

OCEANSCIENCE

Innovative Tools for Oceanographers and Hydrologists

Z-Boat 1800 Application Note #3

Polar Explorers Conduct Remote Surveys Using the Z-Boat 1800

Summary



US polar researchers chose the Z-Boat 1800 for a remote bathymetric survey of supraglacial lakes in Greenland. After customization with special reflectance measuring instruments, hydrographic survey grade depth sounder, Trimble RTK GPS, and a stealth black finish, the Z-Boat was used to conduct surveys where a larger boat would have been impossible to transport to the survey site.

Background

US polar remote sensing researchers traveled to Greenland in July 2012 to conduct studies on supraglacial lakes formed from ice meltwater. As a result of the inaccessibility of the survey locations, all of the scientific equipment and personnel were transported by helicopter, including a specially customized Oceanscience Z-Boat 1800 hydrographic survey boat. While planning the expedition, the researchers were unsure how to remotely deploy their instruments on the Greenland lakes. They quickly realized that a remotely-operated craft of some sort would be required for the project, but recognizing that trying to make their own boat and control system would become a substantial effort in itself, they contacted Oceanscience with a view to adapting an available off-the-shelf survey boat for their needs.



The survey site in remote Greenland.

Supraglacial Lake Bathymetry

Principal Investigator Dr Alberto Behar was quick to recognize that the Z-Boat 1800 already fulfilled most of their requirements. The project called for a boat that was small enough to fit inside a helicopter but large enough to handle the instrument payload, could operate at up to 1km distance, provided real time GPS position and heading, and recorded lake bathymetry to cm-level precision. After visiting the Oceanscience factory in a style fitting his skills as a qualified helicopter pilot, by private plane, Alberto was confident that the Z-Boat 1800 was the most attractive option and work immediately started to get the boat ready in time for the expedition.



Deploying the Z-Boat 1800.

Instrument Payload

The Boat was equipped with a Seafloor Systems SonarMite 200kHz depth sounder for accurately measuring the lake bathymetry. The scientific payload included reflectance monitoring equipment used to help relate satellite measurements to actual supraglacial lake bathymetry. Precise positioning was provided by a Trimble R8 GPS receiver operated in RTK mode. Owing to the potential interference of the boat's hull with reflectance measurements, the Z-Boat was even given a special flat black finish to minimize reflection from the otherwise bright yellow plastic hull.



Collecting Shallow Supraglacial Lake Bathymetry

The research team used "DrDepth", a commercially available software program for basic mapping of the boat position and bathymetry. Primarily used for recreational fishing applications, DrDepth offers a cost effective navigation interface for the Z-Boat when complex hydrographic survey packages are not necessary. The simplicity of this approach further reduced the amount of time that the survey team had to spend on "non-core" activities, to enable the project's scientific goals.

The Z-Boat 1800 system performed as expected, and the key requirement – 100% reliability – was achieved.



Z-Boat 1800 at Sea.

Acknowledgements

Thanks to Alberto Behar for providing photos and survey details.