PROGRESS REVIEW #2

INDIVIDUAL LAB REPORT [ILR02]

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INDIVIDUAL PROGRESS

This week I contributed to the project in three domains: Path Planning, CoDR revision and Project Management.

Path Planning

a. Subscribing to IMU data

I was able to successfully connect to the IMU/GPS ROS Topic published by the SBC. Figure 1 is a screenshot of the IMU/GPS data wherein we can see the following values that are important to us: latitude, longitude, yaw, pitch, roll and velocity.

Figure1: IMU Data collected from the boat

b. Path Planning Algorithms

I have just started to study the Search Based Planning Library which we will be using for writing the path planning of the project.

c. ROS familiarization

I went through ROS tutorials to get accustomed myself with the ROS environment and commands.

CoDR Revision

As Project Manager, I assigned the respective tasks for revising the CoDR to the team members. On my end, I revised the functional and cyber-physical architecture based on the feedback received on the CoDR. Figure 2 is the overall functional architecture of Autonomous Water Taxi.

To make the functionalities of simulator clear, the functional architecture is shown separately in Figure 3. Cyber-physical Architecture is shown in Figure 4.

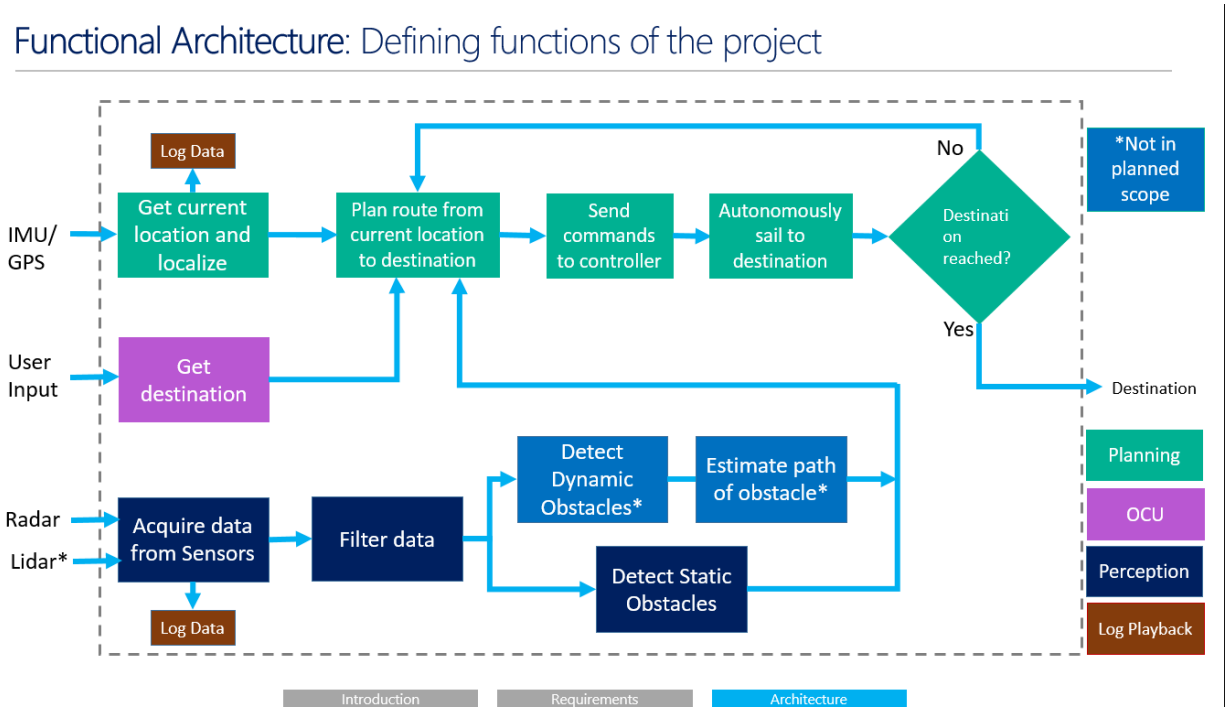

