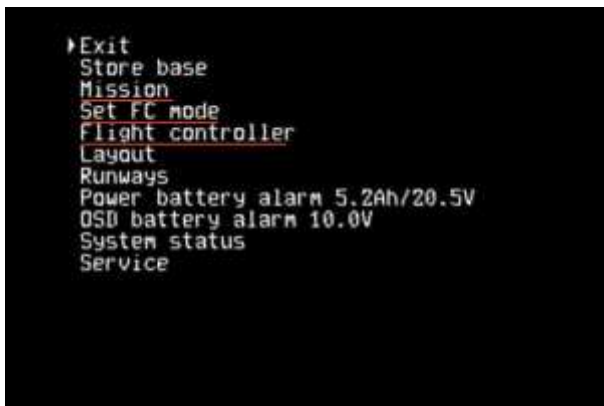


PITLABS MAVLINK FIRMWARE MANUAL SUPPLEMENT

Pitlabs OSD manual supplement addresses the use of a Mavlink capable flight controller with Pitlabs OSD. This supplement focuses on the OSD menu items MISSION, FLIGHT CONTROLLER and BASIC TUNING in the FLIGHT CONTROLLER Sub Menu. See the general Pitlabs OSD manual for detailed information on other OSD Main Menu items.

Mission Planner GCS note: In the connections boxes, upper right of the Ardupilot GUI, once a connection is made, an additional object is presented, labeled: "COMxx OSD 90". This is the mavlink connection to the OSD. If selected, the GUI only gets the OSD layout number. Select the other listing for the FC on that COM port.

Arducopter flight modes are available for change from the OSD Main Menu. Flight Controller actions are also available.



Also note full Pixhawk (or other FC) status is available on the OSD Main Menu item SYSTEM STATUS page.

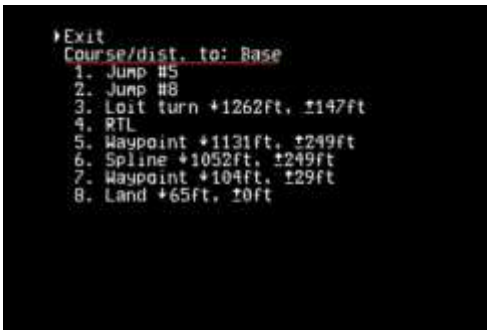


Manual Waypoint Navigation

From the Main Menu, select MISSION:



- Select Course/Dist. to: WAYPOINTS (toggles between waypoint and base went selected with radio switch)



(The arrow to the left of the Waypoint distance, in the above image, is the magnetic direction to the waypoint from present position. In the image, all Waypoints are to the south of home/base position. There are 8 possible cardinal arrow directions - N, NE, E, SE, S, SW, W, NW. Also presented is the programmed Waypoint elevation with arrow showing if the Waypoint is above or below the present altitude.)

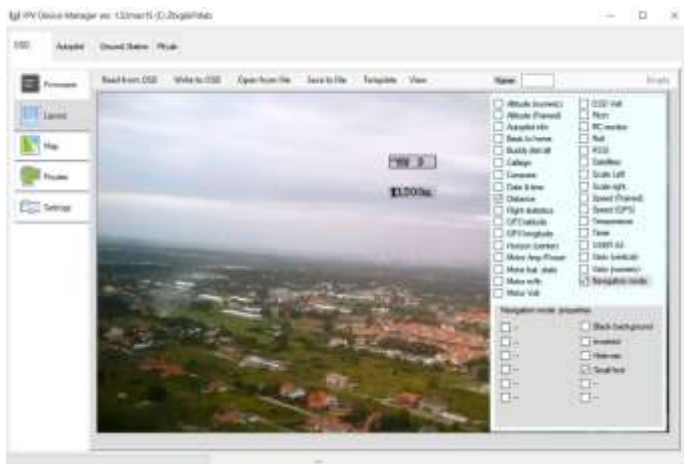
- Select a WAYPOINT (Menu closes upon selection)

- Select a Layout with the OSD horizon item and include Waypoints in the item properties

The selected Waypoint is now displayed with alternating box around number and single or double chevrons indicating if the waypoint is below, level with or above present altitude. If the waypoint is within 10m/33ft of present altitude, only the waypoint number will be indicated. A single chevron alternating with the waypoint number indicates the waypoint is more than 10m/33ft above or below the present altitude. If a double chevron is alternating with waypoint number, the waypoint is more than 50m/164ft above or below the present altitude.

Note, the chevrons also give the pilot a sense of terrain. If a pilot has programmed a Waypoint on top of a hill and the air frame is below the hill elevation and the Waypoint icon is not flashing up chevrons, then the Waypoint has been programmed too low and the air frame will fly into the hillside.

