UUV-3500 DEEP SIDE SCAN SONAR

HIGH-RESOLUTION SIDE SCAN SONAR FOR UNMANNED UNDERWATER VEHICLES (UUV'S)

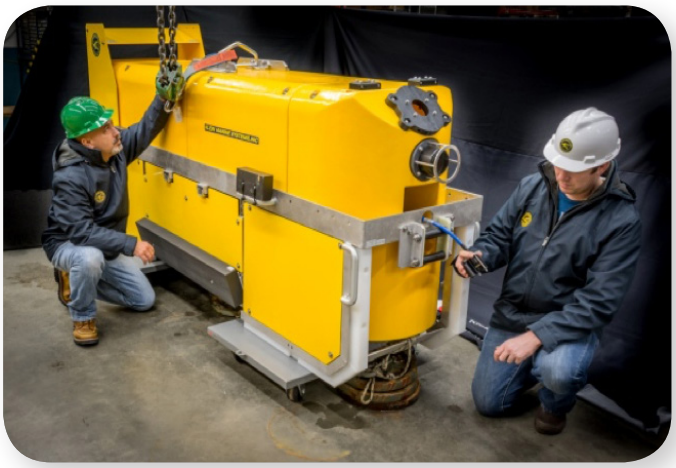
From the experience of over 50 years of sea exploration, Klein offers a line of products rated to 3000 m or 6000 m depth based on its widely successful UUV-3500 side scan sonar payload.

The line is composed of:

- The Mid-Depth (3000 m) UUV-3500 high resolution, low power consuming, dual-frequency side scan sonar for unmanned underwater vehicles, including AUVs and ROVs. The system is designed to interface easily with a remote AUV host controller or a telemetry interface for an ROV.
- The Deep (6000 m) UUV-3500 high-resolution, high power, dual-frequency side scan sonar for unmanned underwater vehicles, including AUVs and ROVs. The system is designed to interface easily with a remote AUV host controller or a telemetry interface for an ROV.
- The Deep tow sled, a highly configurable vehicle, is designed for seafloor mapping and deep water surveys, search and recovery, habitat, geology & mineral resource mapping, engineering and scientific studies, as well as cable and pipeline route surveys.
- Klein's provides full support, from concept and planning to integration design, factory-based and sea acceptance testing (FAT/SAT) and on-site integration, harbor and sea acceptance testing (HAT/SAT), as well as factory-based and local on-site maintenance and applications training.

The 6000 m rated UUV-3500 leverages a powerful, wholly FPGA-implemented, multi-channel processing engine. The sonar engine simultaneously optimizes two different and concurrent output data streams for:

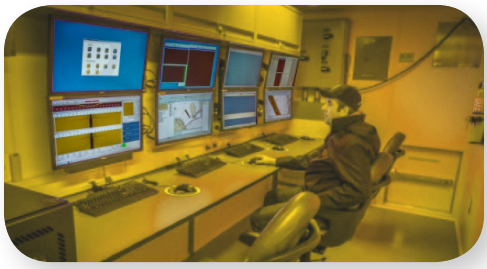
- Photo-quality high-resolution side scan imagery
- True dual-frequency simultaneous operation
- Exceptional range performance
- Flexible and robust electronics payload



The UUV-3500 DEEP operates exclusively with Klein's proprietary wideband technology providing unmatched side scan range and resolution performance in a low-power, compact and lightweight payload.

The system's electronics easily integrate into medium to large size AUV platforms and are also available in a watertight pressure housing configuration for ROV, submarine, and tow sled installations. Klein's ruggedized transducers are designed and built to last and perform in the most demanding environmental conditions.

Real-time control and survey data logging, as well as post-survey analysis of the data, can be accomplished using Klein's SonarPro® software. Alternately, Klein offers a Software Development Kit (SDK) which allows UUV manufacturers and third party software developers the ability to control the sonar directly, record data, as well as display the sonar data using Klein's proprietary image display engine.



