

# UUV-3500 SIDE SCAN / BATHYMETRY SONAR SYSTEM

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

For over 40 years, Klein has “set the bar” for commercial side scan sonar performance. The newly developed UUV-3500 product line leverages a powerful, wholly FPGA-implemented, multi-channel processing engine. The sonar engine simultaneously optimizes two different and concurrent output data streams for:

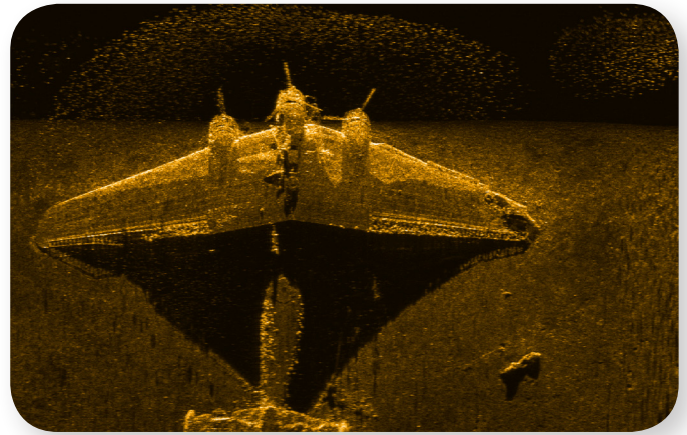
- Photo-quality side scan imagery
- High-accuracy, co-registered swath bathymetry

The UUV-3500 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 swath bathymetry option allows for wide swath performance which is typically 10 to 12 times the overall altitude of the UUV and thereby significantly greater coverage than can be achieved by a multi-beam echo-sounder.

The system electronics will easily integrate into all small UUV platforms currently on the market and is also available in a watertight pressure case configuration. Klein’s newly designed, ruggedized transducers are built to last and perform in the most demanding environmental conditions.

Post-survey analysis of the data can be accomplished using Klein’s SonarPro® software. Alternately, we offer a Software Development Kit (SDK) which allows UUV manufacturers and third party software developers the ability to control the sonar directly, as well as display data using our proprietary image display engine.

### ***The Difference Is In The Image***



### **Applications:**

- Hydrographic / geophysical survey
- Cable / pipeline survey
- Environmental survey
- Small object detection
- Mine Countermeasures (MCM) / Intelligence, Surveillance, and Reconnaissance (ISR) surveys

### **Key Features:**

- Superior low-frequency resolution
- Unsurpassed high-frequency range performance
- True dual-frequency operation to maximize along track resolution
- Onboard processing allows for direct integration with CAD/CAC systems
- Low-power, compact and lightweight
- Easily integrates into all manportable UUV's
- Side Scan and Bathymetry for Autonomous Underwater Vehicles (AUV's), Remotely Operated Vehicles (ROV's) and UUV's
- Excellent cost-to-performance value

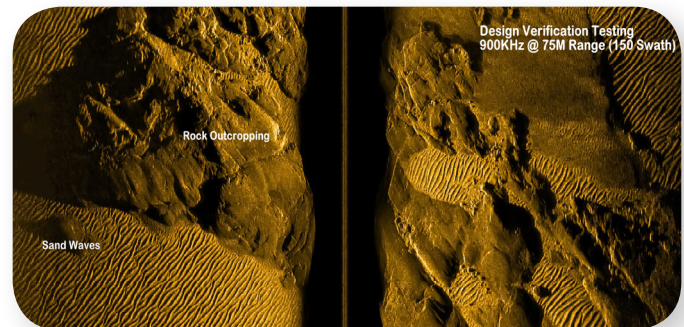
## HIGH-RESOLUTION SIDE SCAN SONAR FOR UUV's

### Specifications:

UUV-3500 General Specifications	
<b>Total Electronics Volume</b>	3" x 4" x 15" - 1.8 lb (Note 1)
<b>Transducers</b>	22"L x 1.75"H x 1"D (Note 1)
<b>Transducer Weight</b>	1.8 lb (dry), 1.0 lb (wet)
<b>Transducers With Bathy</b>	22.75"L x 3.89"H x 1.14"D (Note 1)
<b>Transducer Weight (Bathy)</b>	7.5 lb (dry), 4.0 lb (wet)
<b>Power</b>	24 VDC (nominal), 18-30 W RMS, including optional bathymetry
<b>Depth Rating</b>	600 m (deeper depth rating options available)
Side Scan Specifications	
<b>Frequencies</b>	455 kHz, 900 kHz
<b>Pulse Technology</b>	Wideband FM Chirp (1, 2, 4, 8 msec)
<b>Across Track Resolution</b>	2.4 cm
<b>Beam Width</b>	Horizontal: 0.34°, Vertical: 45°
<b>Range (typical)</b>	150 m @ 455 kHz 75 m @ 900 kHz
<b>Side Scan Data Output</b>	SDF
Swath Bathymetry Specifications	
<b>Frequency</b>	455 kHz
<b>Along Track Resolution</b>	0.48°
<b>Across Track Sampling</b>	4.8 cm
<b>Pulse Technology</b>	FM Chirp
<b>Range</b>	125 m nominal / side (typically 10 to 12 times altitude)
<b>Bathymetric Data Outputs</b>	SDF, GSF, & XYZ

Note 1: System electronics and transducers can be modified to support specific requirements of the UUV

Note 2: Transducers available in either a pigtail or penetrator cable configuration



### Flexible System Architecture:

- System supports local data storage to solid-state hard disk or remote data logging to the UUV host over ethernet using network file system (NFS) protocol
- System supports UUV host via ethernet LAN or over a dedicated RS232 link
- Flexible configurations can support both wet and dry vehicle types
- 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
  - » Control data interface
  - » Receiver
  - » Transceiver
  - » PC-104 CPU
  - » Power filter
  - » Receiver transition
- Port / Starboard transducer (Note 2)
- SonarPro<sup>®</sup> software and documentation

### System Options:

- Pressure housing with end cap
- Bathymetry
- Solid-state hard drive
- Mounting bracket
- Transducer pressure test & certification

Cleared for public release February, 2016. Data, including specifications, contained within this document are summary in nature and subject to change at any time without notice at Klein Marine Systems' discretion. Call for latest revision. All brand names and product names referenced are trademarks, registered trademarks, or trade names of their respective holders.