Wave Co. – Vertical Profiling Float

What It Does:

To meet MateROV's vertical profiling float requirements, Wave Co. is using a buoyancy engine design. A 100 mL syringe is driven by a Wishiot TD-8135MG Continuous Servo to alter the float's density. As the float's density changes, a Blue Robotics Bar30 Pressure Sensor records the device's depth, while an ESP32-S3 records the time and stores all required data.

The float and Wave Co.'s ground station are able to communicate using 433MHz LoRa transceivers. Once commanded to dive, the float's servo adjusts the syringe to draw in water. When the float is fully submerged, radio connection is lost with the ground station, and it begins responding to its surroundings autonomously.

The float continues diving until it hits another surface (ideally, the bottom of a body of water). A reinforced 3D-printed "foot" absorbs the blow and ensures no components are damaged. This sudden deceleration is recorded by a HiLetGo GY-521 MPU-6050 3-Axis Accelerometer, which then signals for the syringe to expel water, causing the float to rise to the surface. Upon reaching the surface, the competition-required data packets are transmitted to the ground station after a radio connection is established. The float can then dive again.

The Design: