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How to Navigate Using a VOR

VOR, short for VHF Omni-directional Range, is a type of radio navigation system for aircraft. VORs broadcast a VHF radio composite signal including the station's Morse code identifier (and sometimes a voice identifier), and data that allows the airborne receiving equipment to derive the magnetic bearing from the station to the aircraft (direction from the VOR station in relation to the earth's magnetic North, at the time of installation). This line of position is called the "radial" in VOR parlance. Pilots then use this information to determine their exact position and navigate to their destination. This article assumes you already have some basic working knowledge of flying an aircraft.

Steps

1 **Tune and identify**. Tune the VOR frequency in the navigation radio. It will be listed on and IFR charts as well as instrument approaches if it is a part of the approach. Identify you have the correct station and the signal is reliable by listening to the Morse code ide

2 **Get your bearing.** Determine which radial you are on by turning the OB Selector) knob until the CDI (Course Deviation Indicator) needle is cent FROM indication.

Looking at the picture to the right, you can see that the needle is cente FROM indication (small white triangle pointing to "FR"), so the aircraft is radial. It doesn't matter what the heading of the aircraft is, it is located s 254° from the VOR station. In order to fly to the station, you would first the needle is centered and the white triangle points to "TO." Note that th exactly 180° from the current radial. Now turn the aircraft to this new heading and keep the needle centered- this will take you to the VOR station.

Intercepting a Course

1 **Fly the heading of the desired course.** You can find the heading of an airway on either a VFR or IFR chart. Set the course into the OBS and turn the aircraft to fly that heading. Once established on

the heading, note the position of the CDI. If it is to the right, your course is to the right. Likewise, if it is left, the course is left.

2 **Intercept the course**. Turn 30 degrees in the direction of the CDI to intercept the cour Although 30° is most common and easy to use, you can use any intercept angle. For ir if you are far enough from the desired course, it may take more than 30° to intercept th course before reaching your destination.

3 **Track the course**. As the CDI moves close to the center, turn your heading to match t course. Keep the needle centered to stay on course. If it starts drifting left, turn left to g on course.

Tracking inbound (towards the station) and outbound (away from the station) radials is the same, except you should get a TO indication when flying inbound and a FROM indic when flying outbound on a radial.

4 **Adjust for wind**. If you find yourself blown off course by the wind, intercept the course a wind correction angle (WCA) of about ten degrees into the wind. If that is not enough increase the WCA. If it is too much, decrease the WCA until the CDI centered.

Identifying an Intersection

Sometimes you may need to identify an intersection of two VOR radials. This may be a point where the airway changes heading, to intercept another airway, a change in minimum altitude for IFR flights, holding point, or a reporting point for ATC. The intersection can be determined by using two VOR radials or sometimes one VOR radial and Distance Measuring Equipment (DME).

An inter displayed chart

1 **Tune and identify both VORs just as before**. Two VOR receivers are best, but you c identify an intersection with one VOR by switching the frequency and comparing the ra

both VORs.

2 **Set the OBS**. Use the OBS to set the correct radials from each VOR. The radials will b displayed on VFR and IFR charts. On VFR charts, the arrows identifying the intersectic to the VOR, while the arrows on an IFR chart point **from** the VOR toward the intersecti

3 **Wait for both CDI needles to center**. While tracking the course on one VOR, watch t VOR to see when the CDI centers. When both needles are centered, you are on the intersection.

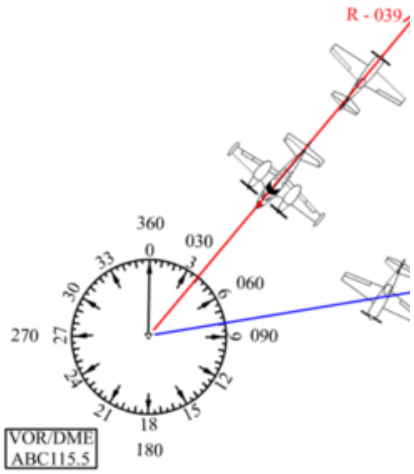
- Use DME to eliminate the need for a second VOR. While tracking the VOR radial, us DME to find your distance from the station. DME distances will be displayed on IFR when it can be used to identify an intersection. For example, WARIC intersection is by the 238 radial from the VOR and the 21 nm DME fix.
- Occasionally a localizer may be used in place of the second VOR. The procedure is the same, but note that the localizer will be twice as sensitive as a VOR.

Video

Navigating in FS9 using a VOR radial.
Aircraft is the Carenado Cessna 182.

Tips

- Always fly the heading shown on the OBS when tracking a course to avoid reverse sensing
- It doesn't matter what the heading of the aircraft is, the VOR will aircraft is on.



- VOR radials are measured from magnetic north, not true north.
- If you see a red flag instead of a a TO/FR indication, the signal is unreliable or you are overhead or exactly 90° from the selected radial to the station. The signal is unreliable whe you cannot hear the Morse code identifier.
- When using a VOR for IFR flight, make sure you have a VOR check within the past 30 day

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