

NavMaster User Guide

***NavMaster* is a simple HSI application designed for general aviation pilots to practice instrument flying (holding, precision and non-precision approaches) to small airports that have limited or no instruments approaches at all.**

Typically if a pilot is based at a small airport and wishes to fly a practice ILS approach, he must fly 20+ minutes from his home field to do so. The NavMaster APP allows this pilot to practice an ILS approach right at his home field OR AT NO FIELD AT ALL.

Prior to Takeoff

1) Insure that you have a good gps signal and will be able to keep this signal through out the flight. Your iPhone/iPad may show excellent gps information at the beginning of the flight but this may not last for the entire flight. When you place your iPhone/iPad in a position to see the screen (on your panel or kneeboard) , the gps information may be replaced with cell tower positioning. Cell tower positioning will definitely not be accurate enough for the *NavMaster App*. NavMaster uses altitude, track and position information provided by your gps. Cell tower information provides only approximate position data and does not provide track nor altitude.

It is recommended that a WAAS GPS with a bluetooth connection be used to provide *NavMaster* with the required data. Traditional gps positioning is accurate to within 15 meters (about 50 feet). WAAS-enabled gps is accurate to less than 3 meters 95 percent of the time. The bluetooth connection is recommended to eliminate additional wires in the cockpit but not absolutely necessary.

WARNING ! NavMaster is for Practice in VFR weather conditions only!

2) After the engine run-up, run *NavMaster*. Respond to “USE PREVIOUS LOCATION”. Answering “No” will use the current location as your landing spot and answering “Yes” will use the previous location. Should you use *NavMaster* on takeoff and fly and land at a second location, re-run *NavMaster* and answer YES to this question. This will allow you to fly a practice precision approach to the original departure location.

3) Respond to the “**VFR ONLY WARNING**” by pressing the blue button in the center of the HSI.

4) Enter the runway heading in degrees true (adjust the runway compass heading for local variation). Subtract west variation and add east variation. Should you input a number greater than 360 you will be directed to “**QUIT APP! START OVER!**”.

TAXI INTO POSITION AND TAKE OFF

What occurs next is strictly automatic but it is worth mentioning. If you are using an iPhone you will notice that the compass card will track as you turn on to the runway because it is being driven by the internal compass. However, since the iPad does not have an internal compass nothing happens until the takeoff roll. At that time the gps track will drive the compass card. At 20 knots a red arrow will appear (points at the touchdown point) and the DME will show the distance to the touchdown point.

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INTERCEPTING THE FINAL COURSE INBOUND

When you are flying toward the touchdown point and also within 20 degrees of the runway heading, the CDI and glide slope indication will appear. The glide slope is set at 3 degrees and each dot on the CDI represents 5 degrees deviation from centerline.

NON-PRECISION APPROACH

In order to practice a non-precision approach press the “glide slope off” button. This will simulate a VOR approach where the VOR is located at your touchdown point.

HOLDING PRACTICE

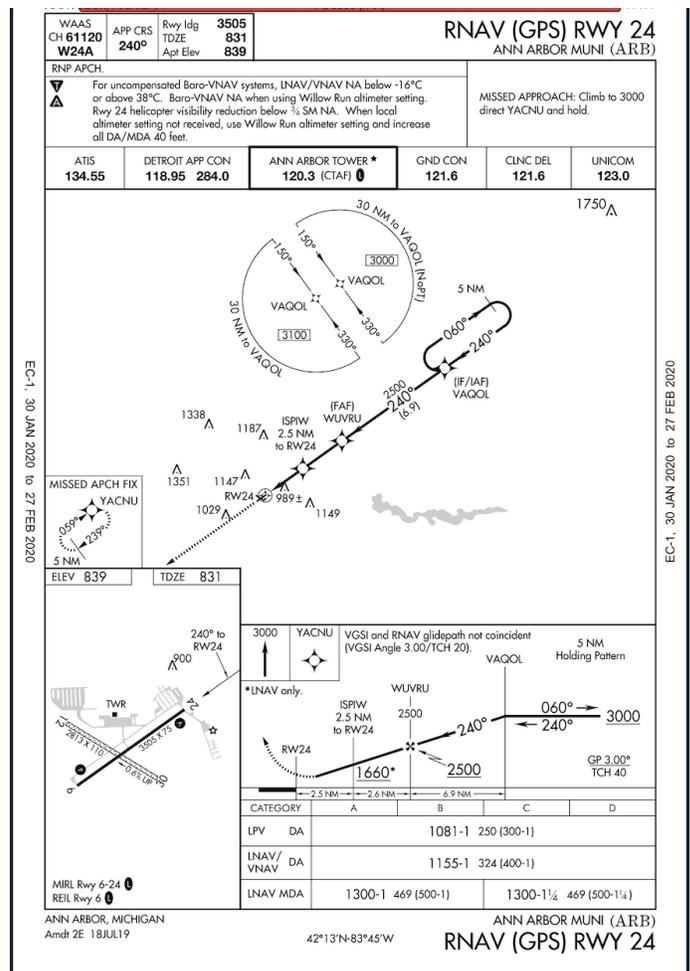
Holding practice can be accomplished at any place in your “practice area”. Simply turn the APP “OFF” and then “ON” at your desired holding location. The runway heading will represent the inbound holding course. Press the “G/S Off” button and fly away from the simulated VOR. Return to practice the various holding entry procedures (teardrop, parallel, direct) and enter holding.

