

Echoscope® Diver Survey Sled NANO

The Worlds Most Advanced Real-Time 5D & 6D Sonars

The New Variant of our Neutrally Buoyant and Highly Maneuverable Survey Sled, which Benefits from the Reduced Form Factor of the Echoscope PIPE NANO Gen Series® Sonar.

The Echoscope® Diver Survey Sled NANO (EDSS NANO) is a new variant of our neutrally buoyant and highly maneuverable survey sled, which benefits from the reduced form factor of the Echoscope PIPE NANO Gen Series® sonar, and a completely re-designed tactical buoyancy set, making it easier than ever to handle underwater.

At the heart of the platform sits our cutting-edge real-time 3D imaging sonar, the Echoscope PIPE NANO Gen Series®, which generates high-resolution real-time 3D images of its environment. These images are then georeferenced using a customer-selectable subsea Inertial Navigation System, enabling it to produce accurate models and maps which are available to the user immediately. Its easily adjustable mounting plate allows it to switch from generating detailed imagery of a ships' hull to providing IHO-grade surveys of the seabed, making it a highly flexible multi-application package.

Just like the standard EDSS, the EDSS NANO has a built-in Diver Control Unit (DCU) which acts as an integrated computer with subsea display, allowing the diver to utilise our 4G USE® DAVD Flex software to acquire sonar and navigation data and display crisp, easily interpreted imagery of the 3D scene in real time.

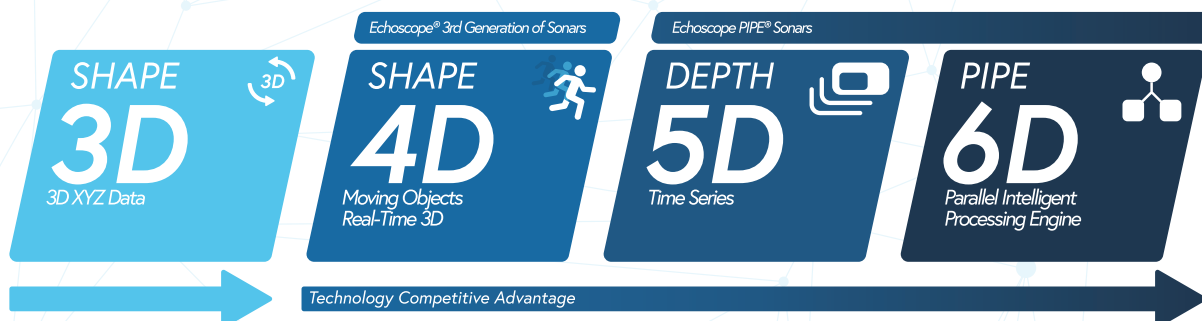
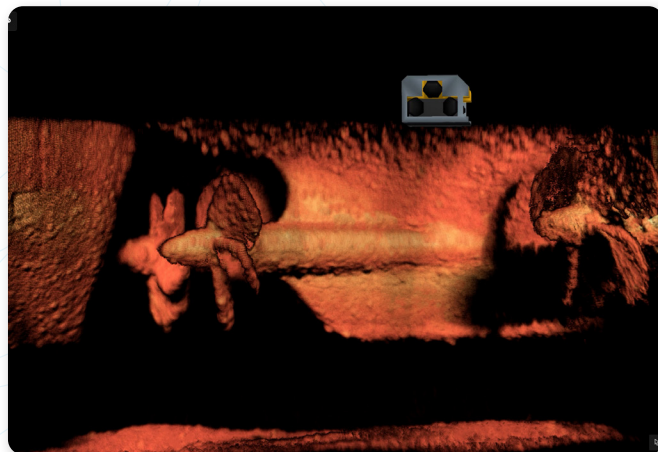
Echoscope PIPE NANO Gen Series® is our AI-ready, ultra-compact family of real-time 3D volumetric imaging and perception sonars — purpose-built for the next generation of underwater vehicles, diver wearable systems, and robotic platforms. Equipped with AI-enabled perception and autonomy capabilities, it converts real-time 3D acoustic data into navigational awareness and intelligent system response. Its reduced form factor and minimal weight make it ideally suited for diver controlled deployments, delivering exceptional underwater spatial awareness and bulletproof performance in zero-visibility conditions. The result is greater operator confidence, enhanced mission effectiveness, and reliable performance in the most challenging subsea environments.