Figure2: Functional Architecture of Autonomous Water Taxi

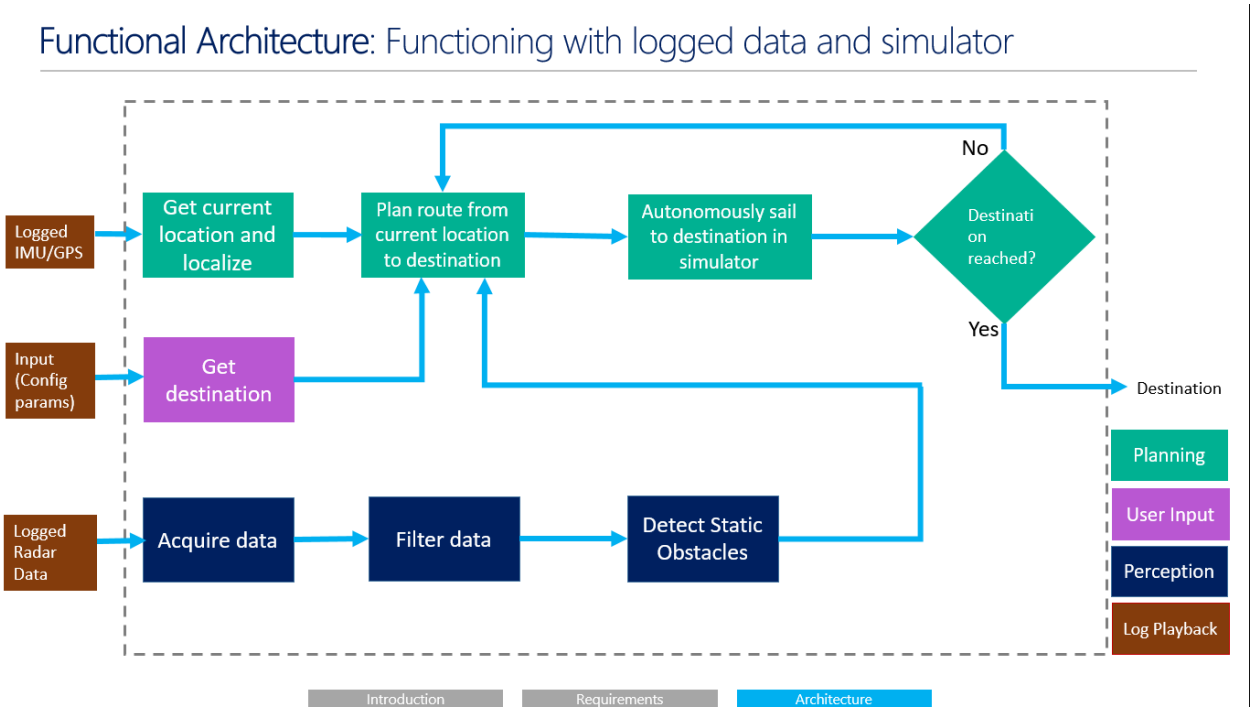

Figure3: Functional Architecture of Simulator shown separately

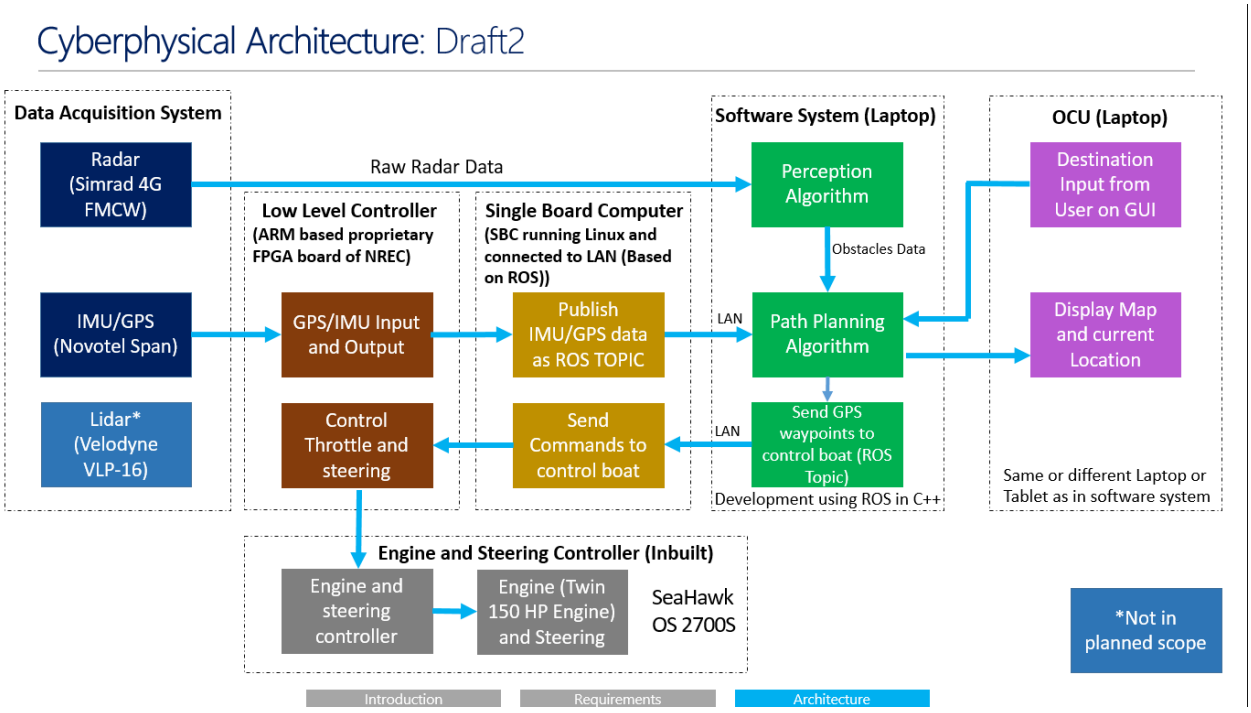

Figure4: Cyber-physical Architecture of Autonomous Water Taxi

Project Management

I am the designated Project Manager of the team and I will be handling this responsibility till the end of this month. My job as project manager is to make sure that we plan and execute all the deliverables in time and with optimal quality. I led the team for first Systems Engineering presentation and I am connecting the dots for the second Systems Engineering presentation. I also assigned the tasks to the team for revising the CoDR.

CHALLENGES

a. **Getting the system fixed and working**

When we started working with the single board computer (SBC) installed on the boat to get the IMU/GPS data, we weren't able to communicate with the board (communication happens through LAN). So, we had to get help from NREC engineers to get the problem fixed. Now, we have a keyboard connected to the SBC which can help us with getting rid of the same problem in case we face it going forward.

b. **Boat Availability:**

The temperature last weekend went below 0 degree Celsius so the boat had to be parked inside the building. We weren't able to go to NREC and work on boat because of this.

TEAM WORK

a. **Shiyu Dong:** Shiyu worked with William on understanding and compiling the OpenCPN library that we are going to use for getting the data from radar. He also updated the risk management and spring validation experiments of CoDR document.
b. **Bikram Hanzra:** Bikram worked on frame transformations using tf package provided by ROS. In addition to this, he published the content on the website and corrected grammatical mistakes of CoDR.
c. **Tae-Hyung Kim:** Tae-Hyung studied various libraries that can be leveraged for path planning. He did the trade study and suggested that we should go forward with SBPL library.
d. **William Seto:** William worked with Shiyu on understanding and compiling OpenCPN library that we are going to use for radar. William also updated the CoDR section (description, requirements and use case study).

FUTURE WORK

a. **Technical**
   - Primarily, my focus on next week would be to study SBPL library in depth. I would be working to practically implement the code from library.
   - I would also be studying various algorithms graph based algorithms like A*, Dijkstra's, weighted A* and D* which can be implemented using SBPL.
   - I will be starting the CAD assignment which is due a couple of weeks from now.

b. **Non-Technical**
   - On the non-technical front, I will be working on revising our WBS and schedule.