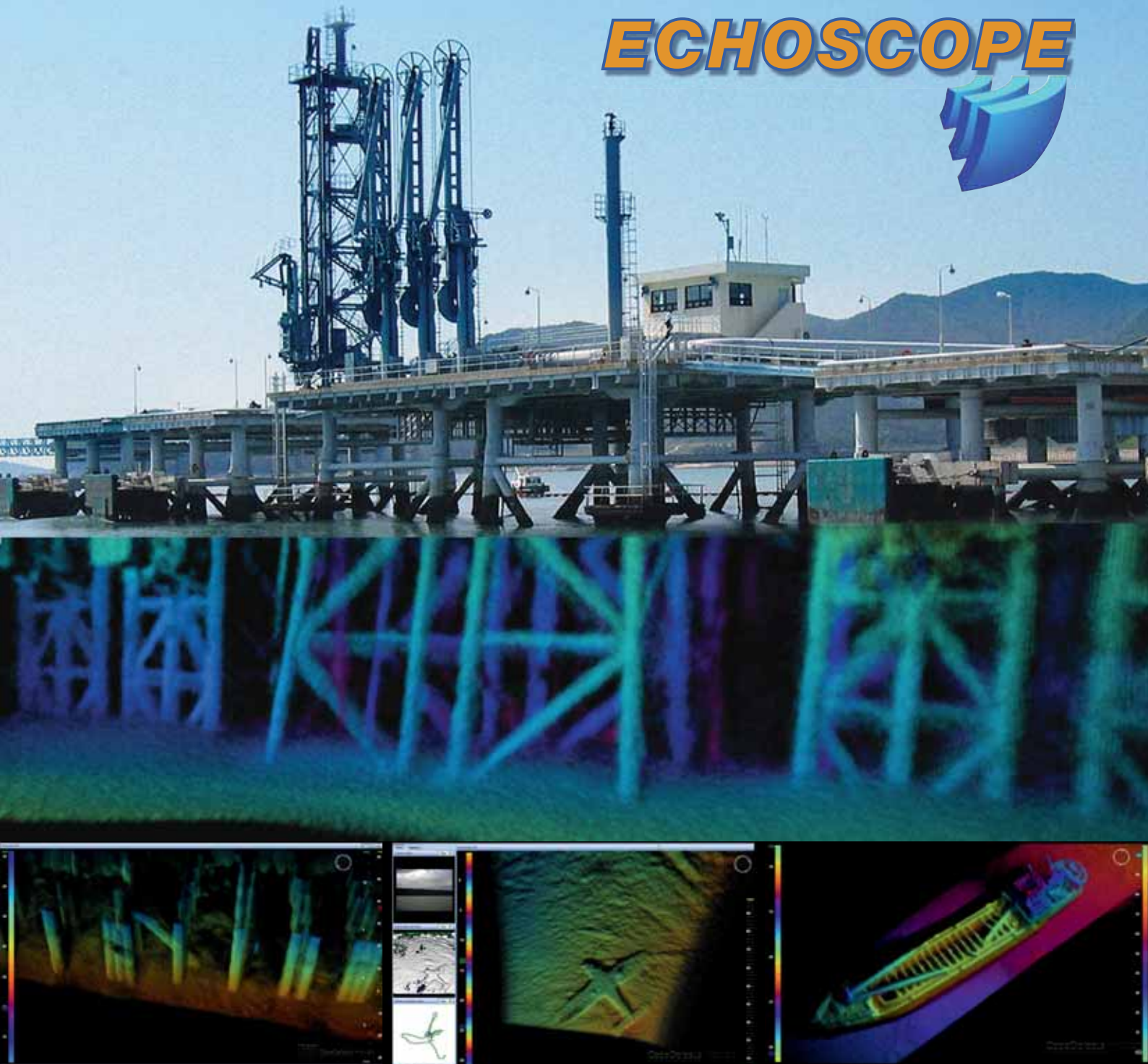


ECHOSCOPE



High Resolution 3-Dimensional Images in Real Time
Unique Sonar Technology

KEY APPLICATIONS

- 🐙 Port & Harbour Security
- 🐙 Underwater Construction
- 🐙 Strategic Asset Inspection
- 🐙 Dredging & Rock Dumping
- 🐙 Search & Recovery

