



# Seafloor Systems Unmanned Surface Vessels (USV's)

## Hydrographic Survey Drones



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# 1 BACKGROUND

Seafloor Systems is a small California-based business specializing in providing turnkey Hydrographic Survey System solutions, both on manned vessels (small, large, new builds) and on our own Unmanned Surface Vessels (USV's). We have over 20 years experience with Multibeam sonar equipment; for two decades, we have grown and evolved with this emerging cutting-edge hydrographic technology.

Today, we choose from the the best systems, and most trusted proven ancillary components, to configure turnkey solutions scaled to meet individual performance requirements and budget. We have long-established official sales and support agreements with some of the best innovators in the Multibeam and hydrographic industry. As a result, all our solutions are proven, trusted, and well-supported.

## **Seafloor Systems USV's – Hydrographic Survey Drones**

Seafloor Systems has also been building Unmanned Surface Vessels for 10 years.

We have been expanding and evolving our fleet of USV options to accommodate complex multibeam and similar payloads; adapting them for the needs of hydrographers for different survey applications, scenarios, and environments.

Today, we offer the HyDrone™, EchoBoat™, and HydroCat™ line of Unmanned Surface Vessels. All are remote controlled, and also operate autonomously with our AutoNav™ option. Our AutoNav is integrated with the standard navigation and data collection software packages, including HYPACK, QPS, PDS2000, and Eiva. And all our USV's are designed to be easy to operate, low cost to maintain, and field-serviceable.

## 2 HYDRONE

The HyDrone-G2 is Seafloor System’s smaller 1.2m unmanned remote controlled and autonomous catamaran style survey platform designed to carry very simple, lightweight payloads. The HyDrone is a platform suitable for calm, protected waters.



*HyDrone-G2, L to R: with AutoNav, Seafloor Systems HydroLite-TM™ echosounder, Trimble SPS985, and TSC3 data logger running SCS900. USGS using with Teledyne RDI RiverPro. Shoshone falls, with integrated PicoMB Multibeam sonar*

Hull Length	116 cm / 45.6 in
Hull Width	21cm / 8.2 in
Hull Material	UV Resistant HDPE
Typical Survey Speed	2-3 knots
Top Speed	6 knots (Payload dependent)
Battery Endurance	8 hours at Survey Speed
Power	2x 14.8 vdc 16 Ah Battery LiPo
Maximum Conditions	1-2' waves/chop
Empty Hull Weight & Batteries	9.8 kg / 25 lbs
Payload	15 kg / 35 lbs
Motor	2 x Brushless thrusters
Remote Range	2km (line of site)
AutoNav Range	2km (line of site)
Example Payload	HydroLite Echosounder, PicoMB Multibeam echosounder, Teledyne RDI River Pro ADCP, Sontek M9 ADCP

### 3 TRIDRONE

The TriDrone™ USV is a super-compact, portable platform for conducting hydrographic surveys in confined & remote bodies of water. With remotely controlled capabilities, a durable assembly, and a hull-integrated single beam echosounder, this USV brings automation and efficiency to any work site. The USV gains stability from its triple pontoon design and folds into thirds for one-person transport. Its maneuverable servo thruster steers the USV into previously unreachable zones with heightened precision and repeatability. Safely conduct hydrographic surveys from the shore and increase productivity in the field with the TriDrone™.



Hull Length	121.92 cm / 48 in
Hull Width	86.36 cm / 34 in
Hull Material	UV Resistant HDPE
Typical Survey Speed	2-3 knots
Top Speed	7 knots (Payload dependent)
Battery Endurance	8 hours at Survey Speed
Power	1 x 14.8 VDC 16,000mAh LiPo Battery
Maximum Conditions	1-2' waves/chop
Empty Hull Weight & Batteries	8.62 kg / 19 lbs
Payload	11 kg / 25 lbs
Motor	1 x Brushless thrusters
Remote Range	1km (line of site)
Payload	Integrated HydroLite Echosounder

## 4 WEEDRONE

The WeeDrone - 120™ is a lightweight and unmanned surface trimaran developed to effectively and efficiently help maintain ponds, lakes, commercial fountains, shipyards and other outdoor & aquatic recreational facilities.

