Docket #: S23-033

Autonomous multi-port AutoSampler drifter system

Discrete water sampling is resource and time intensive. It also involves the need for the scientist with or without a vessel to be on site to take the discrete sample. This can often disturb the environment being sampled and potentially disrupt or contaminate the sample of interest. A Stanford researcher has designed an autonomous multi-port AutoSampler drifter system to replace the need for manual water sampling in a wide range of aquatic environments. As the system drifts with the water current, this system uses a peristaltic pump and a suite of valves to sample water at a predetermined set depth and time and records the GPS location of each sample. This type of sampling is key to obtaining water samples that can be used for chemical or biological analysis and for Lagrangian based research studies. The system uses rechargeable Ni-cd battery packs, eInk display, GPS module, 16-channel relay board, and real-time clock, 1.2 L/min peristaltic pump, and up to 12 sampling valves.

Stage of Development
Proof of concept: prototype has been successfully field tested

Applications

- Academic research in marine and freshwater systems
- Aquariums – e.g., as a stationary sampler
- Water management (e.g EPA, state agencies, consulting)
- Aquaculture

Advantages

- Replaces manual water sampling

- Collect samples without contamination and bias
- GPS module obtains the time and fix of each sample collected and records the drift pathway
- Rapid sampling (1 mL/min)
- Rechargeable, long lasting batteries
- Can be used as a drifter or a stationary sampling system
- Lightweight
- Scalable

Publications

- Mucciarone, D. A., DeJong, et al. (2021). Autonomous submersible multiport water sampler . HardwareX, 9, e00197.
- Mucciarone, D. A., & Dunbar, R. B. (2020). Automated multiport flow-through water pumping and sampling system. HardwareX, 8, e00147.

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