Klein custom designed control room in ISO container

UUV-3500 DEEP (3,000 m and 6,000 m)

HIGH-RESOLUTION SIDE SCAN SONAR FOR UUV's

Specifications:

UUV-3500 Mid and Deep Depth Payloads - General Specifications		
	Side Scan Payload - Mid	**Side Scan Payload - Deep**
Total Electronics Dimensions	18.25 x 4.5 in (114 x 464 mm)	35.6 x 9.1 in (905 x 231 mm)
Total Electronics Weight	28/17 lb (12.7/ 7.7 kg), dry/wet	90/22 lb (40.9/10 kg), dry/wet
Transducer Dimensions	37.1 x 2 x 1.1 in (942 x 51 x 28 mm)	40.5 x 7.2 x 2.5 in (1028 x 182 x 63 mm) – 100/400 kHz 40.4 x 8.6 x 3.1 in (1028 x 214 x 79 mm) – 75/400 kHz
Transducer Weight	8/5 lb (3.6/2.3 kg) dry/wet	89/62.5 lb (40.6/28.4 kg), dry/wet – 100/400 kHz 126.5/88.5 lb (57.5/40.2 kg), dry/wet – 75/400 kHz
Power	20-32 VDC (24V nominal), 18-30 W RMS	215-325 VDC (300V nominal), 150 W RMS
Depth Rating	3000 m	6000 m
Note 1: System electronics and transducers can be modified to support specific requirements of the UUV		

Side Scan Performance Specifications		
	Side Scan Payload - Mid	**Side Scan Payload - Deep**
Frequencies	100 & 400 kHz	75 & 400 kHz or 100 & 400 kHz
Pulse Technology	Wideband Chirp, or CW	Wideband Chirp, Narrowband Chirp, or CW
Across Track Resolution	9.6 cm @ 100 kHz, 2.4 cm @ 400 kHz	2.4 cm @ 75 kHz, 2.4 cm @ 100 kHz, 1.2 cm @ 400 kHz
Beam Width	0.76˚ @ 100 kHz, 0.32˚ @ 400 kHz	1.0˚ @ 75 kHz, 0.76˚ @ 100 kHz, 0.32˚ @ 400 kHz
Range (typical)	600 m @ 100 kHz, 200 m @ 400 kHz	1500 m @ 75 kHz, 750 m @ 100 kHz, 200 m @ 400 kHz
Side Scan Data Output	SDF and/or XTF	SDF and/or XTF

Flexible System Architecture:

- System supports local data storage to solid-state hard disk, remote data logging to the UUV host over Ethernet using network file system (NFS) protocol, and real-time interface with SonarPro® or various third party survey data acquisition software, utilizing Klein's SDK.
- System supports UUV host via Ethernet LAN or over a dedicated RS232 link
- System supports external triggering of its active acoustic devices which mitigates the impact of acoustic interference by allowing the UUV to coordinate acoustic emissions
- 1 PPS timing support

Standard System:

- Sonar Electronics Housed in Pressure Vessel
- Port & Starboard transducers
- Port & Starboard Pre-Amplifiers (in pressure vessels)
- Interconnect Cables for Transducers, Electronics Pressure Vessel, and Pre-Amplifiers
- SonarPro® software and documentation

System Options:

Solid-State Hard Drive

Software Development Kit (SDK)

Klein Direct Support with System Integration

Towsled System Configuration

- Depressor
- Fiber Optic tow cable
- Winch/Controls
- Survey Operation and Control Lab
- Third Party software for survey data acquisition and mapping
- Interface for Doppler Velocity Logger (DVL)
- Interface for Sub-Bottom Profiler (SBP)
- Interface for Multi-Beam Echo Sounder (MBES)
- Interface for Magnetometer
- Interface for Responder/ Ultra-Short Base Line (USBL) Acoustic Tracking System

The Difference Is In The Image

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