**Avalon ROV Electrical Team – ROV PC Frontend**

**Programming Language – C++**

**UDP Library:**

* ASIO – Provides a comprehensive library of functions for communication via multiple protocols (TCP, UDP, etc.). This is done using Sockets. More information can be found here: <http://think-async.com/Asio>

**Interfacing a C++ Library with Python**

* SIP – Generates wrappers for C and C++ Code that can be used by Python Scripts. More information can be found here: <https://www.riverbankcomputing.com/software/sip/intro>

**Library Structure**

The library should take a function structure so that it can be easily called from the Python Script. Each function should perform an individual task. A set of master functions will be used for UDP communication, these master functions will be called within the other higher-level functions that send and receive specific commands and data from the ROV.

**Dummy Library**

Initially a dummy library will be produced that includes the functions that the module will have, without any of the core UDP communication or other functionality. Functions will simply return random values within an acceptable range. This will allow the software team to continue development of the GUI.

**Required Functions**

The following section outlines the functions required for each section of the ROV:

**ROV Motion:**

* Axial and Lateral Movement Control Functions, preferably take a desired velocity from the Python Program.
* Vertical Movement Control Function, preferably take a desired velocity from the Python Program.
* Pitch Control Function, preferably take a desired angle from the Python Program.
* Yaw Control Function, preferably take a desired angle from the Python Program.
* Roll Control Function, preferably take a desired angle from the Python Program.
* Functions for locking the motion of each axis.
* Functions for freeing the motion of each axis.

**Lifting Bag:**

* Close Lifting Bag Release Mechanism.
* Open Lifting Bag Release Mechanism.
* Active system for inflating lifting bag.
* Deactivate system for inflating lifting bag.

**Grabbing Manipulator:**

* Close Grabbing Manipulator.
* Open Grabbing Manipulator.
* Control of Degrees of Freedom.