

# 2<sup>nd</sup> Field Test Plan

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## 1 Perception

- Location:

Find a place that has static obstacles, for example, docked boats.

- Preparations:

We have written the code that can filter radar data (with binomial probabilistic filter), overlay radar data on the occupancy grid map in RVIS, remove bridges and shores on the radar image, and detect all the obstacles on the river (using morphological operations).

- Steps:

Record bag file around the static obstacles at different gains (30, 35, 40), different ranges (100, 125, 150 meters), threshold in the filter and obstacle detector.

- Purpose:

The filter we implemented can remove well the noise according to the rosbag file we recorded. But we are concerned about that some useful information may also be removed. Also, there are some false-positives for our obstacle detector.

So we would like to test around obstacles to find the best parameter for filter, obstacle detector, and radar settings.

## 2 Testing the low level speed control

- We will test the speed control of the boat to check what command velocity (throttle value 0-1) corresponds to feedback velocity (IMU value meters/sec).
- We'll start the command velocity at 0.05 of throttle, increase by 0.05 each time, until the feedback velocity from the rostopic span\_pose reaches 6.7056, which is about 15 miles/hour.
- We will record bag files separately for each throttle command.

Through this test, we can get the graph of throttle - velocity from IMU.

## 3 Testing new functionalities in GUI

1. Send waypoints in UTM from the newly added text boxes and check if it is behaving in the same way as adding waypoints by clicking on GUI.
2. Send multiple coordinates (test for 3 coordinates) in UTM from the text boxes and see how the boat follows these coordinates.
3. Add one way point, press start. Add another waypoint and then press start. Observe and record the behaviour.

## 4 Test Waypoint follower code

1. Send 1 coordinate to test if the boat is able to receive coordinates.
2. Send 3 coordinates to see if multiples waypoints are being followed correctly.
3. Take present location and decide goal. Plan the path from path planner and pass the waypoints to low level controller to follow. See if the boat is following the right path or not.
4. Repeat (3) multiple times and see the issues with motion primitives and if error is huge then try to tune the primitives there itself.