This Unmanned Surface Vehicle (USV) is also the first of its kind, providing complete Autonomous functionality, greatly reducing labor costs and time.



Hull Length	121.9cm / 48in
Hull Width	91.4cm / 36 in
Hull Material	UV Resistant HDPE
Typical Survey Speed	2-3 knots
Top Speed	6 knots (Payload dependent)
Battery Endurance	8 hours at Survey Speed
Power	2x 14.8 vdc 16 Ah Battery LiPo
Maximum Conditions	1-2' waves/chop
Empty Hull Weight & Batteries	18.1 kg / 40 lbs
Payload	18.9 L / 5 Gallons
Motor	2 x Brushless thrusters
Remote Range	2km (line of site)
AutoNav Range	2km (line of site)
Example Payload	Algae Control Products, Chlorine/Pool and Lake Management Products, Anti-Corrosion Products, Flame Retardant/Fire Prevention Products, Pesticides/Agricultural Nutrients, Wildlife Management Products

## 5 ECHOBOAT-160

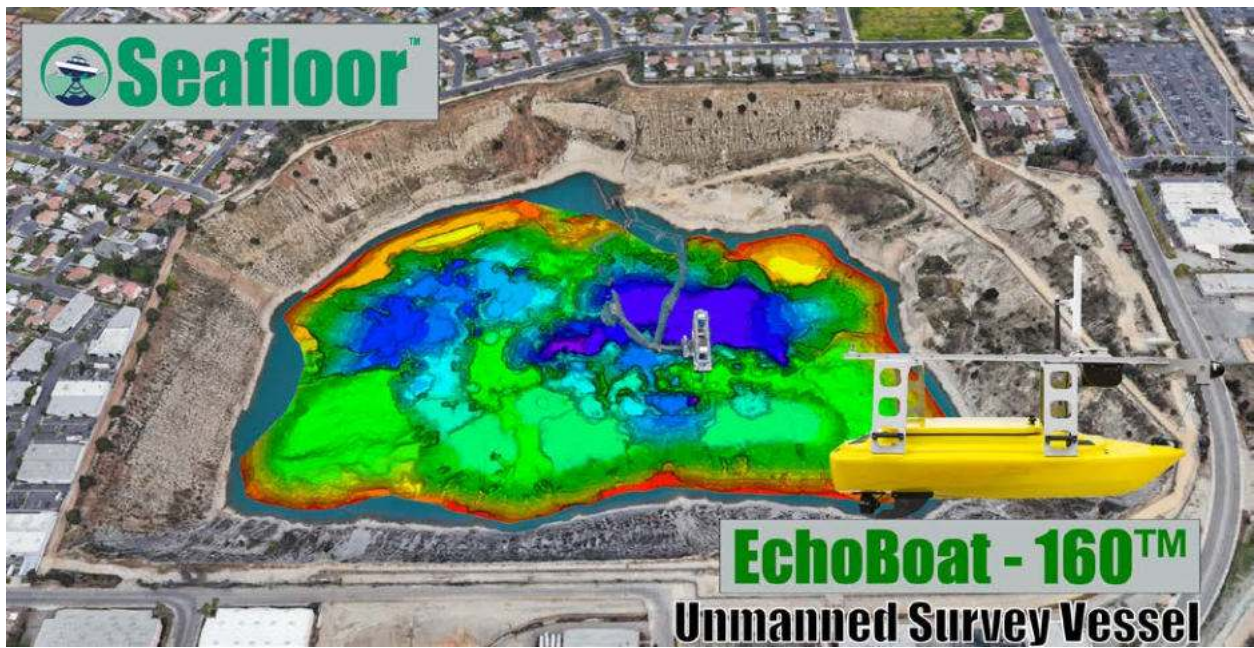
The EchoBoat is Seafloor System's more versatile 1.8m monohull remotely operated, and autonomous survey platform. Its thru-hull mounting system allows for maximum flexibility to swap different systems and payloads in/out of the EchoBoat. It can handle slightly rougher conditions than the HyDrone.

