Proof of Concept Test Demo Sheet[[1]](#footnote-1)

**TEAM NAME: Ocean’s 7 Test Date & Time: 12-1-2016 11:50 am**

**Test # and Name (from PoC plan) Test 3A Communication and Firmware: Feasibility Testing Test Type: Controls**

1. **Purpose of Test and How it Relates to Project (Brief, concise, but complete, description):**

* STM32 Nucleo-144 will communicate via PWM and the UART serial communication standard to an ESC (electronic speed controller), respectively
* Main communication with the computer of Robosub is UART via USB
* PWM control of ESCs is required to make the sub actually move

1. **Test Setup, Pre-conditions, and Procedure (Brief, concise, but complete, description):**

* Connect the STM32 microcontroller to the desktop computer
* Open UART terminal on the desktop computer
* Send control string ‘motor-on’
* Using the oscilloscope, measure the frequency and duty cycle of the outputs of PWM channel 1
* Repeat previous 2 steps using UART inputs of any integer valued duty cycle
* Connect the Blue Robotics T100 motor to an AfroESC
* Connect the AfroESC to one PWM channel on the microcontroller using jumper wires
* Connect the 14.8V line to the AfroESC
* Send 0 over the UART terminal
* Using the oscilloscope, measure the frequency and duty cycle of the outputs of PWM channel 1
* Repeat previous 2 steps sending integer values over UART. Verify that the motor spins clockwise with values >50 and counterclockwise with values <50.
* Verify that the motor stops with a ‘motor-off’ command

1. **Success Criteria (feasibility) / Selection Criteria (alternatives) / Design Info (gathering): (Concise, complete, quantitative):**

* Consistent communication is achieved between the STM board and the ESC/PC making minimal use of any features of the Nucleo board and relying on STM32 Hardware Abstraction Layer drivers
* Speed and direction of both motors should change to be consistent with the values sent as percentages of max speed.

1. **Instructional Team Notes:**
2. **Test outcome and what was learned (toward finalizing design):**

1. One sheet for each test of your prototyping plan. So if your team has 5 numbered tests, you will turn in 5 sheets. [↑](#footnote-ref-1)