

JEPP'S BRIEFING



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Segments on Approach Charts

It is quite fascinating to look at the TERPs criteria to understand some of the background used by the FAA to create instrument approach procedures, but all the knowledge in the world doesn't help until we start making applications to the real world. We'll look at the Manitowoc, Wisconsin VOR or GPS Rwy 17 approach chart to apply part of the theory to actual practice.

Let's assume you are arriving from the north over the Green Bay VOR and you have a communications failure. Since the FARs state that you can descend out of your enroute altitude when you have arrived "over the fix from which the approach begins," can you start down over Green Bay or do you have to wait until over the Manitowoc VOR? If you look over the Manitowoc VOR facility box, you can see the small letters "IAF" in parentheses on top. This means the MTW VOR is the initial approach fix and the approach begins at the MTW VOR when arriving from Green Bay.

If you are at a relatively low altitude over the MTW VOR, you can make a right turn at the VOR and proceed outbound for the procedure turn. While you are in the procedure turn, you are in the initial approach segment and therefore have 1,000 feet of obstacle (and terrain) clearance. This gives you a good buffer, but remember that instrument approach procedures are graphic representations of FAR Part 97 so that if you descend below the specified procedure turn altitude too early, you are in violation of FAR Part 97.

NoPT

When you arrive from over Green Bay, it looks pretty easy to just "slide over" to the left and catch the 166° inbound course, which would make it simple to "shoot" a straight-in approach. Since the inbound course from Green Bay is so close to the final approach segment, it may look like a natural to use 166° and eliminate all the flying for the course reversal — And it is less than 30° difference. Is it legal? Is it authorized? How can you tell?

The Chart Clinic – Twentieth in a Series

It is expected that you will perform the procedure turn every time you arrive over the fix that starts the procedure turn - *except* - when the letters "NoPT" are shown on the feeder route that goes to the fix. NoPT stands for No Procedure Turn. According to the FARs, this means not only that no procedure turn is expected, but that you also cannot even execute the procedure turn unless you notify ATC of your intentions to fly a procedure turn.

Since the letters "NoPT" do not appear on the route from Green Bay, a procedure turn is required. However, there is an exception to the NoPT statement. When you're given radar vectors and the controller clears you for the "straight-in approach," the approach clearance specifies that no procedure turn is required (or authorized).

Excessive Altitude

The next question for the communications failure from Green Bay is "If I am at an excessively high altitude, where should I lose all the altitude?" First, look at the "target" altitude for the approach after the MTW VOR and it is the procedure turn altitude at 2,400 feet. That is the first altitude after passing MTW VOR outbound. If your descent rate will get you comfortably down to 2,400 feet within the procedure turn distance, then the procedure turn is a good option.

If the altitude change is too much, you can enter the holding pattern and descend while holding. But the next question might be, "How to get out of the holding pattern and do the approach?" The FAA has said that a race track course reversal is an authorized substitute for the procedure turn and the holding pattern can be considered a race track procedure.

The minimum altitude for the race track course reversal is 2,400 feet, the same figure as the procedure turn altitude. When down to 2,400 feet, the next altitude is 1,340 feet. The descent from 2,400 can be initiated when established on the inbound course of 166°. As soon as you are inbound, you are now on the final approach segment.

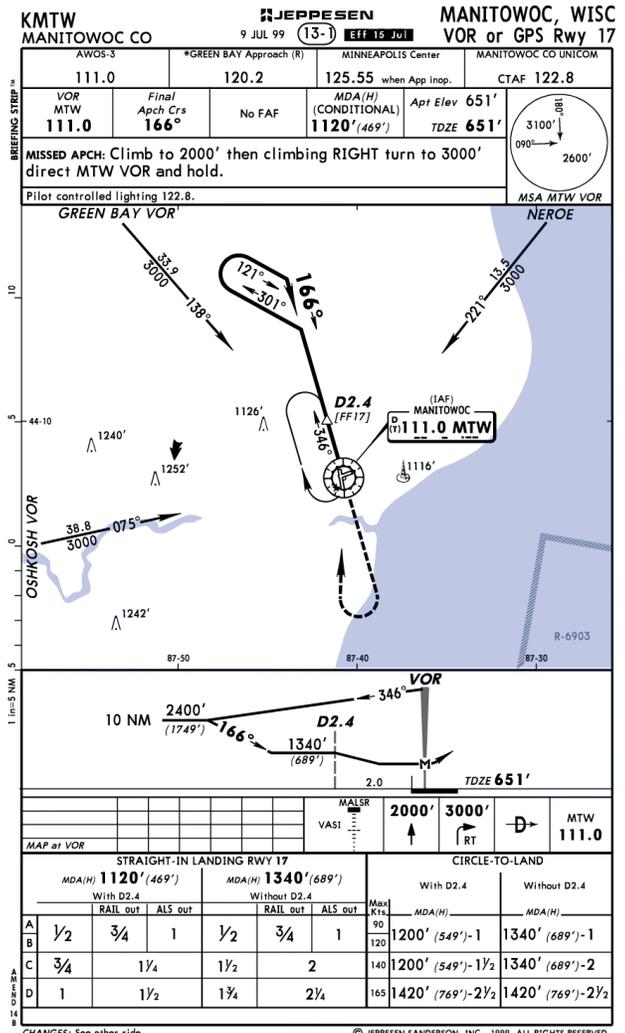
Intermediate Segment

What happened to the intermediate segment? On the VOR or

GPS approach to runway 17 at Manitowoc, there is no intermediate segment. The procedure turn is the initial approach segment until intercepting the inbound course and then you are on the final approach segment. In this case, there is no final approach fix. In FAA and ICAO procedures, the intercept point to the final approach segment is known as the final approach point. It is not a fix since the exact location varies depending on how the approach is flown, where the wind is coming from, the speed of the airplane, and other variables.

