

Benefits

Tracking and recording of block position and orientation during placement and post lay with no additional sensors

Real-Time 3D underwater scene awareness for crane operator

24 x 7 operations irrespective of water visibility

Increased rate of productivity

Increased accuracy and confidence of block final resting position

Increased diver safety and reduced reliance on divers for placement

Real-time survey grade inspection of slope prior to and during placement



Complete breakwater construction management system to see, track, place, record and document blocks placement.

The CodaOctopus® Construction Monitoring Solution (CMS) which works in conjunction with our Echoscope® sonars and our Echoscope® Air is a comprehensive software tool that increases productivity and safety of breakwater construction projects by enhancing the usual Echoscope's proficiency to visualize blocks in all water conditions including zero visibility conditions. The addition of the Echoscope® Air allows 3D Visualization and placement of the above the water blocks.

This solution includes the ability to simplify block position placement, automatically tracks block position/orientation, and record position/orientation for easy project management. Combining this with the Echoscope's capability to perform detailed pre- and post-lay surveys results in the Echoscope and CMS combination providing a complete end to end solution for construction, repair and maintenance of breakwaters.

This solution includes advanced features which enable different types and sizes of blocks to be automatically tracked from the real-time 3D Echoscope data. A 3D model of the berm design can be imported into the software for increased accuracy of placement and ease and speed of operation. The advanced features extend across the project enabling pre-lay survey of the berm and as-laid blocks, assisting real time block placement and recording as laid position of each block for end-to-end management of the project.

The pre-lay target position can be imported into CMS and a target bullseye for each planned block position created, giving the operator a clear easy to use guide to accurate planned, block position in XY and Z space.

The system is fully extensible and is currently certified for a number of different block types including ACCROPODE™, ACCROPODE™ II, and XBloc® construction blocks and variants of the system have been used on a large number of breakwater projects around the world. If required, we can support different type of block selections.

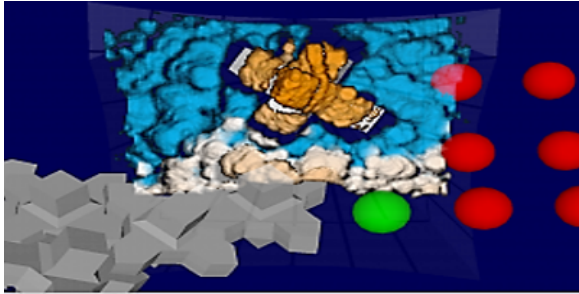
Features

See, track, place, record and document blocks as laid
The acoustic point cloud data of each block is recognized by the software, a 3D model of the block selected by the operator and the solution automatically locks the model onto the point cloud data. The operator has a clear 3D model of the block to work from, enabling increased accuracy of block lay, as the operator can 'see' all sides of the block.

Real-Time Visualization
Real-time 3D visualization of blocks and slope irrespective of water conditions for increased productivity, diver-less placement and pre/post-lay survey.

3D Automatic Tracking
The unique model tracking technology means the final position and attitude can be recorded in the global CMS database. The tracking can be further activated on subsequent survey data allowing the master asset database to be quickly updated with any block-placement movement.

Construction Workflow Management
CMS provides the capability to manage, monitor and document the entire construction phase of asset placement projects. Site design, pre-lay information, and data can be loaded into CMS (full X,Y,Z positions and rotations) for control, progress reporting and full-time visualization of placed assets, including those being actively placed.



Eric Peeters of Van Oord says:

“Van Oord has been using the Echoscope real-time 3D imaging sonar on various projects from 2008 onwards where single-layer artificial armour units (ACCROPODE™ & ACCROPODE™ II) need to be placed. During placement, the Echoscope 3D imaging sonar provides real-time guidance to the crane operator. The Echoscope has contributed to an increased productivity whilst improving safety.