Echoscope PIPE® users can also benefit from our Sequencer technology, which allows them to use a single device for multiple purposes simultaneously. Sequencer allows you to configure multiple sets of acoustic parameters and processing steps, which will be run concurrently and provide separate data streams that can be used for different purposes. Echoscope PIPE® can make full use of Sequencer's capabilities, allowing the user to collect ultra-wide-angle seabed data while also gathering tightly focussed high-frequency data on a specific area of interest.



The 5D and 6D Echoscope PIPE® sonars embed the Coda Octopus' innovative high-powered and extensible real-time parallel processing engine. Legacy Echoscope® variants were capable of outputting up to 65,536 points per ping within the sonar's field of view using a single set of acoustic parameters.

In our 5D and 6D sonars we can, amongst other things, capture (for offline beamforming) and process the full backscatter (3D time series) data of up to 164 million points per ping and also make this data available in real-time for top-end visualization and processing. Supported by a range of advanced signal processing options, Echoscope PIPE® is revolutionary as it allows our customers to access the entirety of the available sonar data for multiple simultaneous outputs such as multiple 4D Images with different processing and/or the full backscatter (time series) output given much greater range and image fidelity – all from a single sensor in real-time. From complex live operations to autonomous vehicle data collection missions, this technology and capability presents a paradigm shift for marine and ocean monitoring and mapping.



3D imaging typically is the scanning of an object of a sequence of images to construct a 3D Shape. The limitation of this approach is the inability to see any moving objects and having a high dependency of a stable platform to perform the imaging.

4D Volumetric Images represent a true volume of spatial data collected and processed at the same instant. Sequential 4D Volumetric images represent a time sequence of the scene showing moving objects within the volumetric image.

5D Images are represented with multiple slices of depth data - similar to a medical CT Scan. The 5D images contain more depth information, detail and resolution of each target and sequential 5D images over time show higher resolution moving targets.

6D PIPE allows multiple parallel 5D images to be generated with different imaging and sonar parameters. This allows different processing to be performed on the RAW sonar data in parallel and extracts more specific results without compromise.

PROBLEM

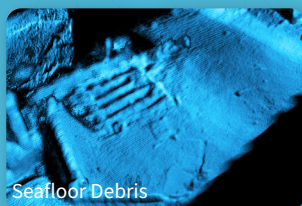
Underwater Salvage

Divers involved in salvage operations have to tackle complex, unstable and frequently changing environments, often with severely limited visibility. They face hazards such as entanglement, disorientation or entrapment, and work on target structures that are likely to be unsound and inherently dangerous. Even areas which have been surveyed or inspected before can present unknown challenges as seabed sediment or the target structure itself shifts over time.

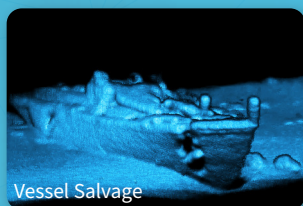
SOLUTION

Echoscope® Diver Survey Sled NANO

The easily maneuverable EDSS NANO allows divers to approach a structure safely and build a 3D model of its current state in real time. It can be moved freely allowing structures to be viewed from all angles for complete scene awareness. Information is available in real time to the diver and also on the surface, allowing for rapid decision making and safe operations.



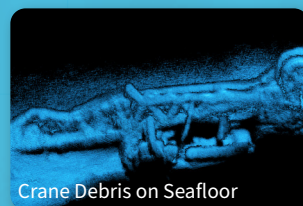
Seafloor Debris



Vessel Salvage



Francis Scott Key Bridge
Salvage Operation



Crane Debris on Seafloor

PROBLEM

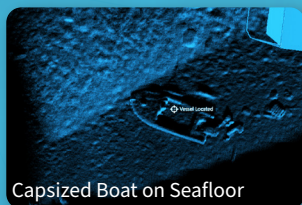
Search & Rescue

Law enforcement agencies around the world are often faced with the task of finding and recovering objects underwater in a wide range of circumstances, from criminal investigations to humanitarian disaster relief. Performing manual fingertip searching is time-consuming and both physically and mentally fatiguing; the logistics of tracking exactly where has been searched, and whether any areas were missed, presents an additional challenge.

