February 8, 2019

Dr. M. Khalid

Capstone Coordinator

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Dr. Khalid,

We intend to undertake the project Remotely Operated underwater Vehicle as our Capstone Design project for 2019. Our group has met with our faculty advisor on January 25, 2019, to discuss this project.

The design problem to be addressed to explore any kinds of water body without being in those water bodies and finish some methods as a human being, such as taking videos. The ROV not only can collect the basic data underwater, such as the depth and its relative position, but also is expandable to put more sensors to collect more different data due to different applications. The data can be used to help user to locate the position of the ROV. Furthermore, user can chose what kind of data that they want to collect to meet the specific requerments.

This problem has many potential impacts on many potential stakeholders such as ocean discover companies and water supply companies. Firstly, the ROV can move in the limited space. By using the extension function of the ROV, those company can use the ROV to find and fix the problems that happened under the water. Additionally, water body research organization also can use it in their water body research programs. The ROV can collect multiple data at the same time by extending its sensitivity and the variety of sensor. As the result, the ROV can be applied to different specific researches.

The design objectives and constraints of this project are:

* To design and implement a prototype ROV as a team.
* Design and build the ROV body using PVC pipes, 3D printing custom designed parts maybe.
* Design and implement a remotely operated control unit using some microprocessor.
* The prototype ROV should be able to maneuver in the water perfectly.

• Test the ROV in the actual field either the swimming pool or the lake.

Those objectives will be achieved through the following tasks:

a) Mechanical design: Design the buoyancy body and electronics container of the device. Design the shape of ROV and the connection from the control panel to the ROV

b) Design the actuator of the ROV: Design the actuator to control the movement of the ROV

c) Design the controller of the ROV: Design the electrical circuit with IC to processing the signal of all the data that ROV collects. Additionally, design the electrical controller for the movement of the ROV.

d)Design the controller for the operator: Design the control interface for users to manipulate the ROV, which includes remote-control unit, data display system, and the video display system.

e) Building the mechanism actuator: building the ROV based on the Design.

f) Implementing the control software: programming and debugging the program of the ROV controller.

g) Experimenting and testing the ROV in the swimming pool.

h) Improving and writing the lab proposal

A tentative timeline for completion of these tasks is shown in the following table:

|  |  |
| --- | --- |
| Tasks | Due day |
| Mechanical design | February 1, 2019 |
| Design the actuator of the ROV | February 15, 2019 |
| Design the circuit of the controller | March 1, 2019 |
| Design the controller of the ROV | March 15, 2019 |
| Design the controller for the operator | March 29, 2019 |
| Building the mechanism actuator | May 10, 2019 |
| Implementing the control software | May 24, 2019 |
| Experimenting and testing the ROV in the swimming pool | July 24, 2019 |
| Improving and writing the lab proposal | August 1, 2019 |

A tentative budget for the project is as follows:

1. $200 for electrical system (ROV control system, operator console panel, digital camera and monitor)
2. $100 for mechanism system (Pressure vessel, buoyancy body)
3. $150 for mechatronics system (pumps and valves)
4. $70 for long distance cable
5. $80 for back up

Respectfully,



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Faculty Advisor’s Name