Coda Octopus
Sound Underwater Intelligence

/Echoscope PIPE® CIVS

Parallel Intelligent Processing Engine

Echoscope Close-In Visualization Sonar (CIVS)

The world's only 3D real-time sonar for ultra high resolution near-field imaging

The new Echoscope PIPE® CIVS is a close-in visualization (CIVS) Sonar from Coda Octopus and forms part of the Echoscope PIPE® family of sonar. Echoscope PIPE® CIVS introduces an entirely new capability into our range of 3D real-time sonar series. Using an innovative, patented beamforming approach, a wide field-of-view is created by stitching together up to nine ultra-high-resolution image tiles. Each image tile is beamformed in 3D using high-frequency pulses at just over 1 MHz, giving angular resolution of less than 0.3° and an impressive beam spacing density of 0.11°. Using cutting-edge processing technology each tile is beamformed in a small fraction of a second (20ms), allowing an entire 9-tile image to be updated at more than 5Hz.

Key Feature of Echoscope PIPE® CIVS

- Angular resolution of less than 0.3° @ 1.15MHz
- Range resolution 1.6 cm
- User selectable field of view up to 45° x 45°
- Image update rate of > 5 Hz
- Imaging range of 0.1m (0.33ft) – 35m
- Power consumption of less than 50 W
- Small form factor
- Depth rated 40m, 250m, 600m and 3000m

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Echoscope PIPE® CIVS Features

The Echoscope PIPE® CIVS system is designed on the back of the state-of-the-art Echoscope PIPE® sonar technology and inherits many of the advanced capabilities delivered by this platform. At the core of the PIPE® (Parallel Intelligent Processing Engine) system's capability is the capacity to store the Full Time Series data acquired by the sonar array, and process it multiple times, and in multiple ways, either online in real-time or by offline reprocessing. This capability also gives unprecedented access to every value in the output dataset – more than 40 million points. The table below highlights the key features the PIPE® platform that are available to the new CIVS system.

High dynamic range delivered by the full floating-point processing resolution.
Improved Image Processing capability, delivering greater flexibility and tunability, including enhanced noise rejection and filtering options, customizable sidelobe clipping, and broad selection of array shading options.
Ability to process up to 40 million points to generate 4D images with typically several 100Ks 4D points per ping (depending on the insonified scene) and providing more than 25 times the 4D data than our previous generations of real time 3D sonars.
Ability to create customized sequences of up to 10 different pings, each with its own set of transmit, beamforming and output options, allowing complex environments to be optimally imaged
Ability to transmit multiple different output datasets to different users, allowing a range of tasks to be performed concurrently
Optional ability to capture raw Full Time Series data from the array for reprocessing offline, allowing different beamforming outputs to be generated and analyzed
Real-time XYZ data output delivered directly from the sonar without the requirement for Coda Octopus top end software.

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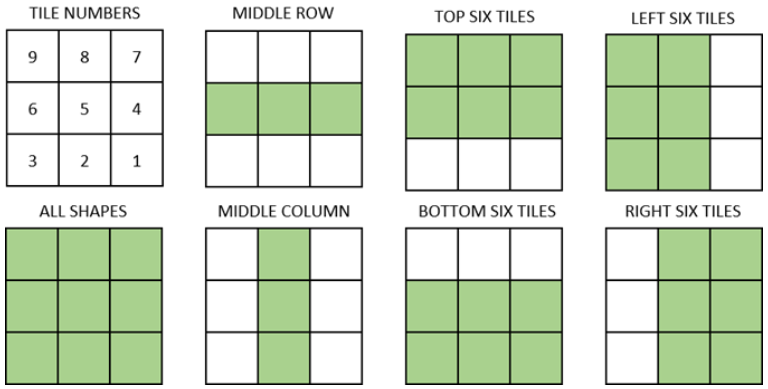
Technical Specifications for Echoscope PIPE® CIVS

Parameter	Specification
Center Frequency	1000 kHz
Adaptive Frequency Band	900 kHz – 1150 kHz
Maximum number of beams	128 x 128 for each tile 384 x 384 for full 3x3 tiled field of view
Maximum range*	35m (115ft)
Minimum range	0.1m (0.33ft)
Range resolution	1.6 cm (0.6”)
Update rate (ping rate) **	Up to 50Hz
Angular coverage (user selectable)	15° x 15° per image tile, with tiles arranged in a 3x3 grid to provide a complete 45° x 45° for full 3x3 tiled output. Other shape options include: 
Beam spacing density	Up to 0.11° x 0.11°

*The actual working range will depend on the target’s size, reflectivity, and the level of detail for the application

**The maximum achievable ping rate is dependent on the maximum range requested and the number of tiles per tile image. A complete 45 x 45 image can be generated at up to 5Hz, whereas the Middle Row or Middle Column can be images at rates over 15Hz and are therefore capable of capturing high resolution close-up motion of moving targets.

Physical	
Dimensions (h x w x d) (Excluding connectors and handles)	232mm x 301mm x 154mm (9.13in x 11.85in x 6.06in)
Dimensions (h x w x d) (Including Echoscope® Protective cover)	355mm x 339mm x 172mm (13.98in x 13.35in x 6.77in)
Weight in Air	15.16 kg (33.4lbs) – 250, 600 and 3000m versions
Power Consumption	2.0 A at 24 V DC An inrush current of up to 10 A for less than 20 µs may occur on start-up.
Depth Rating	CIVS are available in 40m, 250m, 600m and 3000m

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