SOLUTION

Echoscope® Diver Survey Sled NANO

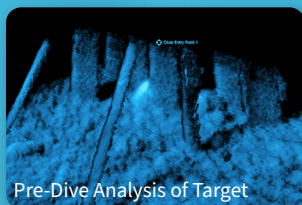
By combining accurate position and attitude navigation with the Echoscope PIPE NANO Gen Series® sonar imagery, the EDSS NANO allows a diver to produce accurate, detailed and reliable models of wide areas. Complete coverage is assured, and data can reviewed and processed in our 4G USE® software, allowing imagery, measurements and 3D point cloud data to be exported for reporting purposes.



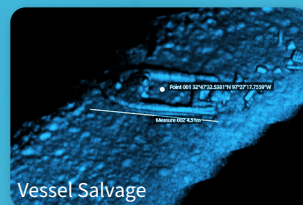
Capsized Boat on Seafloor



Search and Rescue



Pre-Dive Analysis of Target



Vessel Salvage

PROBLEM

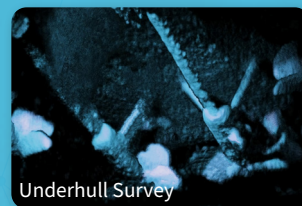
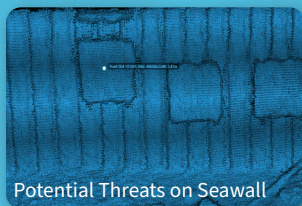
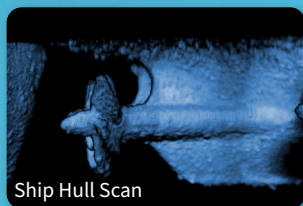
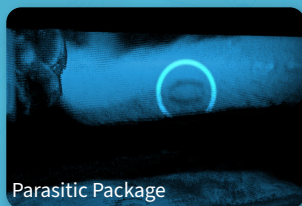
Ship Hull Scanning

Across the globe, port authorities and law enforcement agencies shoulder the vital task of detecting contraband hidden on mule vessels and uncovering parasitic packages attached to larger ships. In challenging underwater environments, where visibility is often murky or nonexistent, inspections typically rely on cameras followed by manual diver checks of the hull. This approach not only increases the risk of missed threats but also places divers in hazardous situations, requiring direct contact with potentially dangerous targets.

SOLUTION

Echoscope® Diver Survey Sled NANO

The EDSS NANO is a compact and ergonomic, diver controlled solution that provides fully geo-referenced, high definition real-time 3D imagery allowing full environmental awareness in all water conditions, including zero visibility. This portable solution allows for quick deployment and accurate data collection in a variety of applications including underhull ship scanning to identify parasitic packages or potential threats.



Some of the innovative EDSS NANO features available are:



All-in-One Solution

EDSS NANO provides direct diver visualization of real-time 3D sonar data, as well as providing an integrated computer, display and software modules for subsea mission planning and scanning, with a built-in inertial navigation system with pressure sensor offering high-precision diver navigation and positioning



Echoscope PIPE NANO Gen Series®

NANO excels in capturing high-resolution real-time 3D data, providing an extensive range of frequency and operating parameters to optimize ship hull scanning, seabed survey and structural inspections, and can be used in tether mode, with data available on the surface in real-time, or on battery for complete diver independence



Practical Handling

Front Handles allow easier scanning operation and uninterrupted access to the Diver Control Unit during a dive, and the frame allows the unit to be set down while protecting the sonar and INS system in harsh environments.



