SYSTEM AUV-5000 (V2)

HIGH RESOLUTION DYNAMICALLY FOCUSED MULTI-BEAM SIDE SCAN SONAR FOR AUV'S

AUV 5000 V2 System Components

In keeping with Klein's reputation of providing the best high resolution Side Scan Sonar imaging systems in the world, we are proud to introduce the AUV 5000 V2 designed specifically as a dual purpose Side Scan and Bathymetry sonar payload for Autonomous Underwater Vehicles (AUV).

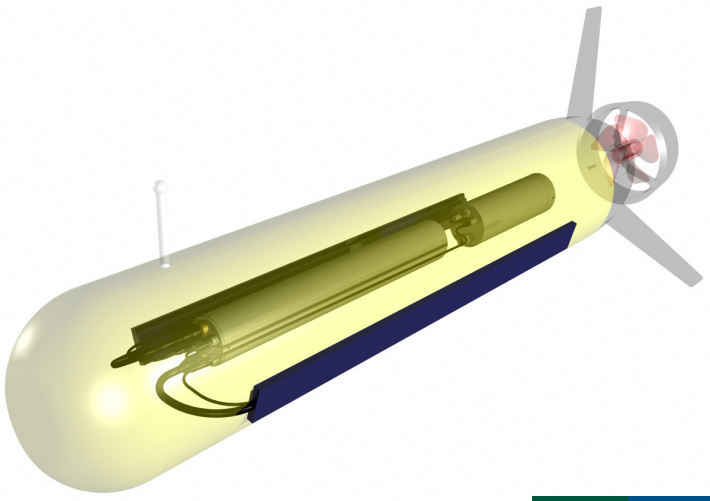
The Klein System AUV 5000 V2 simultaneously generates eight adjacent parallel sonar beams on each side of the AUV while employing advanced beam steering and dynamic focusing for unmatched Along Track resolution that is not possible using single beam or multi-pulse side scan technologies.

With the addition of Swath Bathymetry Sonar, the AUV 5000 V2 employs advanced Interferometric signal processing to produce simultaneous estimates of the seabed topography out to the full swath extent of the sonar, typically 10 to 12 times the overall altitude of the AUV. This added seabed topographic measurement is post processed and co-registered with the side scan backscatter imagery to more accurately position seabed targets. Sonar beam forming is done by the AUV 5000 V2 electronics thus allowing for integration with onboard CAD/CAC software.

The Difference Is In The Image

Key Features:

- Multi-Beam, Dynamically Focused Technology
  - Constant Along Track High Resolution Imagery
  - Enhanced Small Object Detection
- On-Board Processing (AUV)
  - Allows for direct integration with CAD/CAC processing Systems
- 100% Bottom Coverage at High Speed
  - Shorter Survey Time
- Advanced Noise Rejection Circuitry
  - Better performance & easy AUV integration
- Wideband FM (CHIRP)
  - Enhanced Range Performance under adverse conditions
- Bathymetry
  - Coincident Bottom Topography
  - More accurately positioned seabed targets
- SAS Compatible Hardware



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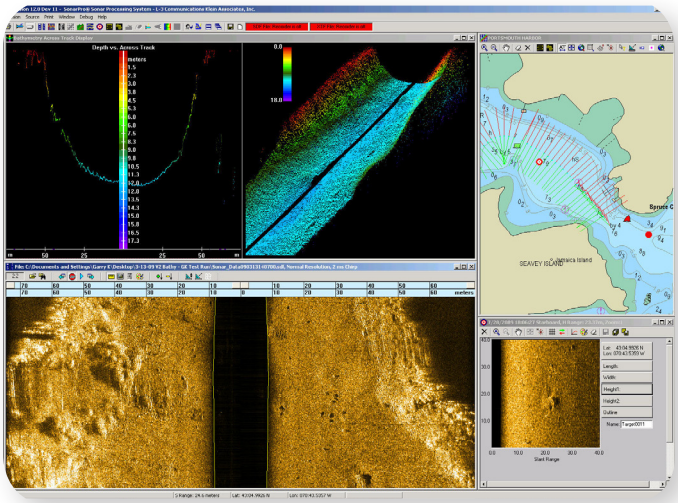
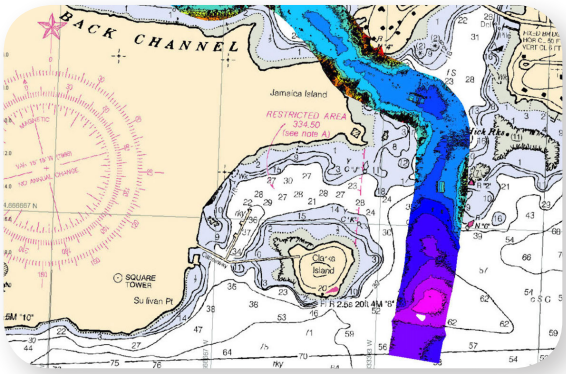
System Specifications	
Number of Beams	8 Port and 8 Starboard
Frequency	455 kHz
Pulse Type (CW/FM)	50 µsec CW, 4, 8, 16 msec CHIRP
Resolution (along track) constant of	10 cm to 38 m Increasing at 0.14° to: 20 cm at 75 m 36 cm at 150 m 50 cm at 250 m
Resolution (across track)	3.75 cm at all pulse lengths
Maximum Operating Range	250 m (500 m swath) in Reconnaissance Mode
Sensors	Roll, Pitch & Heading (Standard)
Depth Rating	500 m
Power	85W (nominal 150m range with an 8 msec CHIRP) to 110W (150m range with a 16 msec CHIRP)
Data Output	100 BaseT Ethernet LAN
Interferometric Bathymetric Specifications (Optional)	
Frequency	455 kHz
Number of Beams	Single Beam (one per side)
Along Track Resolution	0.4°
Pulse Type (CW/FM)	FM maximum 16 msec CHIRP
Maximum Range	125 m nominal
Data Output	Generic Sensor Format (GSF)
Arrays	
Size	120 cm (47.2 in)
Weight	5.26 Kg (11.6 lbs in air) 2.27 Kg (5.0 lbs in water)
Sonar Processing Unit (SPU)	
Size	12.7 cm (5 in) (O.D.) x 40.6 cm (16 in) (length)
Weight (Stainless Steel)	12.7 Kg (28 lbs) in air 7.26 Kg (16 lbs) in water
Input Voltage	18-36 V DC (24 V DC nominal)
Sonar Electronics Unit (SEU)	
Size	11.4 cm (4.5 in) (O.D.) x 91.4 cm (36 in) (length)
Weight	43 lbs in air, 24 lbs in water
Cables	One set of Interconnecting Cabling for AUV Installation includes all necessary connectors and jumpers



DIGITAL SIGNAL PROCESSING

The AUV-5000 (V2) departs from previous multi-beam systems in that the swath forming process is implemented digitally using digital signal processing (DSP), rather than analog delay lines, phase shifters, or multipliers and adders. The primary advantage of this technique is a reduction in the size and weight of the payload. This affords a concomitant reduction in the size of the required AUV/ROV and ancillary handling equipment. Other advantages include more flexibility in the swath processing, allowing software control of operating parameters.

The Series 5000 AUV V2 sonar system equipment consists of the Sonar Electronics (SE), the Sonar Processor (SP), a pair of sonar transducers, a deck cable and power supply (for topside, standalone operation); and various interconnect cables.



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