

GEOG 892: Geospatial Applications for Unmanned Aerial System (UAS)

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Quick Instructions on "Mission Planning" Software

The Mission Planner, created by Michael Osborne, does many activities among them are the following features:

- Point-and-click waypoint entry, using Google Maps/Bing/Open street maps/Custom WMS.
- Select mission commands from drop-down menus
- Download mission log files and analyze them
- Configure APM settings for your airframe
- Interface with a PC flight simulator to create a full hardware-in-the-loop UAV simulator.

1) Connect to learn about "Mission Planner":

<http://ardupilot.org/planner/>

2) Down load the installer from:

<http://firmware.ardupilot.org/Tools/MissionPlanner/>

3) Install the "Mission Planner".

Creating a Flight Plan in Mission Planner

1) Creating a Mission:

- Start the Mission Planner application by double-clicking the MissionPlanner.exe
- Select Flight Plan on the toolbar located at the top of the window (Figure 1). The map window shows one of many available satellite/map backdrops. On the far right of the screen, in the Action panel, is a drop-box that allows you to change to other map types. GoogleHybridMap is the recommended setting.

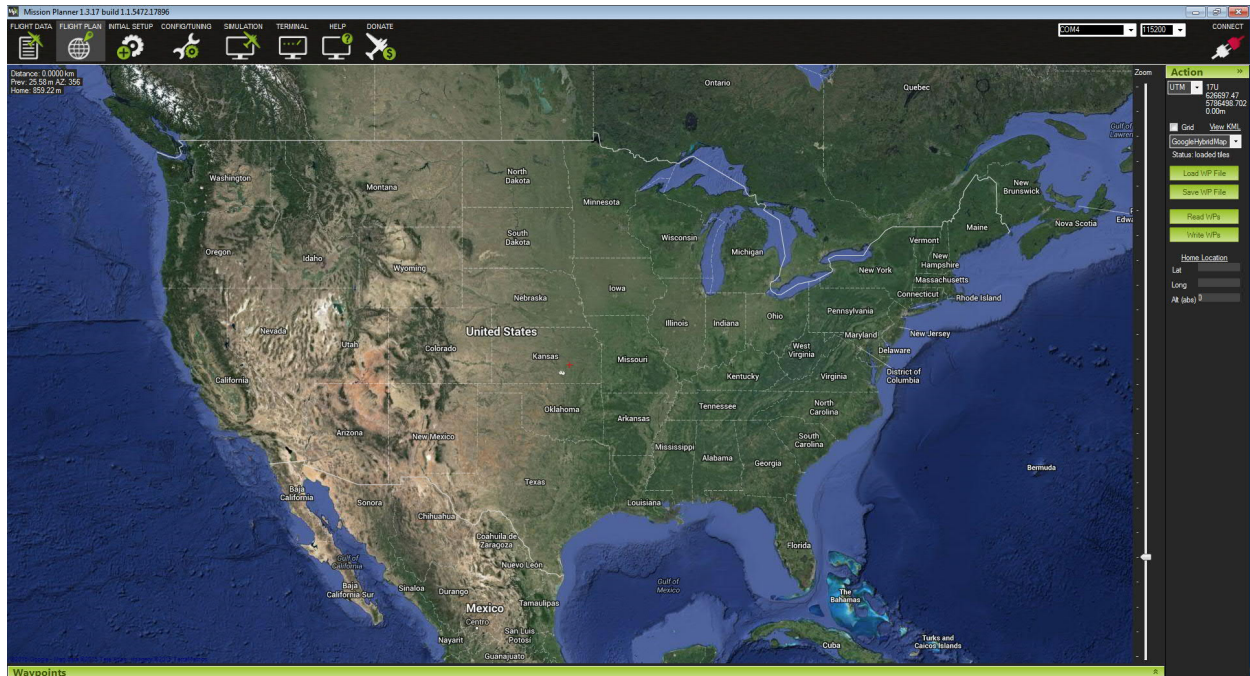


Figure 1 Mission Planner main window

2) Establishing a Mission Launch Point: Home

- Pan/Zoom using the left-mouse button and mouse wheel. Locate the area for which you want to create the aerial survey.
