

# Unmanned Surface Vehicle Delivers Critical Real-Time METOC and Environmental Monitoring Data, Chukchi Sea

## CHALLENGE

Efficiently and reliably collect critical environmental data in the challenging environment offshore Alaska while also reducing cost and risk.

## SOLUTION

Deploy an instrumented unmanned surface vehicle (USV) in the Chukchi Sea and monitor its ability to navigate, hold station, and report oceanographic, weather, and sea current data in real time.

## RESULTS

Proved the capabilities of autonomous monitoring: The USV conducted operations as planned and transmitted uninterrupted metocean data while holding station 100% of the time.

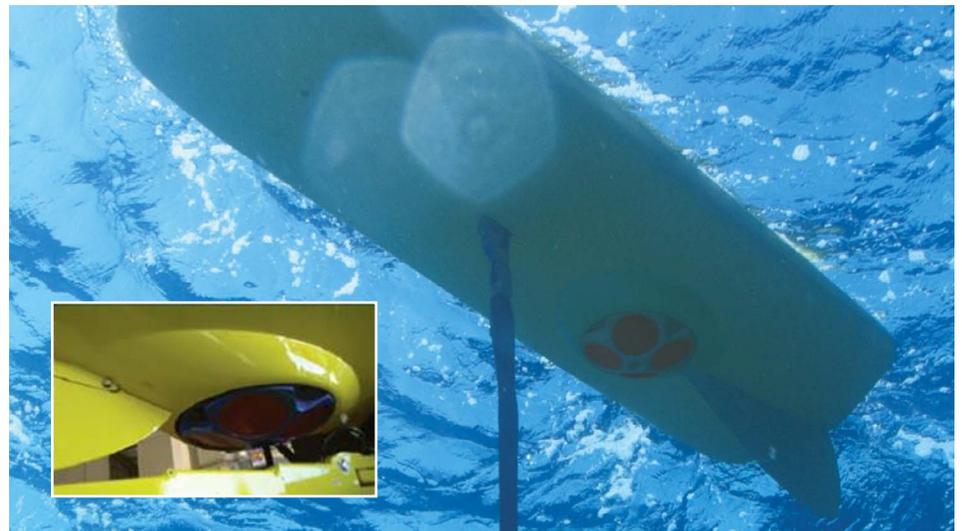


## Real-time measurement of currents and weather

This proof-of-concept mission aimed to test the meteorological and oceanographic (METOC) capabilities of the USVs used by Schlumberger Robotics Services in the Chukchi Sea off the northwest coast of Alaska. Conventionally obtaining METOC measurements requires expense, time, and risk incurred by ships and crews to deploy, recover, and maintain a network of instrumented buoys. Monitoring via a compact, highly mobile USV would not only reduce costs and risk but also provide more flexibility and adaptability for rapid deployment and to accommodate changes in the monitoring program.

## Autonomous data collection and transmission

Schlumberger Robotics Services deployed a USV in the Klondike Block area of the Chukchi Sea. The USV's ability to navigate, hold station, and report oceanographic, weather, and sea current data in real time was monitored for the 5-day deployment.



*The Wave Glider® USV featured an integrated ADCP for long-term current monitoring.*

## Greater data access at lower cost and risk

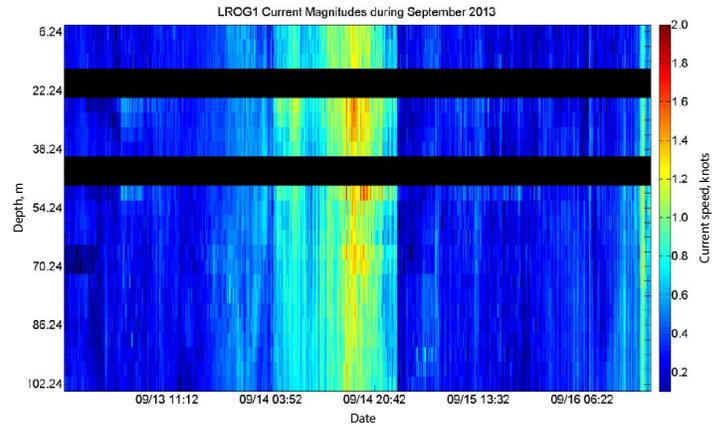
Upon deployment, the USV was remotely navigated to a specified station in the survey block, where it continuously collected valuable and accurate metocean data with its 300-kHz acoustic Doppler current profiler (ADCP) and a weather station. The data was successfully collected on specification and ahead of schedule, saving the operator time and further reducing operating cost beyond costs already saved because neither offshore crew nor fuel was needed. In addition, using a USV eliminated the need for deploying additional ships to measure sea currents, which opened the ships' availability for other operations.

