# Project POWER: A Swift Water Warning System

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Every spring, people drown in local rivers because they underestimate the power and danger of the river flow from melting mountain snow. A literature review uncovered no practical, low-cost, water velocity warning devices. The purpose here was to design, construct, and test Project POWER: a portable swift water warning system that visually alerts swimmers of dangerous water conditions. Constructed of PVC pipes and rust-resistant metals, the buoy included an Arduino microcontroller that was connected to an in-line flow meter and LED lights (located above the water). The LEDs changed from green to red when water velocity reached a set threshold. A 12Ah battery, connected to a 9W solar panel, powered the Arduino and LED lights. After calibrating the flow meter for accuracy and performing buoyancy tests in a pool, a proof of concept was performed, placing the buoy in the Tule River with an across-the-river anchor line. A pulley system positioned the buoy in the area of highest water velocity. The anchoring system effectively kept the buoy in place. The flashing LED lights changed color as programmed. The buoy remained stable and stayed afloat in higher river currents. Reduced accuracy was noted with the in-line flow meter due to the vertical position of the buoy in the river. An external flow meter improved flow rate accuracy. Project POWER demonstrates the potential to save lives by alerting swimmers of quickly developing unsafe river, tidal, or even flood conditions. Future designs will include a temperature sensor, audio alerts, and smart phone applications.

**Awards Won:**

International Council on Systems Engineering - INCOSE: Certificate of Honorable Mention