Adjustable Angles

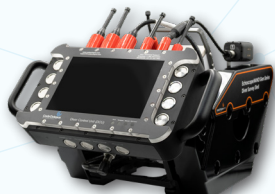
Sonar mounting angle can be adjusted in increments to look upwards, forwards or downwards, allowing fast and easy change from ship hull visualization to inspection or survey operations, with a quick release pin to allow easy tilt angle adjustment for trouble free performance underwater



Neutrally Buoyant

Integrated buoyancy makes the whole platform neutrally buoyant in water, and makes long term use effortless

Main Components



Platform Frame

The Platform Frame accommodates the Echoscope PIPE NANO Gen Series®, Navigation and Sensor Package, Diver Control Unit and Detachable Storage. Its integral sonar pivot allows for manual adjustments from forward looking to upward looking for ship hull scans with quick Echoscope® Mounting and Unmounting, and provides neutral buoyancy with an even list/trim.



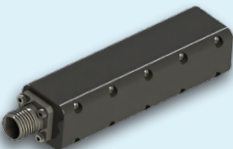
Echoscope PIPE NANO Gen Series®

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Diver Control Unit (DCU)

Housed in a waterproof metal housing, the Diver Control Unit facilitates diver interactions through the two banks of 4 buttons either side of the display. The DCU runs Microsoft Windows® 11 and Coda Octopus Custom Software to perform all surveying, data recording, navigation and sensor information, visualized through a 10.3" full-HUD resolution display, with waterproof connectors for power/ethernet, external storage, navigation, and sonar.



Detachable External Storage Device

The detachable external storage drive provides up to 1TB of solid-state storage for data recording and connects directly to the DCU via a waterproof USB 3 interface. Designed for ease of use, the SSD is secured using clips and a thumb screw that enable quick release when required. A supplied USB cable also allows the SSD to be connected directly to a standard USB port on a PC or laptop, enabling convenient data transfer and post-processing once back on the surface.



Navigation and Positioning Sensor

The EDSS NANO is designed to work with a Doppler Velocity Logger-aided Inertial Navigation System, which combines gyroscopes, accelerometers with pressure and acoustic data to provide accurate and reliable position and attitude information, which is merged with the 3D sonar data to create detailed, geo-referenced models.



Sled GPS

The Sled GPS is a waterproof, depth-rated GPS antenna fitted onto the Platform Frame, providing the INS with absolute drift-free position while at surface to seed position and enhance overall navigation accuracy.

Optional Components



DPPmax

The DPPmax is a high-performance, rugged computer system worn by the diver. It manages, acquires, and processes data from all diver-worn sensors, displaying the data on the Diver HUD. This includes digital audio, digital video, diver depth, full head tracking (and temperature), external sensors, and processed real-time 3D sonar data.



Diver Head-Up Display (GEN_4 HUD)

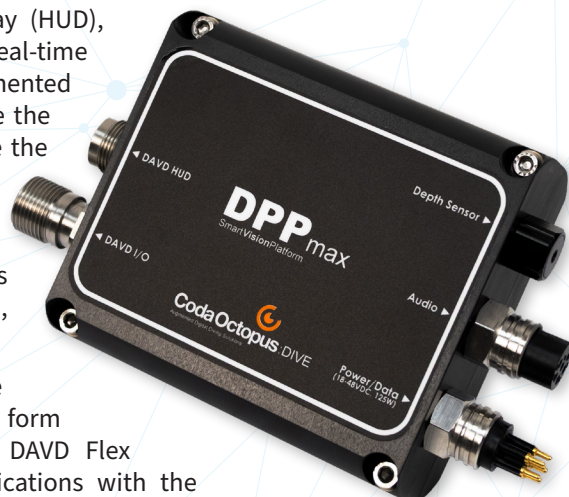
The HUD is used as a data display portal and is compatible with numerous helmets and face masks including those from Kirby Morgan, Interspiro, Draeger and OTS. The HUD is supplied in the visor and is removable. It is a completely waterproof and depth-rated Augmented Reality display system. (Patent Notice: US10877282)

DAVD Flex Integration

By integrating the high-performance, ruggedized DPPmax, operators can integrate DAVD Flex functionalities directly into their EDSS NANO configuration through a Head-Up Display integrated into the Diver's helmet or face mask.

