

Vertical Profiler Float

The Titan Alliance MATE Underwater Robotics Team designed and developed a Vertical Profiling Float (VPF), an autonomous underwater device engineered to descend, hover, collect environmental data, and safely return to the surface without direct tethered control. Inspired by real-world oceanographic systems such as Argo profiling floats used by marine scientists around the globe, the student-built VPF demonstrates the practical application of engineering, electronics, programming, and underwater robotics in a hands-on STEM learning environment.

The VPF is built around a watertight enclosure fabricated from durable PVC pipe designed to safely house onboard electronics and sensor systems. Students integrated microcontrollers such as Arduino platforms along with sensors capable of measuring depth, pressure, and temperature throughout the mission. To maneuver vertically through the water column, the Albany Technical College Titan Alliance team explored buoyancy-driven concepts that allow the float to naturally sink and rise by adjusting displacement and overall density.

During competition missions, the Vertical Profiling Float is tasked with descending to designated depths, maintaining stability, collecting environmental data, and resurfacing safely and efficiently. More advanced mission scenarios challenge students to operate in simulated under-ice environments requiring precision control, systems engineering, troubleshooting, and mission planning.

Through the design and development of the VPF, students on the Albany Technical College Titan Alliance team gain valuable real-world experience in ocean engineering, autonomous systems, electronics, coding, fabrication, and problem solving while preparing for future careers in advanced manufacturing, marine technology, robotics, and other STEM-related industries.

Systems Integrated Diagram VPF

