Pathfinder Setup and Calibration using Mission Planner

Most of this is from Earl Haury, so, we owe him a big thanks for the information. For warnings and a potential problem solution, see the end of this article.

Flight Coach is the latest tool to help improve your flying. It records your entire flight with the ability to playback each individual maneuver as you or the judge might see.

Pathfinder & Flight Coach

Some things to know before you start:

Mission Planner (MP) is an app that provides the tool for calibrating the Pathfinder (PF).

Flight Coach Plotter is the tool you will use to display your flight.

Configuring and Installing Pathfinder.

Download and install Mission Planner on your computer. Choose the most recent "Stable" version from: https://firmware.ardupilot.org/Tools/MissionPlanner/ When installed, open the app.
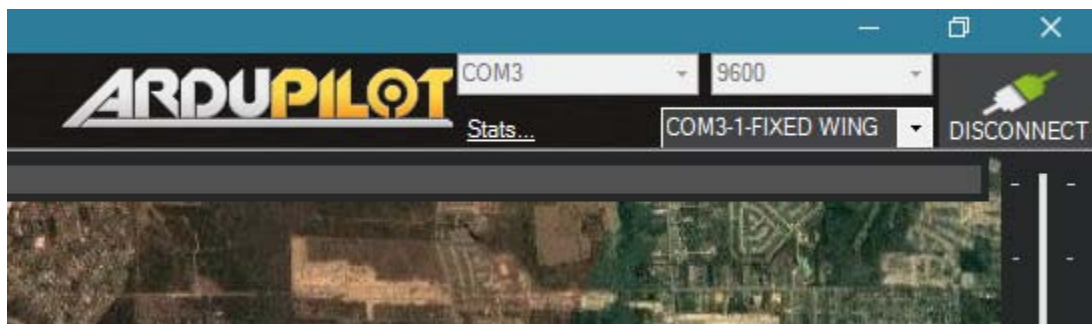
**Connecting to Mission Planner**

- Plug the Pathfinder into the PC USB
- In Mission Planner, in the top right near the "CONNECT" box is a pull down menu for selecting the "Com Port". Click the arrow on Com Port, and select "Auto"
- Click "Connect" on the upper right of the screen. Sometimes this fails! If so, first check that the USB cable is tightly plugged into the Pathfinder, the case can limit the depth some cables can be inserted giving a poor connection. (N.B. This can also cause a disconnect during calibration.). Make sure the USB cable is of good quality. Ardupilot FAQ provides more info if connecting doesn't work. I've had no problems with 2 Pathfinders.

A box will open while the Parms1 file is loaded. Then another box pops up offering to load new firmware. You don't need this so "Close" the box.

If you **don't** have FIXED WING in your Com box as shown in the picture above then from the "Setup Menu" select "Install Firmware" and select "Plane…"

Preparing PF for Calibration

You should now be connected to PF.
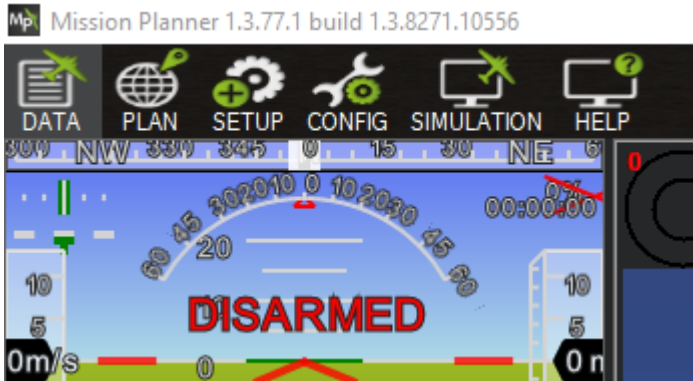
- Select "Config" (top left hand corner), then "Full Parameter List"(down on the left side). Note that the Flight Coach parameter file is pre-loaded in Pathfinder so changing the parameters is not necessary other than the one below.
- 'OK' the 'Raw Param Warning'.
- Scroll down to "Arming_req", change the 0 to a 1, and click "Write Parameters" (top right of the screen, 3rd box down). This disarms the device prior to the calibration step.
- A box will pop up asking 'Are you sure' click 'OK'. Another box pops up 'Parameters successfully saved', click 'OK'.

These steps are necessary for Accel and Compass calibration to be performed in the next section.

Calibrating the PF

On the top left of the Mission Planner screen
- click "Setup"
- then select "Mandatory Hardware".

Complete the "Accel Calibrate", "Level Calibrate", and "Compass Calibrate" steps on the bench as described below.

Accel Calibration

Complete the accel calibration by following the instructions, making sure to fairly accurately placing the unit level and vertical as requested. It is like a four point roll and a vertical up and down line.

Compass Calibration

You will only be calibrating one compass. First determine approximately where compass North is. You will rotate all 3 axis about his imaginary line.

Point the arrow on the PF towards North and slowly rotate the unit nose to tail (imagine a small loop). Now reverse this rotation.

Place the unit facing East West and slowly complete a horizontal roll. Now reverse the roll.

This should move the green bar all the way to the right, when a 'MAG_CAL_SUCESS' message pops up. Click 'reboot'.

If the green bar fails to go all the way to the right, place the unit on a flat surface and slowly rotate like a spinning top, now rotate in the other direction. If the bar still fails to go all the way over, repeat the above rotations.

Not sure if this step is mandatory. I did not calibrate level in my plane and it seems to work OK. Install the unit in the aircraft, level the aircraft (I used an incident meter and propped the tail wheel up to ensure the plane datum line is horizontal) and return to the Accel calibration on the Setup page and perform step 3 'Simple accel calibration'.

Important: After Calibration is complete:
- Click the 'Config tab'
- Scroll down and set 'Arming Required' back to '0',
- Then click 'Write Parameters'.

Click "Data" (1st option on top left of MP page) and the artificial horizon (top left display) will respond to pitch. roll, yaw movements of the device. If this fails to work, then check that the above 'Arming Required' in the previous step was set back to '0'

The map will display compass heading and gps sats acquired. Expect 6-9 satellites indoors, 14-20 outdoors

Go Fly

Set-up is complete, install a Micro SD card and fly.

WARNING:

Do NOT buy a SanDisk Ultra 32gb disk. We tried 4 and Pathfinder would not write a bin file to any of the disks. If Pathfinder fails to write to your MicroSD card, try another type. We have had 100% success with 3 different Pathfinders using SanDisk Extreme 32gb (speed3). SP Elite 32mB is also known to work.

Pathfinder burns about 50mahr per 8 minute flight. If you draw the current from your receiver, be aware!

Difficult Problem Solved:

Problem: Pathfinder starts recording in the pit area and not after takeoff at 15 meters as designed.

You will probably see this if you turn on PF when it is exposed to the sun. It's the photons getting through the translucent case and messing up one of the semiconductors in the circuitry!!.

So in my plane this is what is happening: The canopy is off, sun is shinning on the unit as it is turned on. The PF thinks it is at some negative height. As soon as the canopy goes on the PF thinks we are at, say,

16 meters up in the air and therefore starts recording. Also most of my friends are running off their receiver battery, and as such the canopy is on when they switch the PF on so they don't have the problem.

Solution: Do NOT turn the unit on in direct sunlight or shield the case with a piece of paper, or, do as I did and cover the unit with black electrical tape (see photo)..

Nick Marson