We also offer an integrated remote-controlled profiling winch, to lower a sound velocity profiler for Multibeam surveys, or similar CTD or water quality sensors.

The EchoBoat is Seafloor Systems workhorse system; a cost-effective option used to perform Hydrographic or Hydrologic surveys with Single beam, Multibeam, Sidescan, ADCP, or multi-sensor payload in remote, shallow, or dangerous areas, or when routine surveys can be done more cost effectively with 1-2 person crew from shore.



*EchoBoat-160 with integrated Multibeam sonar, Inertial Navigation System, Sound velocity sensor, Sound velocity Profiler, LIDAR scanner, and onboard PC with hydrographic data collection software*



*Echoboat 160 Multibeam System*



*EchoBoat with EchoCart and Launch and Recovery davit system to lower off a dock or wall.*



*Swapping a Multibeam sonar and ADCP system in/out of the thru-hull moonpool.*



Hull Length	1.7m
Hull Width	0.8m
Hull Material	UV Resistant HDPE
Typical Survey Speed	2-3 knots
Top Speed	6 knots
Battery Endurance	8 hours at Survey Speed
Power	2x 14.8 vdc 16 Ah Battery LiPo
Maximum Conditions	3' waves/chop
Empty Hull Weight & Batteries	58 kg / 130 lbs
Payload	30 kg / 66 lbs
Motor	2 x Brushless thrusters
Remote Range	2km (line of site)
AutoNav Range	2km (line of site)
Forward Looking Camera	yes
Example Payload	Multibeam Sonar (Sonic 2020, Norbit iWBMS, PicoMB-120), Starfish 990 or 453OEM sidescan sonar, Teledyne Odom E20 dual frequency echosounder, PingDSP, Teledyne RDI or Sontek ADCP's, Applanix INS
QuickCast Profiling Winch	Valeport SWIFT sound velocity profiler

## 6 ECHOBOAT-240

The EchoBoat-240 is a larger, scaled up version of the standard workhorse EchoBoat-160 remote controlled and autonomous survey platform. It was developed for applications requiring the highest resolution sensor suite available, and to remain more stable in conditions rougher than the standard EchoBoat-160 can handle.

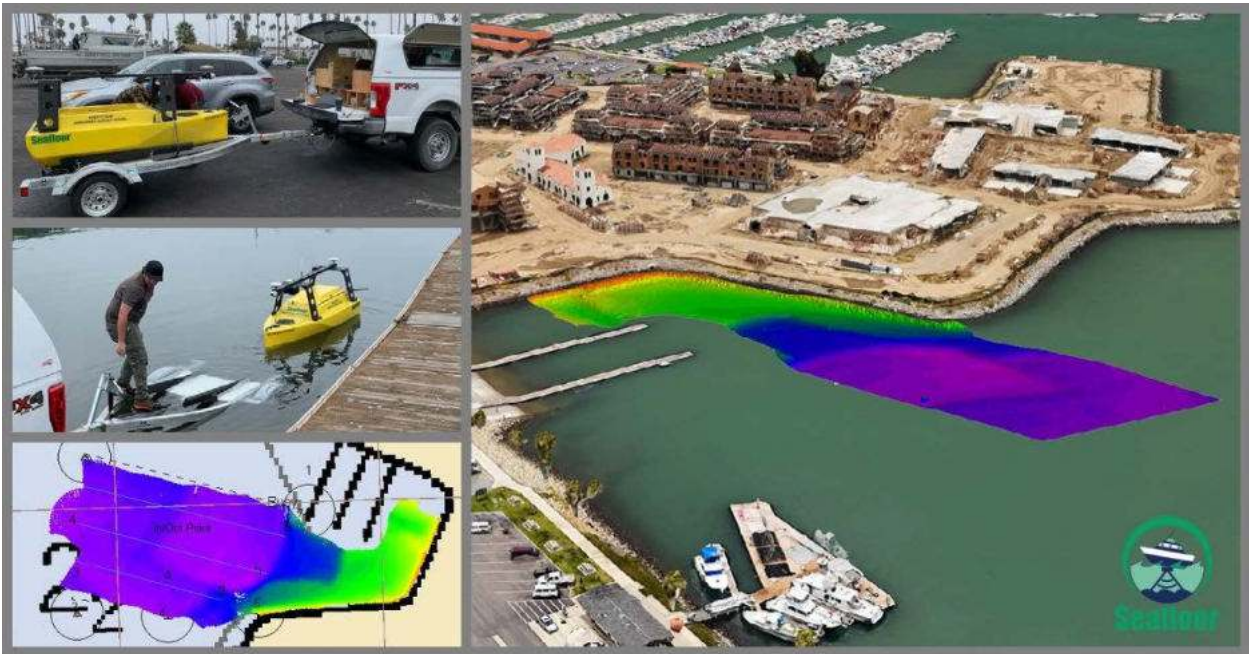
With the new EchoBoat-240 platform, the user no longer has to sacrifice performance to meet payload capacity. The mounting well is designed around models including the Teledyne SeaBat T50/T20, the R2Sonic 2024, or the larger Norbit iWBMS-STX models.

