

Customer Needs

Senior Design Team 504

FAMU-FSU College of Engineering

EML4551C: Senior Design

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October 5th, 2022

Customer Needs

At the time of writing this report, the CIA has not yet been available to provide us with a full outline of the project, nor their requirements for the design. With that being the case, we have decided to research the needs for this project using outside sources such as the F1 Tenth project competition website, from which the project is drawn, and news articles related to the current interest of the CIA. Doing this provides us with direction in getting started on the project, however we know that the vision is subject to change depending on the needs of the sponsor.

Sponsor Meeting Questions

Question: *What do you expect the end product to do?*

- “The product will be able to locate and track objects that are stationary or moving with the camera moving as well. It will work simultaneously with the F1-10th car.”

Interpretation: The system can classify objects in its environment and determine if they should be ignored or treated as obstacles, while from the perspective of a moving reference frame. The product can also be attached to and communicate with the F1-10th car as it maneuvers around its terrain.

F1-10th Research Questions

Question: *What are the hardware requirements of the F1-10th competition?*

- The F1-10th system requires use of a processor with capabilities equal to or lower than that of the NVIDIA Jetson Xavier NX and a LIDAR sensor equivalent or lower than a Hokuyo 10LX. There are no restrictions on cameras, IMUs, or other sensors, except for indoor GPS.

Question: *What kind of environment should we expect in operation?*

- The F1-10th system is expected to work in various environments including outside and indoor tracks, and on different terrain surfaces.

Interpretation: The designed product can work in multiple environments that can have different layouts, terrain types, and lighting.

Question: *What kind of programs are we expected to use to code the system?*

- The F1-10th recommends using Robot Operating System (ROS) to handle the robot controls

Interpretation: ROS is a software library that makes building robot applications easier by providing channels for communication between components. ROS libraries can be built in C++ or Python.

Future questions

To achieve the specific needs of our sponsor, we will ask the following set of questions in the next meeting:

- “Considering the CIA’s area of experience, should we build this project with any stealth components in consideration?”
 - o We will assume the answer to this question is yes
- “Will the system need to be able to differentiate a person from the rest of the environment space?”
- “Will we need to implement encrypted communications or similar security measures into our project?”