

A simple implementation of this system uses ardupilot and mission planner

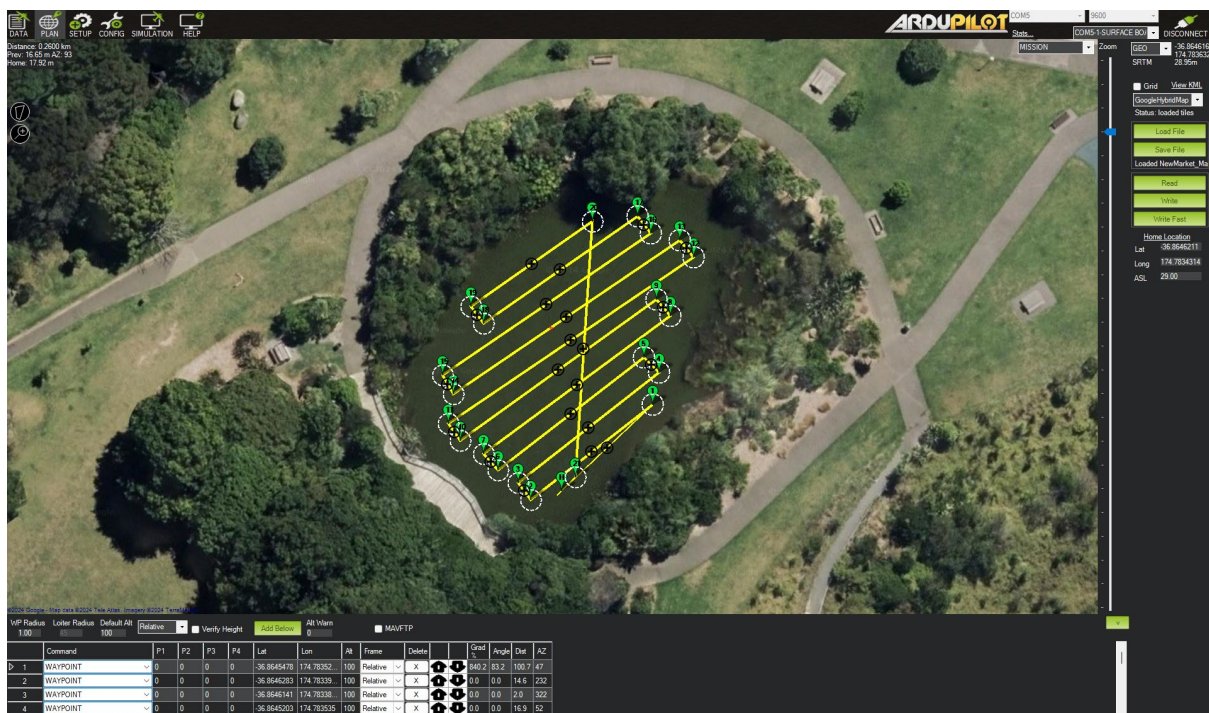
<https://ardupilot.org/rover/>

Mission planner download

<https://ardupilot.org/planner/docs/mission-planner-installation.html>



Setting a plan using waypoints



## Tuning inputs

The screenshot displays the Ardupilot parameter tuning interface with the following sections:

- Steering Rate:** P (0.150), I (0.100), D (0.000), IMAX (1.000), FF (0.200).
- Steering Mode:** Turn Radius (0.5).
- RC Inputs:** RC7 Opt (ACRO Mod), RC8 Opt (AUTO Mod), RC9 Opt (Do Nothing), RC10 Opt (Do Nothing).
- Speed/Throttle:** P (0.200), I (0.200), D (0.000), IMAX (1.000), Accel Max (m/s/s) (1.0), Brake (Disable), Cruise Speed (1.5), Cruise Throttle (5).
- Throttle and Motors:** Motor Type (Normal), Throttle Min (%) (0), Throttle Max (%) (30).
- Navigation:** WP Speed (1.5), WP Radius (1.0), WP Overshoot (0.0), Turn G Max (0.600), Lat Acc Cntl Perio (0), Lat Acc Cntl Damp (0.00).

Buttons at the bottom: Write Params, Refresh Screen.

