

# USV-Deployed METOC Services' Real-Time Data Reduces Risk for Seismic Operations, Gulf of Mexico

## CHALLENGE

Acquire real-time measurements of weather conditions and currents during seismic surveying operations to reduce the risk of towing multiple acoustic streamers close to oil platforms and other vessels.

## SOLUTION

Deploy unmanned surface vehicles (USVs) near platform structures to measure local current speed and direction as well as weather data for relay in real time to the seismic survey vessel's line planning team.

## RESULTS

- Reduced operational risk during the seismic campaign in a busy shipping route by supporting real-time assessment of the prevailing conditions via the USV-obtained meteorological and oceanographic (METOC) data.
- Lowered costs by replacing ships that would otherwise have been deployed to collect the data.



## Current and weather hazards

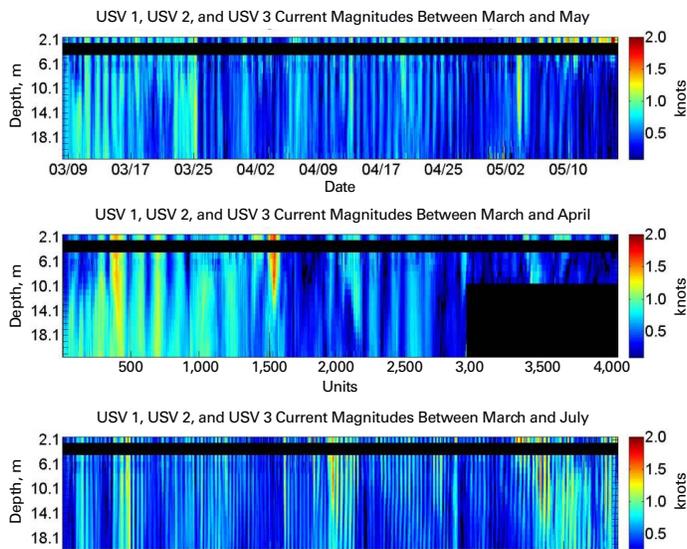
Rich in natural gas and oil resources, the Gulf of Mexico is also home to some of the busiest shipping routes in the world. In the process of seismic exploration, commercial vessels tow multiple acoustic streamers that record the reflection of acoustic energy from beneath the seafloor. The size of these operations and their vulnerability to the influences of surface currents and inclement weather make it critical to obtain real-time measurements of local environmental conditions to support operational safety, especially for close passes to structures and other obstructions.

## Advantages of autonomous solutions

Instrumented USVs support greater situational awareness via real-time weather and current measurements. Even in this well-developed area, deployment on USVs is at a fraction of the cost of traditional monitoring services. With an ability to operate 24 hours a day, 7 days a week and independently of weather conditions, USVs are an ideal approach for persistent metocean monitoring operations.

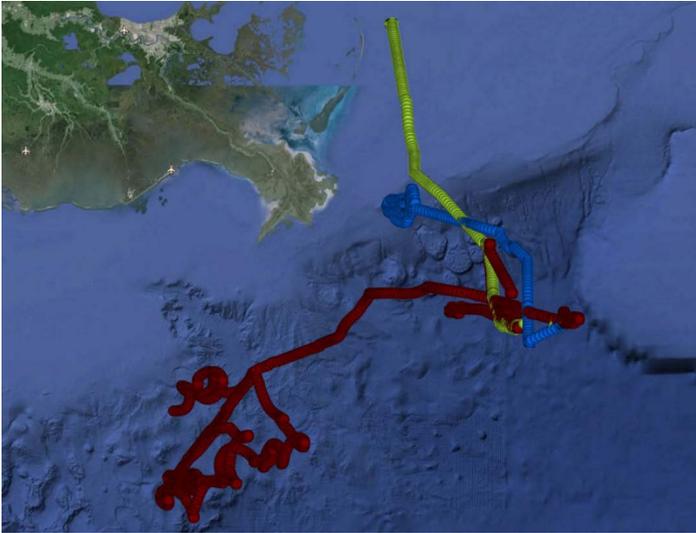
## Reduced operational risk and cost

The autonomously piloted instrumented USVs held stations in the survey area in relation to structures and other obstructions to provide extensive METOC data. With the resulting augmented situational awareness of local current and weather conditions in real time, the line planning team for the survey vessels *WG Amundsen* and *WG Cook* was able to reduce streamer deployment risk.

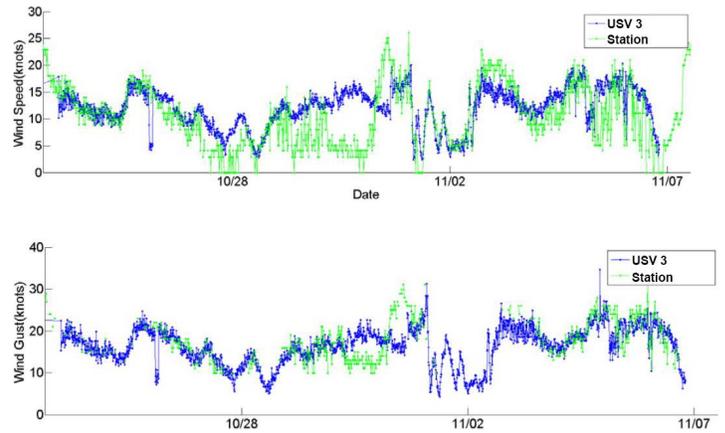


*Time series of current magnitudes measured by the acoustic Doppler current profiler (ADCP) installed on the USVs shows irregular variability between 0.1 and 2 knots. Knowing the magnitude and direction of these currents in real time is critical for supporting navigational safety for the streamer vessel.*

## CASE STUDY: USV-deployed real-time METOC services reduce seismic risk, Gulf of Mexico



USV 1 (blue), USV 2 (yellow), and USV 3 (red) were autonomously piloted during the METOC services data collection. The USVs held station within the survey area while providing critical real-time weather and current measurements during seismic survey operations.



Wind data from the USV (USV 3) coincides with data from the Automated Weather Observing System's station. Differences can be attributed to the height of the sensors: The USV measures at 1 m above the sea surface whereas automated weather station is at 110 m.

### METOC Services Data Acquisition to Support Seismic Surveys

Results	Flex Trend Multiclient Wide-Azimuth and Four Point Multiclient Seismic Surveys		Four Point Multiclient Seismic Survey
	USV 1	USV 2	USV 3
Number of current measurements	17,265	1,753	17,724
Number of weather measurements	6,839	710	20,797
Distance traveled, nautical miles	961	116	1,621
Days in water	49	5	146
Average vehicle speed, knots	1.2	1.0	0.8
Maximum vehicle speed, knots	2.5	2.8	3
Maximum wind speed measured, knots	23.5	21.4	37.1
Maximum current speed measured, knots	1.7	1.5	3.0

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