

# SUCCESS STORY

## Unmanned Surface Vehicle



## Sonar Motion Compensation & Data Georeferencing

SeaRobotics has selected the Ekinox-E inertial navigation system to equip the USV 2.5, a small Unmanned Surface Vehicle tuned for the Center for Marine Science and Technology at North Carolina State University.



**CLIENT**  
SEA ROBOTICS

**APPLICATION**  
USV-based Bathymetry

**PRODUCT**  
Ekinox-E Inertial Navigation System

**PROJECT**  
Motion Compensation & Georeferencing

SeaRobotics is specialized in smart vessels that are remotely or autonomously-operated. The USV 2.5 is a 2.5 meter long Unmanned Surface Vehicle that offers a broad range of instrumentation, with the flexibility to swap sensing payloads based on the demands of the mission.

### USV EQUIPMENT

The USV 2.5 has been delivered to the Center for Marine Science and Technology at North Carolina State University. The USV integrates an Edgetech 6205, an innovative SwathBathymetric and Simultaneous Dual Frequency Side Scan Sonar System, a sound velocity probe, the highly flexible inertial navigation system Ekinox-E from SBG Systems connected to a dual antenna RTK GPS from Hemisphere, and HYPACK software.

Given the diverse capabilities of the USV, it will be utilized as both an experiential-based teaching tool and to conduct basic and applied research in lake, river, estuary and coastal environments. "The USV will be used for seabed and water column mapping critical to an improved understanding of various marine and aquatic processes, including ecosystems dynamics, water quality, and shoreline stability," stated Del Bohnenstiehl, principal investigator on the project.

### A COMPACT & SURVEY-GRADE INERTIAL NAVIGATION SYSTEM

"The Ekinox-E inertial navigation system from SBG was an easy choice for the USV 2.5" stated Geoff Douglass, Development Manager at SeaRobotics. "When compared to competing

« The Ekinox-E allows us to streamline system integration while still providing customers the ability to acquire and process high resolution bathymetry. »

Geoff Douglass, Development Manager at SeaRobotics Corp.

# SUCCESS STORY - USV-based Surveying

products with similar resolution, the Ekinox is much simpler to integrate because of its compact form factor. On small unmanned surface vehicles (USVs) available payload (weight, footprint, power, I/O) is the most precious asset. The Ekinox-E allows us to streamline system integration while still providing customers the ability to acquire and process high resolution bathymetry", added Geoff.

## EKINOX-E, A SMART BALANCE BETWEEN SIZE, WEIGHT, AND PRICE

Ekinox-E is a high accuracy and cost-effective inertial system which accepts aiding data from any external GNSS receiver (in this case, a Hemisphere) to provide roll, pitch, heading, position, and heave data for multibeam sonar compensation and georeferencing. This extremely versatile inertial navigation system (INS) weights only 300 grams and consumes less than 3 Watts while delivering an attitude accurate to 0.05°.

Ekinox also provides outstanding



USV 2.5, the smallest USV from SeaRobotics



Bathymetry data collected with the USV 2.5

heave computation with a real-time heave accurate to 5 cm and a delayed heave reaching a 2.5 cm accuracy. The delayed heave is an advanced algorithm processed onboard with a more extensive calculation. It results in a heave accurate to 2.5 cm displayed in real-time with a little delay.

Ekinox-E integrates a data logger and is compatible with all hydrographic software, a smart solution for hydrographic applications.

### AUTHORS

Geoff Douglass from SeaRobotics Corp.

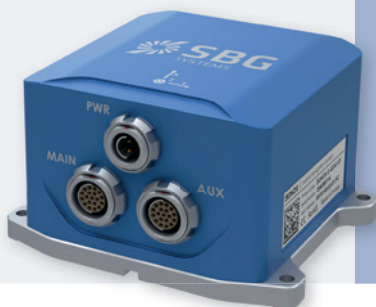
Hélène LEPLOMB from SBG Systems  
November 2016

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Geoff Douglass, SeaRobotics Corp.

## EKINOX-E KEY FEATURES

- » Connect to external GNSS receiver for a real time data fusion of inertial and position information
- » 300 grams, 3 WATT power consumption
- » Survey-grade Performance
- » Internal Data Logger



## ABOUT SEAROBOTICS

We specialize in smart vessels that are remotely or autonomously-operated. Our clients include major military and commercial organizations, US and foreign. SRC's seasoned marine survey software interfaces with most data acquisition hardware, software and sensing systems. Many of our vessels are small, modular, and man-portable, allowing rapid deployment in remote areas or deployment by larger vessels. Our command and control systems are user-friendly and compact, allowing backpack mobilization. Applications for our vessels range from: bathymetric and hydrographic surveys through coastal, harbor and riverine surveillance.

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