

SWORDTIP FLOAT NON-ROV DEVICE

2022-2023 ROVOTICS

ROVOTICS' float Swordtip Squid (Figure 1) is used in task 3.1 to perform two vertical profiles of the underwater environment independently. Swordtip Squid communicates with the mission station providing sampled information from underwater. Swordtip Squid consists of two waterproof containers, one which houses the batteries and another which houses the float's buoyancy engine. Two 9v batteries are used to power the motor-driven buoyancy engine and the onboard microcontroller, an ESP-32-S3 (Figure 1). When surfacing the float will communicate the status to an onshore personnel using a P2P (Peer to Peer) communication protocol.

Swordtip Squid's battery compartment contains two 9v batteries in a secure battery holster near the top of the compartment. At the bottom of the battery compartment is a 2.5cm rubber pressure release plug that allows the compartment to open freely when pressure develops inside the housing. The 9V batteries have a 5A fuse attached within 4 cm of their positive terminals. Three power wires from the battery compartment connect to the buoyancy engine compartment (Figure 1).

Swordtip Squid's buoyancy engine compartment contains the motor-driven syringe. The ESP micro-controller communicates to another ESP board at the mission station and is activated via communication between the two. Once activated, the ESP micro-controller communicates with the onboard motor driver, which uses power from the 9v batteries to drive the motor forward and backward. The motor rotates a lead screw attached to the syringe, moving the piston in the syringe up and down. The ESP board uses an RTC (Real Time Clock) timing system to determine when the motor will be driven up and down, and also to keep track of the UTC (Coordinated Universal Time). The movement of the syringe's piston moves water into and out of the internal syringe, altering buoyancy, which causes the Swordtip Squid to complete vertical profiles.

SWORDTIP BREAKDOWN

1. High Gain Antenna
2. Schrader valve to test pressure release (ELEC-NRD-004)
3. 9v operating voltage (ELEC-NRD-001)
4. 5A fuse used (3.2A max draw x 150% → 5A) (ELEC-NRD-001)
5. Batteries are secured in place ELEC-NRD-004)
6. 2.5 cm rubber pressure release (ELEC-NRD-004)
7. Disconnectable Enclosures
8. Motor Driven Syringe
9. Gentle Landing Feet

Figure 1. Swordtip Squid