If Distance and Navigation Mode items have been included in an OSD Layout, Base will be displayed in the Navigation Mode display item and distance will alternate between Base distance and last mission Waypoint. Base distance is annotated with a " / " and the Waypoint by a flag symbol.



**** Only the active Waypoint is displayed. ****

Automatic Navigation

(Requires previously loaded "mission" by Mission Planner or other GCS)

The first method to begin Automatic Navigation from the main OSD Menu is to select FC Mode, then AUTO.

-Select AUTO



(Menu closes upon selection)

If the air frame is armed and on the ground, the air frame will take off and begin the mission.

If in flight, the air frame will now track to the first Waypoint(not a command point) from present position and continue the mission from that point, using the waypoint parameters set in GCS.

IMPORTANT NOTE: See Flight Controller|AUTO Option below

"Mini Missions" within Overall Mission

A new feature of OSD is the ability select and activate "mini missions" within the overall Mission structure. No new or additional commands are used beyond the normal Arducopter Flight Plan commands.

The Main Menu item Mission lists all the Waypoints and commands of a Mission Planner created mission. OSD presents a convenient method for selecting a flight segment from within the whole mission, using the "DO_JUMP" command.

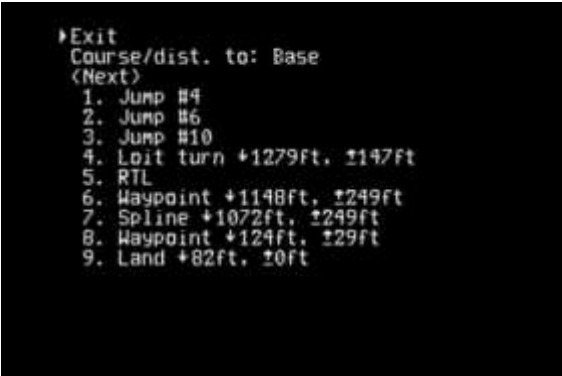
When creating a mission, the pilot may want to create flight segments within a larger mission structure. These flight segments - mini missions, are easily constructed in the Mission Planner Flight Planning framework. By building the mission in this manner, the flight segments are readily accessible individually and the pilot does not have to rely on a phone app or notebook to load and send the air frame the new mission.

On the flight Plan page, start constructing the mission with the idea of how many flight segments would be used in the overall mission. Create that number of DO_JUMP commands, i.e., 3 flight segments in the example below, create 3 commands. The pilot will return to them later to designate which Waypoints to jump to in order to start that flight segment.

From that point build the first(or main) mission and commands. The last Waypoint or command of that flight segment should be Land, RTL or Loiter Unlimited. Land will command the air frame to land at the selected point and disarm the air frame. RTL will return the air frame to the takeoff point and disarm after landing. Both will stop the overall mission at that point. Using Loiter unlimited will leave the air frame hovering at the designated point and altitude for further pilot input.

Continue to create Waypoints and commands for the next segment, using the segment ending commands last. Do this for the 3 segments.

Once the pilot is satisfied with the overall mission structure, return to the initial DO_JUMP commands and designate the Waypoint AFTER the segment ending command as the start of the new flight segment. In the below example of 3 flight segments, the first DO_JUMP command will have Waypoint #4 as the Waypoint to "jump" to, to start that flight segment. Select the subsequent Waypoints(#6 and #10) for starting a segment and enter them next to the appropriate DO_JUMP command.



```
►Exit
Course/dist. to: Base
(Next)
1. Jump #4
2. Jump #6
3. Jump #10
4. Loit turn +1279ft, ±147ft
5. RTL
6. Waypoint +1148ft, ±249ft
7. Spline +1072ft, ±249ft
8. Waypoint +124ft, ±29ft
9. Land +82ft, ±0ft
```

Now the pilot has an easy method of selecting a flight segment since the Jump commands are at the top of the Mission menu list and the pilot does not have to scroll through what could be a long waypoint list.

IMPORTANT NOTE: If the pilot is starting any mini mission from a non AUTO Flight Mode except the primary or first one, the AUTO Options field in Flight Controller|AUTO Option item MUST be set to RESUME MISSION. If left in Restart Mission any mini mission JUMP command will be ignored and the overall mission will be restarted at the first Waypoint. If a JUMP command is invoked while the flight controller is in AUTO, then the JUMP command will activate.

Tip: The best technique is to leave the AUTO Options item in Resume Mission. That way, any command selected on the Mission list will activate. The pilot can always invoke a Restart Mission(from the beginning) by selecting the first Waypoint of the overall mission.

