

# Milestone 3 Progress Evaluation

## 1 General Information

1. Project Name: IGVC - Intelligent Ground Vehicle Competition
2. Team members:
  - Viet Dung Nguyen (CSE) (dnguyen2016@my.fit.edu)
  - Jinwen Zhang (jzhang2015@my.fit.edu)
  - John Light (jlight2016@my.fit.edu)
  - Sijin Yang (yangs2017@my.fit.edu)
  - Peter Tarsoly (ptarsoly2016@my.fit.edu)
3. Faculty Sponsor: Dr. Marius Silaghi (msilaghi@fit.edu)
4. Client: Dr. Ken Gibbs
5. Meetings with the Client:
  - 10/25/2019
  - 11/01/2019
  - 11/08/2019
  - 11/22/2019
6. Date of meeting faculty sponsor:
  - 11/25/2019

## 2 Task matrix

Task	Completion %	Viet Dung	To do
Implement mapping	100	100	None
Test mapping	80	80	Require integration testing

## 3 Task Discussion:

### 3.1 Implement mapping:

The team use a Numpy matrix in order to represent the map. In order to get the coordinates consistent with the matrix representation, the map used a left-handed Cartesian coordinate system.

Because the dimensions of the field and the original position of the robot are unknown, the map must be expandable. When expanding the map, the old matrix will be copied into a larger matrix and the origin point of the coordinate system might be changed depending on the direction of expansion.

The map will keep track of the robot's position by receiving information about the angle and distance that the robot travel. The robot data structure contains information about its position and its angle relative to the vertical axis of the map.

The map subsystem will receive the coordinates of the lane and the obstacles relative to the robot from the detection subsystems. Using matrix transformation, the module will calculate the absolute coordinates and apply them to the map

### 3.2 Test mapping:

The team will use unit testing in order to test the map. Specifically, we will test these functions: tracking the robot, mapping the obstacles, mapping the lane, and extending its size.

After completing other functions of the robot, the team will proceed with integration testing and system testing.

## 4 Contribution Discussion:

- Viet Dung Nguyen
  - Writing the map and the robot representation data structure
  - Writing the coordinates transformation matrix
  - Writing test script

## 5 Plan for next milestone:

- Implement and test obstacle detection
  - Access the robot camera and find the appropriate mode for finding the obstacle
  - The robot must have the obstacle detection capacity in order to avoid the obstacles on the track.
- Measuring the robot field of view in order to adjust the programs' configuration variable
  - Currently, the parameters for the software modules (lane detection, mapping) are experimental. More information about the robot camera is required in order to set the accurate configuration.

## 6 Faculty Sponsor feedback on each task for the current milestone:

- Task 1

- Task 2

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Signature

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Date

## 7 Faculty Sponsor evaluation:

Viet Dung Nguyen 0 1 2 3 4 5 6 7 8 9 10

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Signature

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Date