



2026 Non-ROV Device Design Document

Wave Co. at Embry-Riddle
Aeronautical University

(Company ID: 0200A)

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Wave Co. presents its *third and highest performance* Vertical Profiler yet, now named Atolla. The external dimensions and housing remain the same as the previous two iterations, with a maximum diameter of 89mm and overall length of 440mm. The housing is held together solely by negative internal gauge pressure, allowing for the entire 76mm internal diameter to be opened in the event of overpressure. The electronics were completely overhauled this year, with a new, custom-designed PCB, machined in-house. This PCB significantly reduces the internal clutter because smaller components and connectors can be placed on the PCB. All of the electrical components are powered by eight NiMH 2Ah AA format batteries, all of which are wired in series to produce a maximum pack voltage of 10.8V. This battery pack is fused at 1A. Depth control is handled using a buoyancy generator, which is made of a syringe with a plunger that is moved by a stepper motor with a leadscrew nut inside the core, allowing for linear motion. Wave Co. intends to complete all portions of Task 4 this year. The depth controller to do this is a bang-bang type, as it is simple to program and tune. The communications approach remains the same, an ESP32-S3 with the WROOM module connects to a mobile hotspot on the surface and hosts a webserver. On this webserver, the defined data packets are displayed and the dive command is sent through an HTTP_GET command. This year, Atolla's code has been refactored to be primarily asynchronous using the ESP32-S3's FreeRTOS to allow for more efficient STEP/DIR control of the TMC2209 stepper driver, while polling the depth sensor at >10Hz. Below is an image of Atolla.

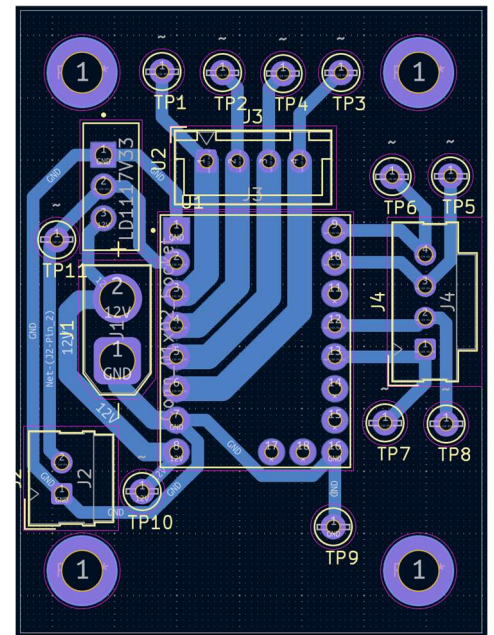
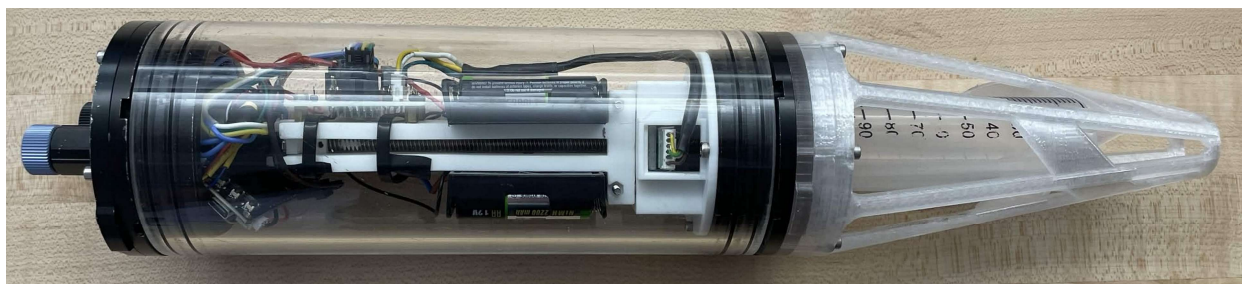


Figure 1: Custom Atolla PCB



The FLA value of Atolla during operation was measured by submerging the body of the syringe in water with an ammeter in series with the fuse. Below is the table of FLA measurements.

	Current (A)
Idle	0.350
Buoyancy Change mode	0.960
Fuse Size:	1A

Below are pictures of the fuse (left) and battery pack (right)



Non-ROV Device SID

Full Load Amps (Motor On) 960 mA Full Load Amps (Motor Off) 350 mA
Fuse Size Selected 1A

Legend	
Power	—
i2C	—
GPIO	—