- In the Action panel is a section labeled Home Location with Lat, Long and Alt fields. Left-click in the Lat box. A prompt will appear in the map window instructing you to "Click on the Map to set Home". Click "OK" and then click a spot in the map from which you plan to launch your flight. A Home waypoint icon should appear at the selected location and the Lat/Long fields should update accordingly. Also you can right click at any location in the map and select "set home here"

3) Creating the Mission Boundary

- Right-click at a location in the map view at which to begin drawing the mission boundary and select Draw Polygon>Add Polygon Point. Continue with left-clicks to complete the polygon. Existing points may be repositioned by left-clicking and dragging them. Right-click and select Draw Polygon>Clear Polygon to start over. Polygons may be loaded or saved from this same menu item. Figure 2.

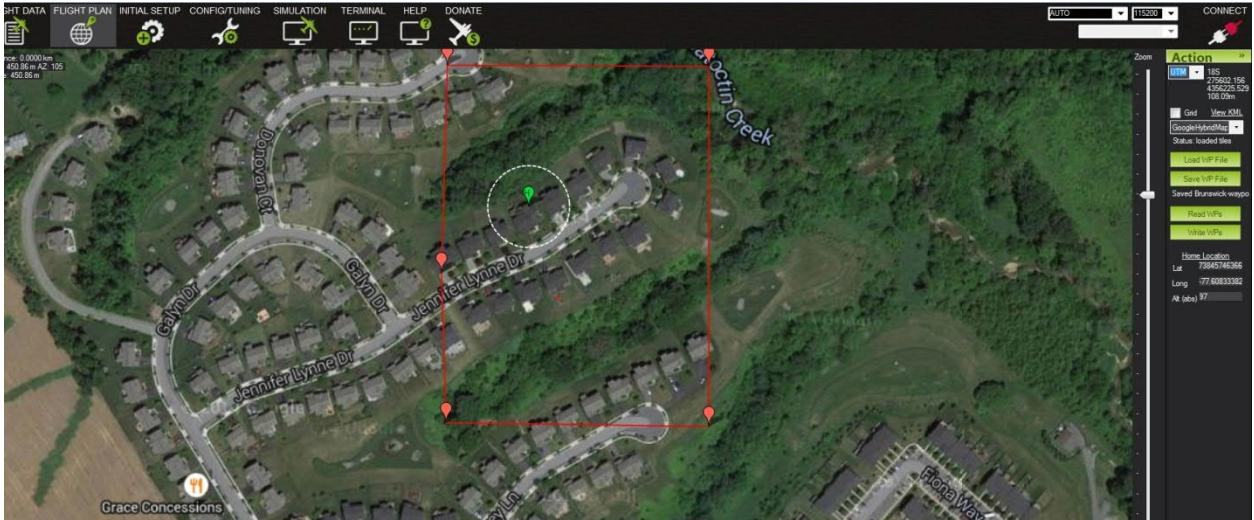


Figure 2 Creating project's boundary as polygon.

4) Creating the Flight Lines

- Once a polygon is defined (and, optionally, saved), right-click and select Auto WP→Survey (Grid). This opens the survey planning tool which is populated with flight lines created from settings used for the last planned mission (Figure 3). There will be three tabbed panels to the right of the map display which allow you to customize the mission to your specifications. Note that if only a single tabbed panel is visible, check the "Advanced Options" checkbox at the bottom of the panel.



Figure 3 Flight Plan Parameters settings

5) Setting Basic Flight Plan Parameters

On the "Simple" tab (Figure 4), select your camera. Altitude should be set such that you obtain the desired Ground Resolution which is visible in the bottom left Stats section of the window (Error! Reference source not found.).