The DAVD Flex integrates topside control, a Head-Up Display (HUD), and digital communications for divers, facilitating seamless real-time information exchange between divers and supervisors via augmented reality displays in the diver's helmet or mask. Supervisors use the Coda Octopus 4G USE® DAVD Flex Edition software to manage the HUD, displaying real-time 3D imagery and communicating with divers through images, videos, technical drawings, and messages. Divers access critical technical data and support from surface teams, optimizing mission outcomes with features like real-time depth, compass, head tracking, dive timers, alerts, positioning, navigation, and enhanced audio capabilities.

Traditional diver audio communications can be challenging in the best of conditions, but are the primary form of communication between the diver and the supervisor. DAVD Flex opens the gateway to a new era of digital diver communications with the surface, providing a number of critical features including auto-noise cancellation and background noise suppression. These functions provide clear audio communications even with background noise at either the diver or on the surface. Recorded speech, videos with audio tracks and automated computer speech instruction are output digitally from the DPPmax on the diver in crystal clear audio.



Overall

Dimensions (L x W x D)

548 mm x 244 mm x 328 mm
(21.57" x 12.91" x 12.91")

Weight in Air

18 kg
(39.68 lbs)

Depth Rating

50 m

Platform Frame
(Including Foam)

Dimensions (L x W x D)

431 mm x 367 mm x 250 mm
(16.96" x 14.44" x 0.98")

Depth Rating

50 m

Diver Control Unit
(DCU)

Dimensions (L x W x D)

431 mm x 367 mm x 250 mm
(16.96" x 14.44" x 0.98")

Power Input

24 - 30V DC

Depth Rating

50 m (164 ft)

Pressure Rating

5 BAR

Display Size

256 mm
(10.1")

Resolution

1920 x 1200

Brightness (cd/m2)

320

Processor

11th Gen Intel® Core™ i7-1185G7E

RAM

32 GB

Operating System

Microsoft Windows® 11

Sled GPS

Dimensions (L x W x D)

51 mm x 51 mm x 96 mm
(2.0" x 2.0" x 3.77")

Power Input

5V DC

/Echoscope PIPE

■■■■■ NANO Gen Series

Dual Frequency

Triple Frequency

Acoustic Projectors

Mid-Frequency
(500 kHz)

High-Frequency
(840 kHz)

XD Low-Frequency
(375 kHz)

Mid-Frequency
(500 kHz)

High-Frequency
(840 kHz)

Adaptive Frequency
Band

420 kHz - 550 kHz

700 kHz - 920 kHz

320 kHz - 400 kHz

420 kHz - 550 kHz

700 kHz - 920 kHz

Number of Beams
(Density)

Up to 256 x 256

Number of Values per
Beam

2,500 (Dependent on Features Purchased)

Maximum Range*

60 m (197 ft)

50 m (164 ft)

120 m (394 ft)

60 m (197 ft)

50 m (164 ft)

Minimum Range*

0.5 m (1.64 ft)

Range Resolution

1 cm (0.7")

Update Rate (Ping Rate)

Up to 50 Hz

Imaging Field of View
(User Selectable)

54°x54° - 46°x46°

33°x33° - 23°x23°

90°x45° - 45°x22°

54°x54° - 46°x46°

33°x33° - 23°x23°

Beam Density (Spacing)

0.21° x 0.21° - 0.18° x 0.18°

0.13° x 0.13° - 0.09° x 0.09°

0.35° x 0.18° -
0.18° x 0.09°

0.21° x 0.21° -
0.18° x 0.18°

0.13° x 0.13° -
0.09° x 0.09°

*The actual working range will depend on the target's size, reflectivity and the level of detail required for the Application.

Dimensions (H x W x D)

218 mm x 182 mm x 149 mm
(8.6" x 7.2" x 5.9")

Weight in Air

4.8 kg (10.6 lbs)

Power Consumption

2 - 5 A at 24 V DC

Depth Rating

Rated up to 50m (164 ft)

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