Parameters file can be used for the rest of the requirements

Overview of main parameters:

FRAME\_CLASS = 2 (Boat)

Sonar (<https://ardupilot.org/copter/docs/common-bluerobotics-ping.html>)

- `SERIAL2_PROTOCOL` = 9 (Lidar)
- `SERIAL2_BAUD` = 115 (115200 baud)
- `RNGFND1_TYPE` = 23 (BlueRoboticsPing)
- `RNGFND1_MIN_CM` = 30
- `RNGFND1_MAX_CM` = 2600. This is the distance in centimeters that the rangefinder can reliably read.
- `RNGFND1_ORIENT` = 25 (down) if mounted on a boat

Lidar (<https://ardupilot.org/copter/docs/common-rplidar-a2.html>)

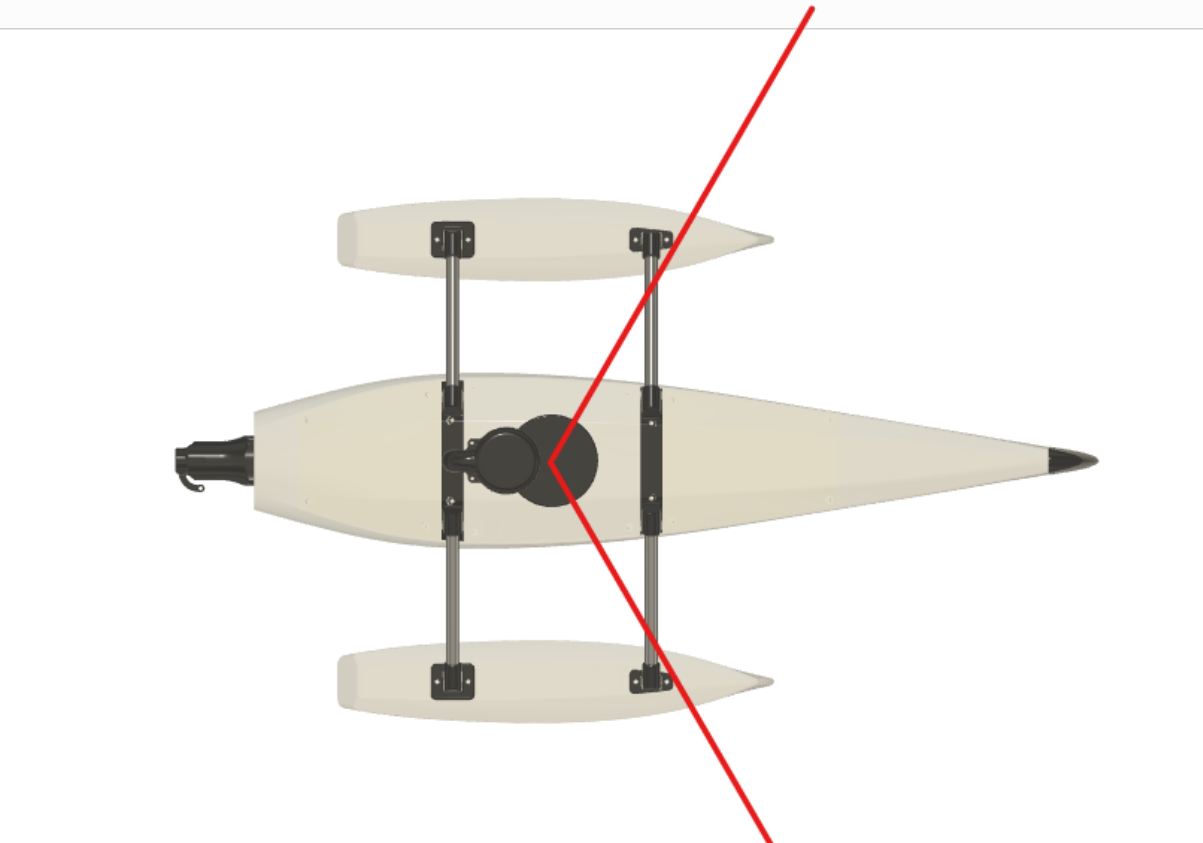
- `SERIAL1_PROTOCOL` = "11" ("Lidar360") if using Serial1
- `SERIAL1_BAUD` = "115" for C1/A2, "256" for S1,A2M12 if using Serial1
- `PRX1_TYPE` = "5"
- `PRX1_ORIENT` = "0" if mounted on the top of the vehicle, "1" if mounted upside-down on the bottom of the vehicle.

<https://ardupilot.org/copter/docs/common-proximity-landingpage.html#common-proximity-landingpage>

Exclusion zones are set via the `PRXx_IGN_ANGx` and `PRXx_IGN_WIDx` parameters, specifying a direction and width the frame obstruction presents and will be ignored.

PRX1_IGN_ANG1	135	0	deg	0 360	Proximity sensor ignore angle 1
PRX1_IGN_ANG2	225	0	deg	0 360	Proximity sensor ignore angle 2

PRX1_IGN_WID1	120	0	deg	120.0	Proximity sensor ignore width 1
PRX1_IGN_WID2	120	0	deg	0 127	Proximity sensor ignore width 2



Advanced implementations of the system require the use of the raspberry pi which can be connected using a mavlink connection  
(<https://ardupilot.org/dev/docs/raspberry-pi-via-mavlink.html>)