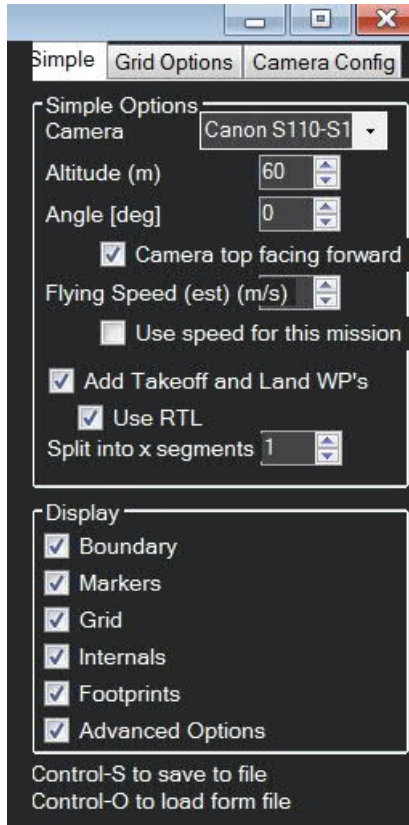


Figure 4 "Simple Options" settings

6) Setting Overlap and other Options

Select the "Grid Options" tab, Figure 5, and verify that the OverShoot values are zero (these are used for fixed wing aircraft), the Overlap or forward lap is usually 80% and Sidelap is 60%. "Start From" should be set to one corner of the polygon such that the travel from Home to and from the beginning and ending waypoints is minimized. Delay at WP should be zero; Heading Hold unchecked.

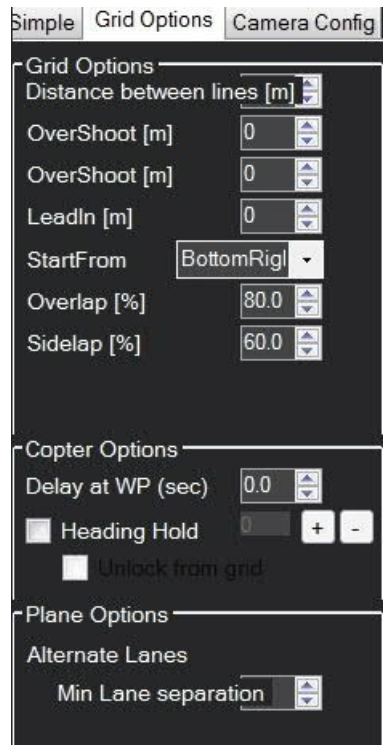


Figure 5: "Grid Options" settings

7) Setting Camera Information

On the "Camera Config" tab, select your camera information and confirm that CAM_TRIGG_DIST (Camera trigger by distance) is the selected Trigger Method, Figure 6.

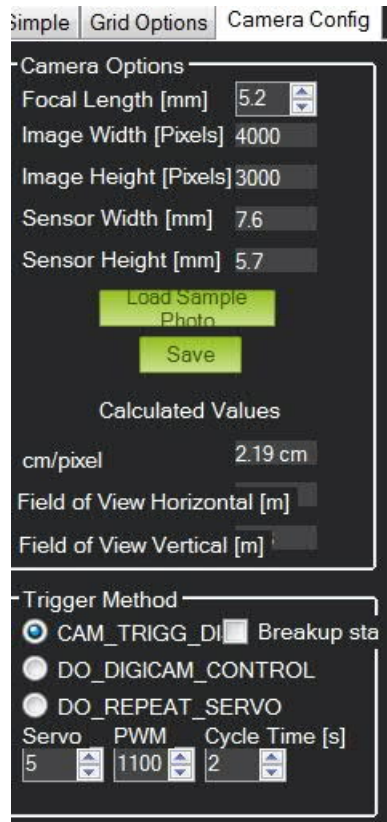


Figure 6 "Camera Configuration" Settings

8) Accepting the Flight Plan

Once you confirmed all the settings, click "accept" in the green box in the bottom right of Figure 3. Flight lines will be layout as is in Figure 7.

