A Next Generation Depth Integrated Water Quality Sampler

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USGS science for a changing world

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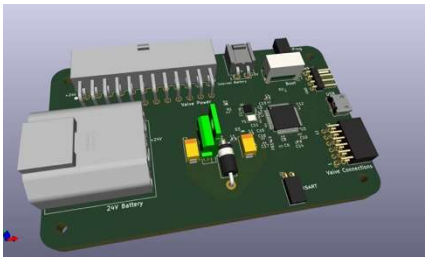
PROJECT BACKGROUND & DESIGN GOAL:

The U.S. Geological Survey (USGS) collects water samples manually, necessitating trained personnel to be physically present during specific streamflow events. The existing equipment is heavy, only collects one sample at a time, and has not been upgraded in many years. **Our team developed a depth integrated water quality sampler that takes up to twelve samples at once with a single device deployment.**

DESIGN OUTCOMES:

A hydrodynamic prototype of a user-triggered water sampler that collects multiple water samples at once while improving ease of use, reliability, and manufacturability. The use of modern materials and manufacturing practices eliminates long lead times. Additionally, an onboard custom PCB has modernized sampling logic to expand the use-case for the depth integrated water quality sampler.

Exploded view of final water sampler design



Custom PCB for modular sampling logic

DESIGN CONSTRAINTS:

- Must collect 12 water samples in a single deployment.
- Must collect samples isokinetically.
- Physical prototype must operate hydrodynamically.
- Each sample must be approximately 1 liter.
- Must operate at water depths of 2 to 110 ft.
- Must avoid contaminating the collected water samples.
- Must be powered through a 12 V or 24 V DC battery supply through a single tether.
- Prototype size must not exceed 24 in. x 36 in.