Sequoia Scientific, Inc. is pleased to offer the first low-cost acoustic backscatter sensor designed specifically for measuring suspended sediments. The LISST-ABS is a fixed-point sensor. It uses a new and novel technique to internally compensate for sound attenuation, yielding an attenuation-corrected concentration over a wide range.

Why acoustics? Why single-point, and why 8 MHz? Acoustic sensors benefit from their much higher tolerance to fouling than optical sensors, which is an obvious advantage. Single-point use makes them suitable for monitoring wherever optical turbidity type sensors are in use. The choice of 8MHz frequency is made to ensure nearly flat response to particles in the size range 30-400 microns (See figure on back). For example, LISST-ABS maintains calibration over this size range within ~ ±30% from its mean value. In contrast, the sensitivity of optical turbidity sensors changes by ~± 400% over the same size range.

The LISST-ABS also covers a wide concentration range, from 1 mg/L up to 30g/L for 5-10 micron sediments.

Analog voltage, SDI-12, and RS232 outputs are available on the underwater connector. The analog and digital values are available as soon as power is applied. SDI-12 is available on demand.

The LISST-ABS has a maximum operating depth of 100 m. It may be held vertically or pointing into flow for low drag as in towed or river applications. A small wing-shaped towed body is available as an option.

Power source and data storage are external.
Submersible Acoustic Backscatter Sensor

**FEATURES**

- Outputs: Concentration in Analog voltage; RS-232 and SDI-12 formats. Some calibration required.
- Sample volume Location: 5.5 cm from sensor face.
- Operating Frequency: 8MHz
- Tolerant to fouling.
- Calibration over 30-400 micron sizes: flat to within ±30%; [compare with ±400% for turbidity sensors]
- Calibration for fine particles below 30 microns: response follows $d^{1.5}$
- Analog, SDI-12 and Digital (RS232) outputs available on the underwater connector
- Simple endcap connector, compatible with many turbidity type sensors.

**SPECIFICATIONS** *(subject to change without notice)*

Sensor Type: Point measurement.
Sample volume size: 10 dia x 15 L (mm) approx.
Operating Frequency: 8MHz
Sample volume: approx. 4 cm long, 5.5 cm in front of sensor
Minimum distance from solid boundary: 15cm.
Output: Analog: 0-4V (analog), continuously updated at 1 sec. intervals; RS-232 continuous; SDI-12: polled.
Conversion to physical units: Provided with user calibration.
Working Range: 1mg/L to 30g/L (7-micron silt); or <20 g/L (200 micron sand)
Calibration: Recommended with sediment samples.
Drift: Internally compensated for temperature.
Resolution: 0.5% of current value.

**Mechanical and electrical**

- Sensor Dia.: 2.00 in (5.08 cm)
- Length: 13.25 in (33.65 cm)
- Weight: 1 lb. (0.5 Kg) in air; 0.5 lb. (0.22Kg) buoyant in water.
- Transducer: 10mm dia, ceramic
- Power supply voltage: 11-18 Vdc
- Power supply current: 100 mA
- Max. Depth: 100 m
- Material: ABS Plastic
- Connector type: Impulse MCBH-8-MP-SS
- Power on LED: Green, slow blink at idle, double blink while sampling

Figure on right shows the relative responsivity of optical turbidity meters contrasted with the LISST-ABS acoustic backscatter sensor.

Image on left shows the LISST-ABS mounted to a streamlined depressor wing that allows it to be towed at speeds in excess of 5 knots.

Photo and original concept courtesy of Shawn Hintz, Gravity Consulting, Inc.

Sequoia Scientific, Inc.
2700 Richards Road, Suite 107, Bellevue, WA 98005 USA
Tel 425.641.0944 Fax 425.643.0595 email info@SequoiaSci.com
www.SequoiaSci.com