Final Approach Segment

In the plan view, there is a fix identified as 2.4 DME from the MTW on the 346° radial. When flying outbound to the procedure turn, it has no significance. It is, however, important when inbound on final. Since this approach is an "or GPS" approach, it is an overlay approach where a certified IFR approach GPS receiver is allowed to fly the



approach without the availability of the VOR. Along with the DME distance at the fix, the alphanumeric characters "FF17" appear in brackets below the D2.4.

All fixes in the GPS database must have an identifier. When the FAA establishes a five-letter identifier that is pronounceable and unique, the FAA's identifier is used for the fix in the database. When an FAA identifier is not established, a unique five-character identifier must be established for the fix. The ARINC 424 Specification titled *Navigation Database Standards* has been established by industry and government representatives worldwide and includes standards for how waypoints and fixes will be identified when names are not provided by government authorities.

Since the FAA requires that all GPS approaches have a final approach segment that begins at a final approach fix and ends at a missed approach fix, a "pseudo FAF" is established at a location according to specifications established by the FAA. Once the pseudo FAF is established, then the ARINC 424 rules are applied to create the waypoint identifier. Basically, the ARINC rules state that a final approach fix should use the letters "FF" followed by the runway number. Other fixes use letters that are appropriate to their use on approaches. For example, missed approach fixes use the letters "MA," stepdown fixes use the letters "SD," runway fixes use the letters "RW," etc.

At Manitowoc, the identifier FF17 is used for the waypoint identifier in the database for the "pseudo" FAF. One of the important reasons for the pseudo FAF is that it is the location where the course deviation indicator changes to final approach sensitivity.

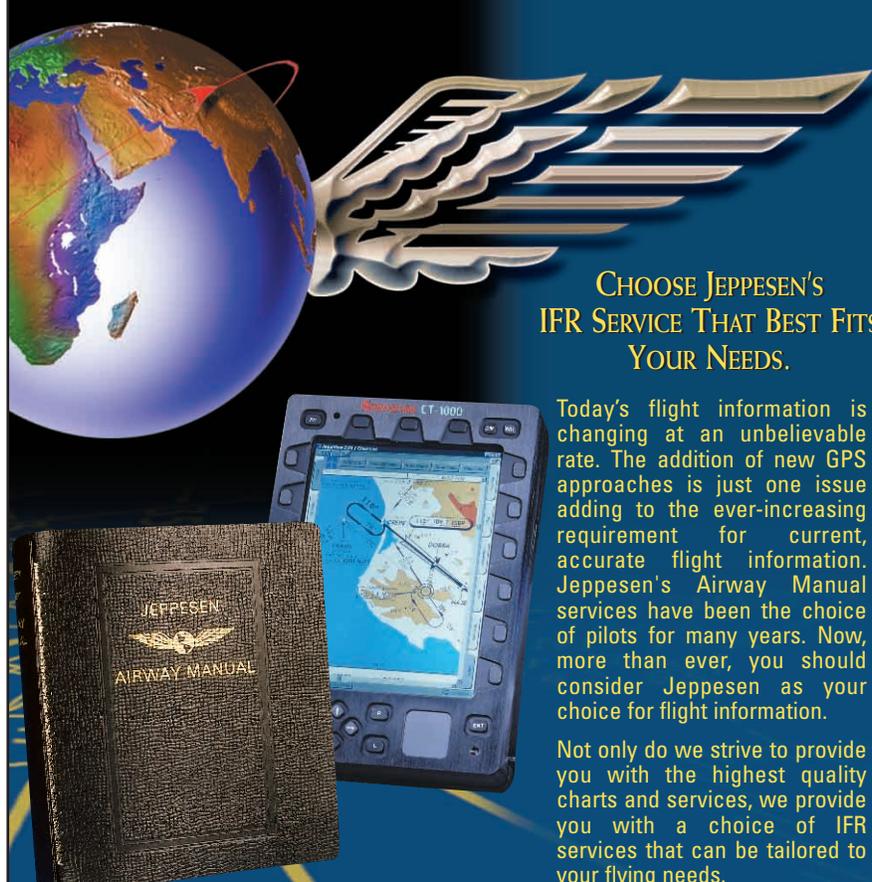
If your airplane is equipped with either a DME or approved GPS receiver, you can descend down to the straight-in landing minimums once you have passed 2.4 DME or the FF17 waypoint. For a straight-in landing, the MDA is 1,120 feet. If you don't have either of these receivers in your airplane, then the altitude of 1,340 feet at the 2.4 DME is your MDA.

In either case, the final approach segment ends at the MTW VOR. By the time you reach the MAP, and if you are still at the MDA because you haven't had visual contact with the runway or its environment, it is really too late to land if you see the runway at the MAP. The descent gradient from the VOR at the MDA can't make a landing happen. A missed approach is then initiated.

Missed Approach

The icons below the profile view indicate an initial climb to 2,000 feet, followed by a right climbing turn to 3,000 feet, and then direct

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to the MTW VOR. The missed approach text completes the missed approach instructions with an indication to hold. The graphic depiction in the plan view shows the hold on the 346° radial. The instrument approach ends at the missed approach hold.

In the next article, we will continue to apply the segments to approach charts.



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