panel.
>   - After putting the plane into HDG mode, you are free to press "PROC" and then "Activate Vectors to Final".

- *It is common practice for controllers to turn you on to what is essentially a "base" leg which is perpendicular to your final approach course*. Once you are perpendicular to the final approach course you can expect your next clearance to be something like "Cirrus 128WC 5 miles from OYIVE turn right heading ___ Maintain _____ft until established on the final approach course, cleared for the RNAV GPS 23 approach Bedford".
    - A pro tip for this is that you should begin to anticipate this radio call coming through once you are on that "base" leg. Have your hands ready to turn your heading bug/altitude bug as desired. When the controller tells you to turn to the heading, you can start doing that while they are still reading you the rest of that clearance. This will make it much easier to repeat your assigned heading/altitude as you can just read them off of your primary flight display.
- Once you turn your heading bug to the assigned intercept heading and you are "cleared for the approach" you need to make sure that you also press the "APR" button on your autopilot panel to arm your NAV and GP/GS.
    - **If the controller tells you to turn to a heading and intercept the final approach course make sure that you do not press "APR" as that will arm your Glidepath/Glideslope and could begin descending you when you have not been cleared. Instead, press "NAV"**

Approach from an Initial Approach Fix or any fix on the approach

After getting the weather	Load expected approach from the closest "IAF"
ATC clears you to a fix on the approach	Cursor over the fix name and "Direct Enter Enter"

ATC gives crossing altitude and clears you for the approach	Verify Crossing Altitude in your FPL and then
	    - Bug FAF altitude
	    - VNV
	    - APR
	- **Verify scoreboard reads correctly**

Upon intercepting the GP/GS or reaching your FAF altitude	- **Bug your missed Approach Altitude**

Upon reaching DA or MDA	If Approach has a DA (Decision Altitude)
	    - **TOGA**
	    - **Positive rate of climb and sufficient airspeed Flaps Up**
	    - **"NAV"**

	- **"FLC"**
	If Approach has MDA (Minimum Descent Alt)
	   - *Upon reaching MDA*
	       - ***"ALT"***
	   - *Upon reaching Missed Approach Point*
	       - **TOGA**
	       - **Positive rate of climb and sufficient airspeed Flaps Up**
	       - **"NAV"**
	       - **"FLC"**

Vectors to Final

After getting the weather	Load expected approach from the closest "IAF"
ATC assigns you heading for "Vectors to Final"	- "HDG" - "PROC" - "Activate Vectors to Final"

ATC reads "Turn Right/Left Heading ___ maintain ____ ft until established cleared for ____ Approach"	- **Twist heading bug to desired heading**
	- **Verify altitude is accurate**
	   - If not then bug it and press **VS** and descend to the desired altitude
	- **Press "APR"**
	   - Verify NAV armed and GP/GS armed.

Once established at FAF altitude or GS/GP intercept altitude and on the final approach course	- **Bug the missed approach altitude**

Upon reaching DA or MDA	If Approach has a DA (Decision Altitude)
	   - **TOGA**
	   - **Positive rate of climb and sufficient airspeed Flaps Up**
	   - **"NAV"**
	   - **"FLC"**
	If Approach has MDA (Minimum Descent Alt)
	   - *Upon reaching MDA*
	       - ***"ALT"***
	   - *Upon reaching Missed Approach Point*

	- **TOGA** - **Positive rate of climb and sufficient airspeed Flaps Up** - **"NAV"** - **"FLC"**