

ENHANCING HYDROGRAPHIC SURVEY WITH AUTONOMOUS VESSELS

📍 CALGARY, ALBERTA

Looking to expand the capability of their survey fleet and overcome accessibility challenges, Measurement Sciences Inc. (MSI) decided to equip their 3-meter RIB (Rigid Inflatable Boat) with Sea Machines' **SM300 Autonomous Command and Control** system.

This enhancement enables MSI to reduce personnel count on hydrographic survey operations by **60%** and allows the vessel to access areas considered unsafe for manned vessels.

ABOUT MEASUREMENT SCIENCES INC.

Measurement Sciences Inc. (MSI), founded in 2005 and based in Calgary, specializes in professional engineering and surveying. The company employs advanced technology to serve a diverse range of clients, including oil and gas pipeline companies, land developers, power generation firms, engineering and construction companies, as well as local municipalities and provincial governments.

PROBLEM STATEMENT

Safety is a primary concern for MSI, especially when dealing with hazardous water environments such as hydroelectric dams, flood conditions, debris, swift water, toxic bodies of water, and more. Traversing these waters often requires multiple permits, consuming both time and money, and still puts personnel at risk.

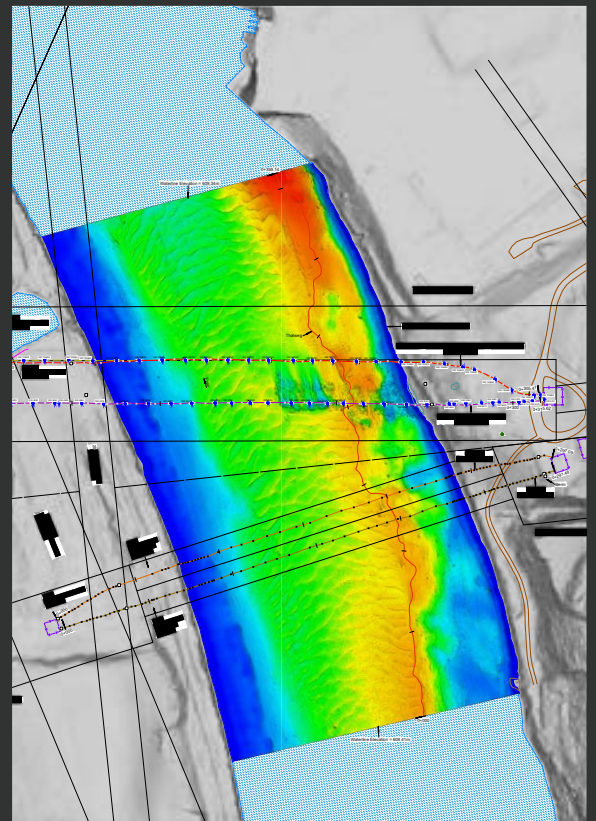
In this case study, MSI conducted pipe coverage surveys at four different locations. Due to the high flow events during the surveys, using manned vessels would have been unsafe. Therefore, at the request of their customers, manned craft were not used.

SOLUTION

By converting the RIB into an autonomous vessel using the SM300 system, MSI can remotely command the autonomous boat from shore or do manual remote control. This setup eliminates the need for humans on board while still enabling the collection of survey data in the necessary areas.



*SM300 Autonomous Command and Control System
(Ruggedized Laptop and Processor Cabinet)*



239 Causeway Street Suite 300, Boston, Ma, 02114 | Tel. +1-617-455-6266 | sales@sea-machines.com

WWW.SEA-MACHINES.COM



WHY CHOOSE THE SM300?

Robust and reliable autonomy aside, the SM300 can be retrofitted to vessels of any size. This provided MSI the flexibility to choose a vessel that was both nimble and capable of withstanding high flow conditions, as well as accommodating the additional weight of the onboard sensors.

This is a significant advantage over many USVs available on the market, which often do not perfectly match specific needs—being either too small to handle strong currents and payloads, or too large to navigate smaller waterways.

IMPLEMENTATION



Installation

The SM300 system was installed on the RHIB, including all necessary sensors and control modules



Calibration and Testing

Extensive calibration and testing were conducted to ensure the system's accuracy and reliability.



Training

MSI's operators received training on using the SM300 system, focusing on remote operation using the wearable Wireless Remote Helm

AUTONOMY TAKES YOU BEYOND REMOTE CONTROL

The SM300 system not only supports remote command from shore but also offers a range of advanced autonomy features specifically designed for survey operations.

Full Autonomous Operation – Plot waypoints from the SM300 user interface or import missions from hypack or Qinsy to execute survey projects from start to finish without human intervention.

Tight & Productive Surveys – High performance control from acute position sampling to fine rudder and speed modulation provides very tight cross track error and minimizing holidays, greatly surpassing the average manual operations, increasing job productivity and efficiency.

Collaborative Autonomy – Enabling multiple simultaneous survey vessels for an expanded swath of data collection to increase productivity multi-fold.



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RESULTS

Operator using the wearable Wireless Remote Helm

COST SAVINGS

By eliminating the need for personnel on both the survey and rescue crafts in high-flow environments, MSI achieved a 60% reduction in required staff.

Additionally, the consolidation of operations into a single vessel instead of two (a survey craft and a secondary stand-by rescue craft) led to significant time and fuel savings.

INCREASED SAFETY

Removing humans from the physical survey location eliminates potential risks associated with being on the water.

Operators can safely manage the survey operations from shore, significantly enhancing safety.

ENHANCED ACCESSIBILITY

With an unmanned craft, MSI can access waterways with fewer permits related to human safety regulations, saving time and effort.

The smaller RIB can be launched from a simple ramp or shoreline, unlike traditional vessels that need a proper boat ramp, often situated far from the survey area. This reduces transit time and streamlines logistics.

TIME SAVINGS

Remote operation eliminates the need for operational downtime due to breaks, meals, and other interruptions.

The unmanned vessel can remain on station continuously, maximizing survey time and efficiency. Deployment times are also reduced, with the smaller vessel being easier to transport and launch.

CONCLUSION

The integration of the SM300 Autonomous Command and Control system into MSI's survey fleet has significantly enhanced their operations by decreasing costs and increasing safety.

Retrofitting the system onto an existing vessel tailored to specific job requirements allows MSI to enhance operational efficiency without compromising quality.

Looking ahead, MSI anticipates that the transition from manned to unmanned vessels will be a beneficial and inevitable evolution, as they plan to expand their autonomous fleet.