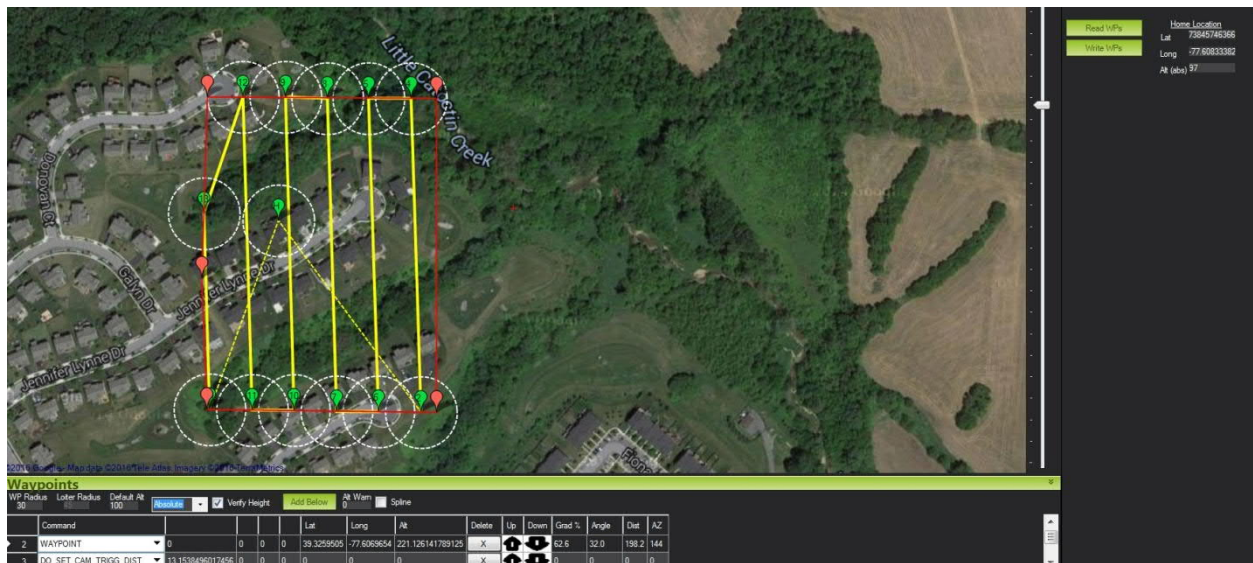


Figure 7 Completed Flight Plan.

9) Saving the Flight Plan

Details of the flight plan can be saved by clicking on “save WP File” option of the “Action” options at the right side of the flight plan view, Figure 8.

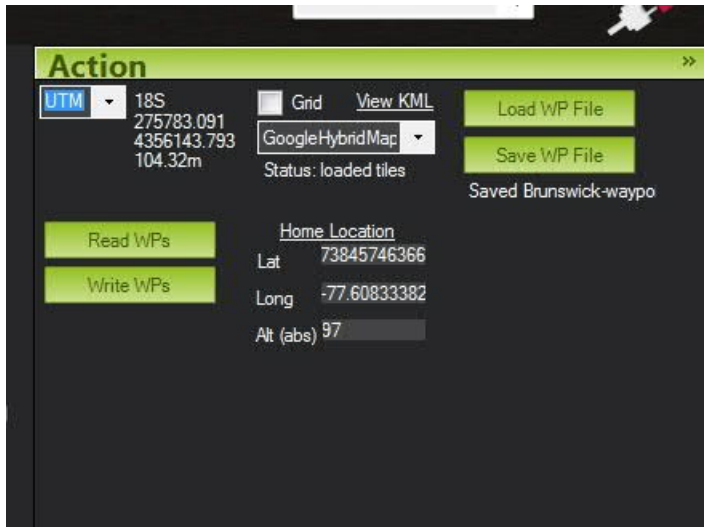


Figure 8 Save WP file.