Still two person transportable, it is an ideal model to launch from a trailer or cart in areas where a crewed boat is not necessary. Or launched via a davit off a survey boat, to be used as a force multiplier alongside your crewed survey vessel, working in shallower areas or alongside the main boat.



*EchoBoat-240 with SeaBat T50 integrated on it.*





*EchoBoat-240 with SeaBat T50 Multibeam System (USACE-Los Angeles District)*

EchoBoat-240 features include:

- Rugged, pollutant-resistant HDPE hull for maximum durability
- Wave-piercing displacement hull shape
- Actuating thrusters
- Integrated Battery with external AC Power charging port
- Intelligent power supply with protected power management
- Configurable cargo deck and internal equipment rack
- Integrated Industrial PC and Wi-Fi Communication

Hull Length	2.4m
Hull Width	0.9m
Hull Material	UV Resistant HDPE
Typical Survey Speed	3-4 knots
Top Speed	5 knots (payload dependent)
Battery Endurance	8 hours at Survey Speed
Power	25.2VDC
Maximum Conditions	4-5' waves/chop
Empty Hull Weight & Batteries	158 kg / 350 lbs
Payload	90 kg / 200 lbs
Motor	2 x Brushless DC Outdrive thrusters
Remote Range	2km (line of site)
AutoNav Range	2km (line of site)
Forward Looking Camera	yes
Example Payload	Multibeam Sonar (Teledyne RESON SeaBat T50/T20, R2Sonic 2024, DVL, ADCP, Sound Velocity Profiler)
QuickCast Profiling Winch	Sound velocity profiler

## 7 HYDROCAT-180

The HydroCat-180 is Seafloor Systems largest USV platform. It is a 5.5m / 18' Catamaran, with independent articulated hulls and a gimballed deck, designed specifically to handle rough conditions and manipulate over waves while keeping the payload stable. It includes a remote-controlled retractable sonar arm, Remote controlled profiling winch, large waterproof equipment enclosure, and ample space for a customized multi-sensor payload, with both fixed mounted and towed sensors.

This model is designed for more coastal offshore use, SS2-SS3 conditions. While it is not an “offshore” platform, it is an ideal system to use as a force multiplier for survey large open areas and near shore work. Below, we have an Integrated Dual Head SeaBat T50 installed.



*HydroCat-180 with IDH SeaBat T50, INS Type 30 (Hampton Roads Tunnel Connectors)*



*HydroCat-180 with a Winch towing a Klein MA-X View 600 sidescan sonar*

We are now building the G2 version of the HydroCat-180 with Aluminum Hulls.