High Resolution 3-Dimensional Images in Real Time Unique Sonar Technology

APPLICATIONS

- 👉 Port and harbour security
- 👉 Underwater construction
- 👉 Ship hull scanning
- 👉 Dredging and rock dumping
- 👉 Mattress laying
- 👉 Grout bag installation
- 👉 Scour monitoring
- 👉 Search and recovery
- 👉 Inspection of bridges, dams, harbour walls
- 👉 Contraband detection
- 👉 Pipeline touchdown inspection and placement
- 👉 Obstacle avoidance
- 👉 Bathymetry
- 👉 Iceberg monitoring
- 👉 Fisheries research
- 👉 Subsea metrology

Versatile

- Suitable for vessels of all sizes
- ROV, AUV, pole mount, fixed installation
- Rapid deployment
- Accurate even in turbid water
- Compact and portable
- Simple to operate
- Can be used in navigationally restricted environments

Unique

- The world's only underwater real time 3D high resolution sonar
- Patented automatic 3D mosaics and scene visualisation
- Accurate geo-referenced data
- Superior performance
- Platform independent
- 24 hour/7 day worldwide technical support



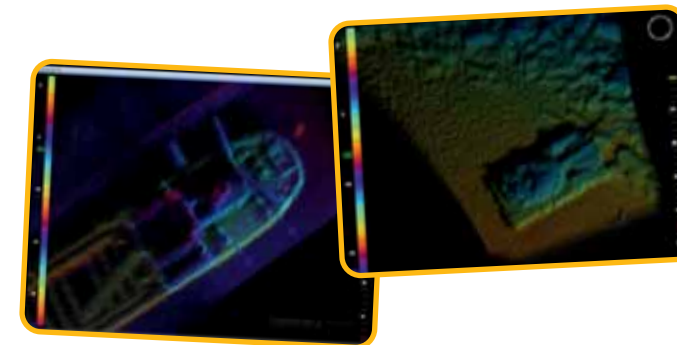
Echoscope mounted and deployed with excavator bucket

Taking sonar to the next dimension

Coda Echoscope is a unique sonar device

Using phased array technology the Echoscope generates over 16,000 beams simultaneously, producing instantaneous three-dimensional sonar images of both moving and stationary objects. Capable of up to 12 updates per second, the co-registered 3D imagery from each ping allows visualization of the whole scene in real time. The 3D aspect enables the high resolution visualisation to be performed from multiple perspectives.

The addition of motion sensor inputs enables the data to be positioned accurately in 3D space and adjacent pings can be used to create mosaics on-line. The resulting whole area visualisation allows for extremely rapid reconnaissance and inspection.



Deployment

Compact and portable, the Coda Echoscope is about the size of a briefcase and can be rapidly deployed on vessels of opportunity. Suitable for use on almost any vessel with an over the side or bow mounting, it can be easily operated in navigationally restricted environments. The Echoscope can also be mounted on an ROV or AUV.



Coda Echoscope-UIS

Underwater Inspection System

The Echoscope-UIS is world's first fully integrated high resolution real time 3D inspection system. It delivers precise, intuitive and instantaneous three-dimensional images and enables inspection of large areas of complex infrastructure with 100% coverage. Developed under a US Department of Defense contract for the US Coast Guard, the Echoscope-UIS takes the unique Echoscope technology to the next level. Even the least experienced user can operate it to undertake rapid inspection of harbour walls, critical marine infrastructure and ship hulls and to visualize underwater intruders.

Digital navigation charts and satellite imagery can be imported, together with previously-collected target data to allow quick comparisons in areas which have been inspected at earlier stages. The Echoscope-UIS can be integrated with existing infrastructure and the data transmitted in real time to a Command and Control Centre for instantaneous decision making.

As part of a small boat package, the UIS includes a ruggedized waterproof digital video camera (for both day and night operation) to provide a separate and immediately obvious above water reference.

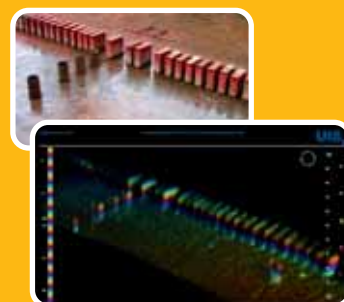


Coda Echoscope-CMS

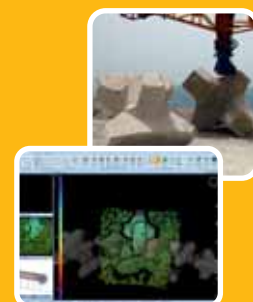
Construction Monitoring System

This new product has been specifically designed and developed to provide improvements in the efficiency and safety of underwater construction. Capitalising on the unique features of the Echoscope-UIS software, the Echoscope-CMS enables operators to clearly visualise, monitor and place objects, such as concrete armour protection blocks, underwater in real time. The intuitive software includes 3D graphic representation of the block and automatic tracking of its position and orientation.

