Night Owls
Vertical Profiling Float

The Night Owls' Vertical Profiling Float is a hydraulic buoyancy engine powered by 2 AA batteries and controlled by a BBC Micro:bit microcontroller. The electronics surround the 100 mL syringe inside the water bottle. The syringe, resin-sealed cap, and water bottle assembly are all reused from our MATE ROV 2022 buoyancy engine. An O-ring between the cap and the water bottle provides a water-tight seal, which is openable above water to modify electronics as needed. Inside, a servo rotates a worm gear connected to the syringe plunger that draws in water or expels it as commanded by the connected microcontroller.

The power supply connects to the JST 3V port on the Micro:bit; a 3 ampere fuse between the battery and microcontroller protects the electronic components. The Micro:bit computer itself provides 3V power and grounds the servo. A push-button switch uses two signal connections to communicate with the microcontroller. This switch notifies the system when the servo has taken in the maximum amount of water, and shortly after the servo takes the plunger back down to achieve positive buoyancy again.

The final process running on the Micro:bit is the Bluetooth Low Energy (BLE) interface to the surface computer. Once it receives starting numbers from the surface computer, the onboard computer begins to iterate hour, minute, and second values and sends a string value over radio waves to be displayed on the surface computer. The receiver is a computer terminal connected over a USB cable to another Micro:bit microcontroller to send and receive radio waves.