Also note that if there are more than 9 Waypoints or commands, there will be additional pages.

```
►Exit
Course/dist. to: Base
<Next>
1. Jump #9
2. Jump #6
3. Jump #10
4. Loit turn +1279ft, ±147ft
5. RTL
6. Waypoint +1148ft, ±249ft
7. Spline +1072ft, ±249ft
8. Waypoint +124ft, ±29ft
9. Land +82ft, ±0ft
```

```
►Exit
<Previous>
10. Loit turn +1744ft, ±249ft
```

Other Flight Controller Options

FLT Controller Sub Menu

```
►Exit
Trigger camera
Set altitude
Fence: Enabled
Arm
Basic tuning
Preflight reboot
AUTO option: Resume mission
```

-Trigger Camera

Shutter release for appropriate camera mounted to the air frame (Menu closes upon selection)

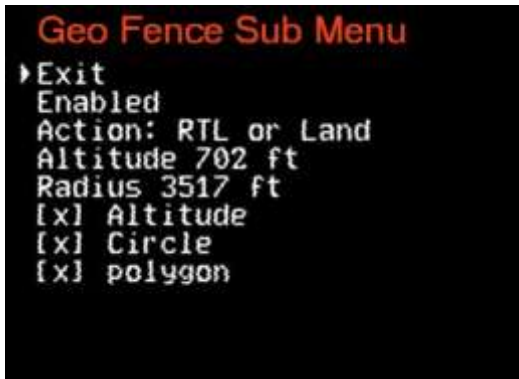
-Set Altitude

```
►Exit
150 ft
300 ft
500 ft
700 ft
1000 ft
1500 ft
2000 ft
2500 ft
3000 ft
3500 ft
```

Selects enroute altitude (Menu closes upon selection)

-Fence: (Enabled/Disabled)

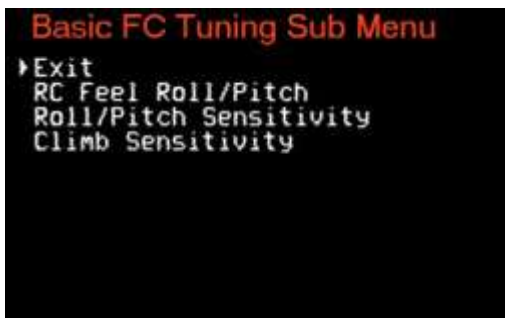
This item allows the pilot to enable or disable the Geo Fence, change the action when the fence is encountered, set altitude and radius parameters and individually enable/disable altitude, circle or a polygon fence if one programmed in the FC.



-Arm

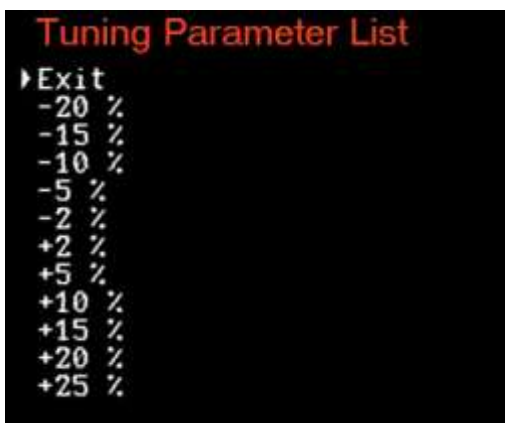
Arms air frame (Menu closes upon selection and appropriate tones are heard from FC)

-Basic Tuning



This item allows the pilot to modify the tuning parameters.

All three items have the same numeric list

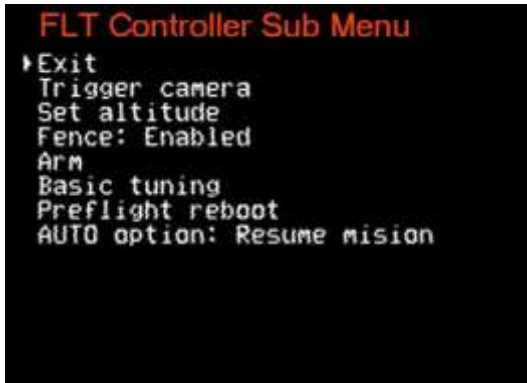


OSD will retain these changes and are percentage changes in total. If the FC has different values for pitch and roll, those are preserved with the OSD values layered over them.

-Preflight Reboot

This option is only visible in the sub menu IF the air frame is disarmed.

-AUTO Option



There are two AUTO options: Restart Mission and Resume Mission

When the pilot is presented with the sub menu, AUTO option will always list the last state of the option. In the above image, it is Resume Mission.

To change the option, select AUTO option and toggle it active with the designated radio switch.

Restart Mission is the same as AUTO FC mode where the air frame will restart the mission from the first Waypoint, with the additional step of invoking AUTO FC mode after selecting Restart Mission.

Resume Mission will command the air frame to join the mission at the next Waypoint past where the flight was interrupted. Example: mission has proceeded past Waypoint #4 ("reached command #x" will be seen in OSD) and is interrupted. The mission will resume at Waypoint #5.

**Both options require the pilot to then invoke AUTO FC Mode from the Main Menu.
