

A scalable, distributed, open-source system for volunteer bathymetry collection.

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While there has been significant interest in Volunteer Bathymetric Information (VBI), also known as Crowdsourced Bathymetry (CSB), in recent years, there have been few public programmes which have enabled routine hydrographic use. Part of this problem is calibration of data in the vertical, but a significant issue is data volume. Obtaining sufficiently dense data to overcome calibration or noise issues is difficult: VBI only works well, unsupported, with dense data collection within a limited area, requiring a system that is inexpensive and readily distributed to independent local organisations, enabling scale.

There is therefore a need for a widely available, simple, and inexpensive system that can be independently implemented by local organisations while still ensuring that the data arrives at the IHO Data Center for Digital Bathymetry (DCDB). The objective here is to provide a complete system simple enough for any group of interested volunteers to adopt without significant external support or expense, removing barriers to adoption at scale.

The Wireless Inexpensive Bathymetry Logger (WIBL) system provides an open-source system that includes hardware production files required to fabricate loggers; firmware to log NMEA data; a mobile application to offload data and transmit to the cloud; and an extensible cloud service that transmits to DCDB. The production prototypes of the logger can be fabricated for ~\$10 (US) (although there may be extra costs for enclosures and connectors), and have been field tested on an expedition through the Northwest Passage and by a volunteer in San Diego, CA.

The advantage of an open system is that it can establish de facto standards for system interfaces, allowing, for example, the processing section to be used for other loggers through a simple file translation application; or for commercial implementations of compatible hardware so that smaller groups do not have to fabricate their own loggers. We hope, by providing the entire system as open source, to encourage these efforts and to enable and empower even small groups to collect data in their own area, while still ensuring the data is available in DCDB for everyone's benefit.

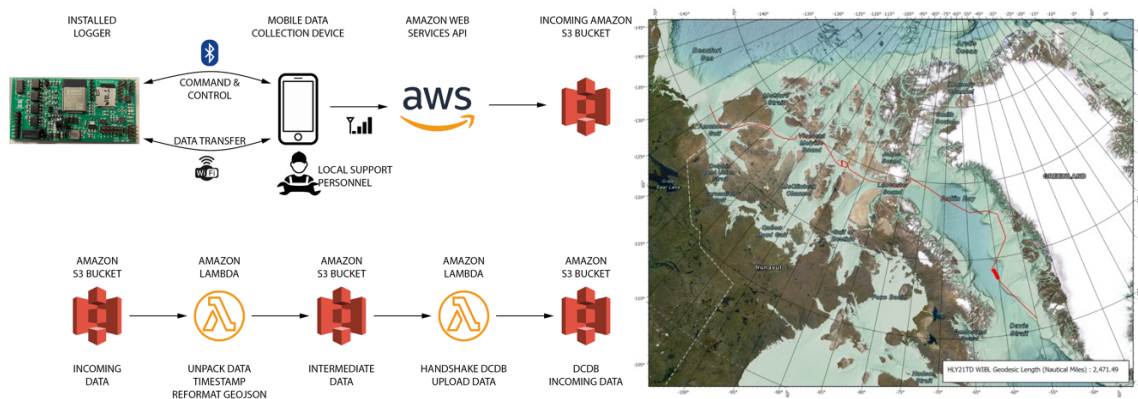


Figure: Wireless Inexpensive Bathymetry Logger dataflow and concept of operations (left) and example WIBL data (right) from the USCGC Healy expedition through the Northwest Passage.