Underwater construction projects using the Echoscope-CMS have recorded increases in productivity of 70%.



Dry dock in Belgium showing targets before and after flooding



Placing concrete armour protection blocks in breakwater construction using Echoscope-CMS

Advantages over Conventional Sonar Systems

Sonar applications are numerous and varied and the Coda Echoscope provides significant advantages, benefits and improvements over conventional sonar systems.

For users of:

Multibeam echo sounders

The Echoscope increases survey productivity

With over 16,000 simultaneous beams, the Echoscope can acquire all the data required for an inspection task from a single ping. This removes the need to co-register the data using survey positioning and motion sensing equipment and it can therefore be operated without specialist survey knowledge. A data density 100 times greater than a traditional multibeam echo sounder, combined with the ability to view the same data from multiple angles, allows real time robust filtering of spurious echoes normally associated with multibeam system. This results in far greater detail without the need for post processing.

The Echoscope is quickly and easily deployed from small vessels of opportunity or is suitable for bow mounting for inspection in very shallow water or where access is restricted, such as under rigs or in narrow channels. The large overlap between the areas covered by each ping allows very high vessel speeds whilst maintaining 100% coverage.

Sector scan sonars

The Echoscope improves image quality, coverage and resolution

The Coda Echoscope achieves both excellent angular coverage and excellent vertical and horizontal resolution simultaneously. When deployed looking forward it can acquire accurate range data and create detailed images of the scene with each ping. By contrast high resolution sector scan sonars, as used by ROVs for target imaging in construction and mine warfare applications, have vertical resolutions that are much poorer than their horizontal resolution making them unsuitable for obtaining range data from a scene as a whole. For conventional sonars, the choice of vertical beam width is always a compromise between sufficient coverage and improved vertical resolution.

In naval visualisation roles the Echoscope provides imagery of sufficiently high quality for the operator to identify a target as potentially harmful or benign at longer ranges than would be feasible with a sector scan sonar.

Underwater video cameras

The Echoscope eliminates down-time in poor visibility

The Echoscope generates high quality data sets even in turbid water, allowing visualization of the seabed and the workplace in real time. Replacing video cameras and even divers in applications such as underwater construction ensures continued good visualisation of the work environment along with reduced health and safety risks. Intuitive software enables 3D graphic representation of underwater objects.

TECHNICAL SPECIFICATION

PERFORMANCE

Frequency	375kHz
Number of beams	128 x 128 (16,384 total)
Maximum range*	150m (500ft)
Minimum range	1m (3ft)
Range resolution	3cm (1.2")
Update rate (ping rate)	Up to 12Hz
Angular coverage	50° x 50°
Beam spacing	0.39°

*Actual range is dependent on pulse length, target size and target strength.

PHYSICAL

Dimensions (h x w x d)*	380mm x 300mm x 160mm (15" x 11.8" x 6.3")
Weight in air	22kg (48lb)
Weight in water	12kg (26lb)
Power consumption	3-6A at 24Vdc
Depth rating (standard)	600m (2,000ft)
Depth rating (optional - special order)	3000m (10,000ft)

*Excluding connectors

INTERFACES

Sonar head control unit	Serial RS232 and Ethernet
Control unit to top end PC	Ethernet

Control unit can be sub-sea or surface located



AUXILIARY SENSORS

Tilt Sensor

Internal attitude sensor. Pitch and roll accuracy <math><0.5^\circ</math>

Optional precision attitude and positioning sensor (eg; Octopus F180)

DATA FORMATS

XTF
Output X, Y, Z position plus target strength and time to ASCII file
Output imagery
Output video clips

SOFTWARE

Windows Vista/Windows XP compatible

Comprehensive real time display and control software, including:

- Full control of viewing angle, transmit power, receive amplification
- Ability to position viewpoint and centre of observed volume arbitrarily in 3D space
- Ability to create pixel, grid, contour or sun illuminated views of 3D space
- Ability to generate movies of real time 3D data
- Automated mosaicing of sonar data, using external motion sensors

CodaOctopus PRODUCTS

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Enhance your operational performance with round-the-clock technical support, software maintenance and more with membership of CodaOctopus team. Complimentary 12 months' membership included with the purchase of a new Coda Echoscope.

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We reserve the right to change equipment specifications without notice. Selected images courtesy of GeoSea nv, Van Oord nv, Seatronics Ltd and Aberdeen Harbour.

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Coda

Advanced 3-D Sonar Solutions

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