Over the last year, Van Oord has taken part in the development of the CMS 2.0 solution which provides, amongst other new features, enhanced ACCROPODE™ tracking functionality which makes it another leap forward to diver-less placement. By providing a test location in Constanta, Romania, it was possible to feed the software developers instantly with new information.

Van Oord operates around the world as a leading contractor for dredging, marine engineering, and offshore energy projects (oil & gas and offshore wind).

Blair Cunningham, Coda Octopus President of Technology, says “in developing our CMS solution, we worked closely with Van Oord who own multiple Echoscope systems. This has given us real world feedback to enhance the capabilities of the package and, more importantly to address challenges that our customers face in these types of operations.”

Past Projects and References

ACCROPODE™ and ACCROPODE™ II Projects

- 🌀 Satah al-Razboot (UAE)
- 🌀 Upper Zakum Field (UAE)
- 🌀 Constanta Ras (Romania)
- 🌀 Ras Laffan (Qatar)
- 🌀 Moin (Costa Rica)
- 🌀 Chhara (India)
- 🌀 Tema (Ghana)

CORE-LOC™ Projects

- 🌀 Al-Zour (Kuwait)

Tetrapod Projects

- 🌀 Tokushima (Japan)

Antifer Projects

- 🌀 Hamifratz Port (Israel)
- 🌀 Colombo (Sri Lanka)

XBloc® Projects

- 🌀 Sumburgh (Scotland)
- 🌀 Swinoujscle (Poland)
- 🌀 Offshore Islands (Abu Dhabi)
- 🌀 Dunkerque (France)
- 🌀 Das Islands (Abu Dhabi)
- 🌀 Istanbul (Turkey)

Bloque Cubic Rainure (BCR) Projects











- 🌀 Port of Safi (Morocco)

Productivity Gains

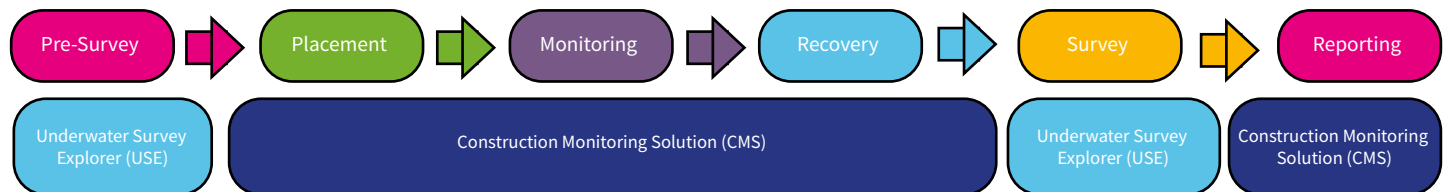
- 🌀 Satah al-Razboot, UAE - 8-9 blocks/hour (CLI Data)
- 🌀 Zadco Upper Zakum Field, UAE - 8-9 blocks/hour (CLI Data)
- 🌀 LNG Port Expansion - 10 blocks/hour (Van Oord/Boskalis Data)

Supported Block Types

CMS supports a number of different block types which are listed below. If your Block Type is not currently listed, please contact us and we can extend our support for your Project Block Type.

	ACCROPODE™ I		ACCROPODE™ II
	ACCROBERM™ I		ACCROBERM™ II
	CORE-LOC™		Dolos
	ECOPEDE™		Tetrapods
	XBloc®		XBloc® Plus

CMS Solution Workflow



How to Access CMS Software

Our CMS software is available to license for fixed periods of 6, 12, 24, or 36 months. Each CMS license is linked to a specific Echoscope® sonar and can only be used with this system. Please contact sales@codaoctopus.com for more information on how to obtain a CMS license.

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 for providing the 3D models of the breakwater block types pictured in this document. ACCROPODE™, ACCROPODE™ II, ECOPEDE™,
 ACCROBERM™ I, and ACCROBERM™ II are trademarks of d'Artelia. CORE-LOC™ is a trademark of the United States Army Corps of Engineers.
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