Operating 24 hours a day for the five-day deployment, the Robotics Services USV deploying METOC services proved the high operational capabilities of the vehicle and its integrated monitoring and communications components. Data was reliably collected and transmitted data independently of the challenging arctic weather conditions.

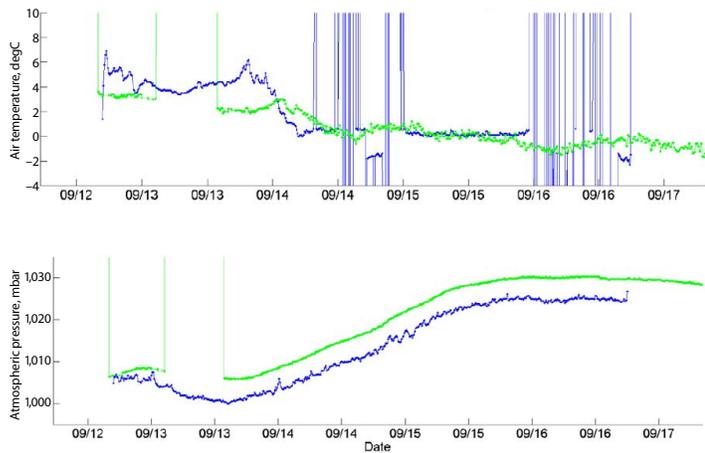
# CASE STUDY: USV efficiently collects and delivers important METOC and environmental monitoring data, Chukchi Sea

## USV Monitoring Results

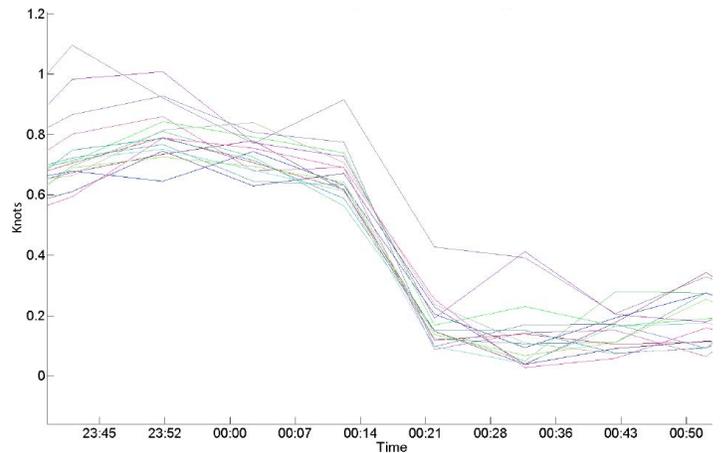
Number of current measurements	565
Number of weather measurements	582
Time on station (within 1 km of waypoint)	100%
Distance traveled	500 nautical miles
Days in water	5 days
Average vehicle speed	1.4 knots
Maximum vehicle speed	2.9 knots
Maximum wind speed measured	25.3 knots
Maximum current speed measured	1.7 knots



Current magnitudes measured by the USV show a gradual increase throughout the water column on September 14, with a significant decrease on the eve of September 15.



Weather data from the USV and NDBC mooring 48213 agree reasonably well.



On September 15, the ADCP documented a large decrease that amounted to approximately 1 knot over a time period of 1 hour throughout all bins measured over 100 m of the water column. Knowledge of this occurrence is critical to maintaining safety in navigating commercial vessels in and around oil rigs.

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