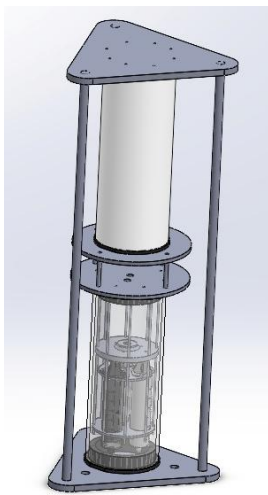


QuadRuple Non-Rov Device



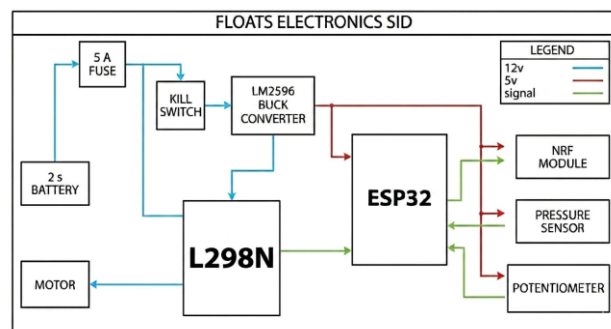
Nautilus

The “Nautilus” subsystem integrated into the DG-1 platform was developed to perform stable underwater profiling and controlled depth operations during mission tasks. The overall structure was designed with emphasis on simplicity, stability, and reliable buoyancy control under dynamic underwater conditions. To improve stability, the distance between the buoyancy chambers and ballast section was intentionally increased. This configuration minimizes unwanted tilting and enables more balanced underwater positioning during operation.



The buoyancy adjustment mechanism is based on three 60 mL syringe chambers driven through a lead screw system powered by a DC motor. By controlling the linear movement of the syringes, the system regulates the amount of water entering the chambers, allowing dynamic control of buoyancy. A potentiometer integrated into the mechanism continuously monitors the movement position and improves adjustment precision. Buoyancy analysis of the system was performed according to Archimedes’ principle. Initial calculations demonstrated that the float slightly exceeded the

neutral buoyancy threshold. Instead of fully compensating this difference with additional ballast, the system was intentionally configured with slightly greater positive buoyancy to ensure automatic resurfacing after mission completion. The electronic architecture of the system is based on an ESP32 microcontroller integrated with pressure sensor feedback for depth monitoring and stabilization. Wireless activation and communication are achieved using NRF modules. Real-time sensor data enables continuous depth correction and stable underwater positioning throughout operation.



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Due to its compact architecture, controllable buoyancy mechanism, and stable profiling capability, the Nautilus subsystem provides an efficient and reliable solution for underwater task execution within the DG-1 platform.