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How to Practice Instrument Approaches Away From Any Airport

The greatest benefit and the original purpose of NavMaster was to be able to teach instrument flying in a non-IFR airplane and in the local practice area (not at any airport). There are days when you are assigned an aircraft with an inoperative ILS or when the airport traffic pattern is too busy to accept practice approaches. These are the days to go to your local VFR practice area and pull out *NavMaster*. For example, to practice the RNAV (GPS) RWY 24 at Ann Arbor Muni proceed as follows:

- 1) Insure your iPhone/iPad has good gps signal (best result use external WAAS gps with bluetooth connection).
- 2) Insure *NavMaster* is OFF.
- 3) When in the local practice area, proceed to a recognizable spot (pond, lake, barn, etc.) and maintain 2000 MSL (this will establishes pseudo airport elevation to 2000')
- 4) Add 1000' to all minimums on the approach plate.
- 5.) Run *NavMaster* and answer No to "USE PREVIOUS LOCATION, acknowledge VFR ONLY WARNING and place 240 degrees in the Runway



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Heading input box (no need to correct for True heading because there is no actual runway).

6) When over the “recognizable spot” at 2000’ press OK on the Runway Heading Input screen. This will establish the end of the pseudo runway at your selected spot. The red arrow will appear and point to this spot and the DME will report the distance to the spot.

7) Proceed to the Northeast for at least 15 miles and climb to 4000’.

8) Proceed back inbound to intercept the CDI on the 060 degree radial (240 inbound).

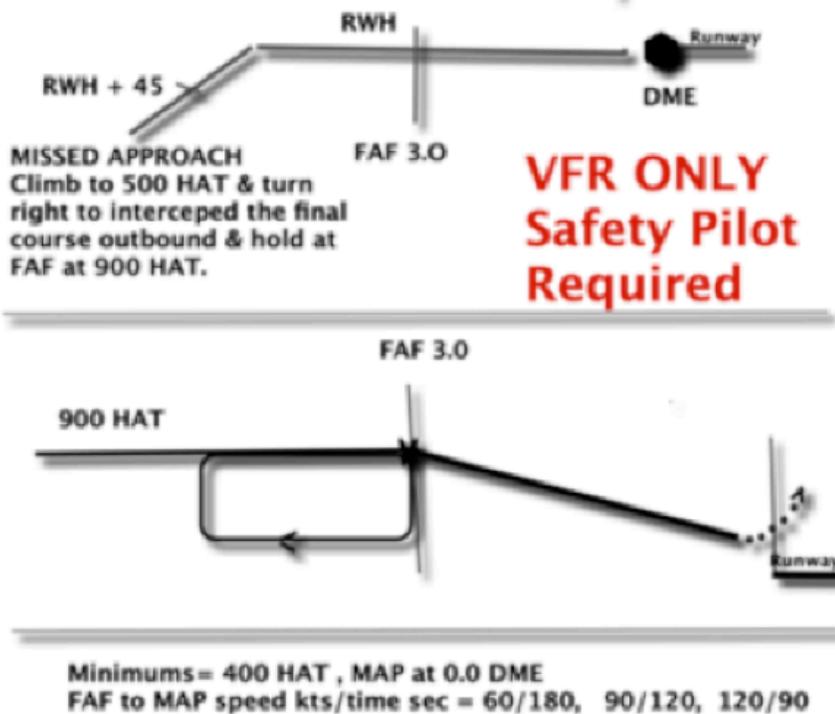
9) Intercept the glide slope and begin descent. (should you want to fly a non-precision approach, select GS OFF).

10) At the minimus (listed minimums + 1000’) execute the missed approach.

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EXAMPLE APPROACH PLATE

Practice Only Approach Plate



LEGEND

DME - On the approach plate is the identifier for the distance-measuring device that is located at the runway touchdown point.
FAF - Final approach Fix
MAP - Missed approach Point
HAT - Height above touchdown.
RWY - Runway heading.

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