Boulder High Robosharks

Non-ROV Device Documentation

Design

Our float was designed with the intent of making a simple design that had the minimal amount of complexity needed to meet its goals. To achieve this it uses a linear actuator to operate the buoyancy engine and is controlled using a Portent C33. The broadcasting system uses the wifi access ports on the Portenta to interface with an antenna that goes outside of the float. Additionally, it is constructed using a rubber end cap in order to seal the internal compartment while also providing easy access to the electronics and a mechanism for internal pressure to release.

Operation

Our float is fully self-contained and requires no outside input to function. Once assembled on the surface it is activated, starting a code-based delay to give time for it to be deployed before the buoyancy engine starts as well as the broadcasting. The float starts in the ‘sinking’ position, with the linear actuator at its minimum extension, in order to prevent the internal pressure from raising during operation and compromising the seal on the float. It then alternates between an extended position to rise and a retracted position to sink.

Buoyancy Engine

Our float’s buoyancy engine is powered by a store-bought linear actuator that we use to move a piston which is sealed using an O-ring. This changes the overall volume of our float, thereby allowing us to adjust its density and move up and down in the water.

Safety

Our float was constructed in order to be as safe as possible from both an electrical and physical standpoint. We use 8 standard AA alkaline batteries for our power, and these batteries are securely fastened to the inside of the float’s body with a 1 amp fuse positioned within 5cm of the positive terminal of the battery. It additionally has no external components such as thruster blades that could be a danger on it.