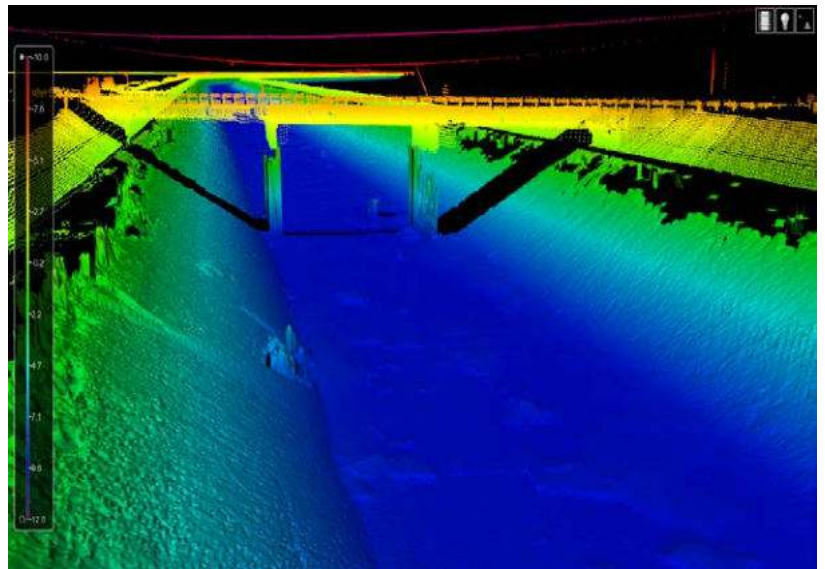


Hull Length	5.5m / 18 ft.
Hull Width	2.5m / 8ft.
Hull Material	Aluminum
Typical Survey Speed	4-6 knots
Top Speed	10 knots (Payload dependent, mounting pole retracted)
Battery Endurance	6-12 hours (user defined, more batteries possible)
Power	25.2VDC
Maximum Conditions	6' waves/chop
Empty Weight & Batteries	680 kg / 1500 lbs
Payload	320 kg / 700 lbs
Motor	2 x 10Hp electric outboards
Remote Range	2km (line of site)
AutoNav Range	2km (line of site)
Forward Looking Camera	yes
Example Payload	Multibeam Sonar (Integrated Dual Head Teledyne RESON SeaBat T50/T20, Norbit, R2Sonic, PingDSP, Applanix, towed Klein Sidescan Sonar, etc)
QuickCast Profiling Winch	Sound velocity profiler, CTD,

## 8 CUSTOM / BESPOKE USV'S

Seafloor's range of unmanned vehicles does not meet the requirements for every application. Our Team of engineers can design and develop a custom solution to meet any requirement whether big or small for inshore or offshore use. Additionally, we offer custom sensor integration for applications including hydrographic survey, security, MCM, Inspection, and Monitoring. Contact our Sales Team to get a custom solution and proposal.

Examples of custom USV's include the HydroCat-150 with integrated Dual Head SeaBat T50 Multibeam System, INS Type 30 Applanix Oceanmaster with POSPac MMS, AML MicroX, AML BaseX2, BV5000 high resolution multibeam on Pan and Tilt with MotionScan, Carlson Merlin LIDAR, HYPACK HYSWEEP, CARIS HIPS/SIPS, complete with training follow up maintenance program for the California Department of Water Resources Aqueduct Maintenance Division.



## 9 SUMMARY

Seafloor Systems is continuing to develop and improve the EchoBoat and HydroCat systems as affordable, effective survey platforms with ultimate flexibility and adaptability to individual customer needs and environments.

All Seafloor USV's are designed to be versatile; easily adaptable to accommodate customers' existing equipment, easy to operate, and low cost to maintain. Or we can provide a complete turnkey solution. Seafloor is capable to customize solutions to meet your specific requirements.

Seafloor Systems USV's are tools that surveyors can use to:

- Save operational costs when used in conjunction with other survey platforms as a force multiplier
- Gain access to difficult areas where it is not possible to launch a conventional survey boat
- Remove risk and human harm from the equation in other dangerous environments
- Execute quick progress or search and recover survey, very cost effectively

This technology has already arrived, and has already been proven. They are reliable and viable tools already employed. The bettering and building upon these tools is ongoing. And SeaFloor as at the forefront of this movement.

If this technology and capability is of interest, please keep in touch and follow our progress. You can contact us directly with any pricing inquires, or inquire about demonstrations.

We stand by our products. Our goal at Seafloor is provide quality solutions, within budget. Reliability, Repeatability, Quality, Support, Value. Customer feedback and suggestions are always welcome.

We are designing and adapting these for your use, as hydrographic surveyors.