

Performance Plus

The first side scan sonar to offer both advanced Chirp technology for long range scanning and CW (tone burst) pulses for short range resolution



The Benthos SIS-1600 Series Side Scan Sonar is a fully integrated system that uses both advanced Chirp and conventional continuous wave (CW) technologies—single frequency or dual frequency—and an advanced high-speed communications link to acquire high resolution side scan sonar images.

The Benthos SIS-1600 is a complete side scan sonar survey system that includes a topside acquisition system and software, a 100-meter tow cable, the CL-160 Communications Link, and one of two available tow vehicles: the TTV-196 Tow Vehicle, which acquires long range, high resolution Chirp side scan sonar images in a single frequency band; and the TTV-196D Tow Vehicle, which acquires long range, high resolution Chirp side scan sonar images in two frequency bands simultaneously. In addition to the Chirp side scan sonar, both tow vehicles provide CW side scan sonar which can be used to acquire high resolution images over short ranges.

- ▶ ACOUSTICS
- ▶ FLOTATION
- ▶ **GEOPHYSICAL**
- ▶ HYDROPHONES
- ▶ LOCATOR
- ▶ MODEMS
- ▶ ROBOTICS



System Highlights



The CL-160 Communications Link is the main surface component of the system. It provides the high voltage DC power for the tow vehicle, and it serves as the high-speed communications link between the tow vehicle and a client computer running third party sonar data acquisition and display software.

The tow vehicle contains all the required sonar electronics to transmit, receive and process the Chirp and CW sonar signals. It also contains pitch, roll and heading sensors, and the high-speed communications electronics to transmit the processed sonar data, along with tow vehicle status information and sensor data, to the CL-160 over a single coaxial cable.

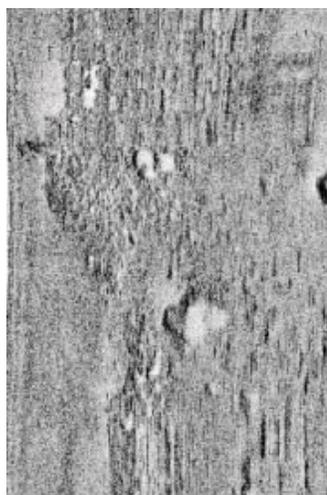
CL-160 Communications Link

The client computer communicates with the CL-160 Communications Link by running an operating system that can support a Transmission Control Protocol/Internet Protocol (TCP/IP) connection, such as Windows 98/NT/2000/XP, Linux, Unix, or Solaris, and have a Ethernet 10/100BaseT adaptor installed.

The data generated by Chirp high resolution sonar requires an advanced high-speed communications link to acquire data from the tow vehicle and to send commands to the tow vehicle. To achieve the required data rates, and to reliably transmit the data over commonly used coaxial cable, the SIS-1600 Series Side Scan Sonar System includes the Oceanographic High Throughput Communications System (OHTCS).



▲ *CL-160 Communications Link*



▲ *100 kHz, 100 meter range*



▲ *400 kHz, 100 meter range*



▲ *Topside sonar processor*

System Features

TTV-196 and TTV-196D Tow Vehicles

The TTV-196 Tow Vehicle includes the transceiver electronics, the processing and communications electronics, the port and starboard side scan transducer arrays, the pitch, roll and heading sensors, and the optional sensors. The optional sensors include a water temperature sensor, a pressure sensor, a magnetometer, and a responder.

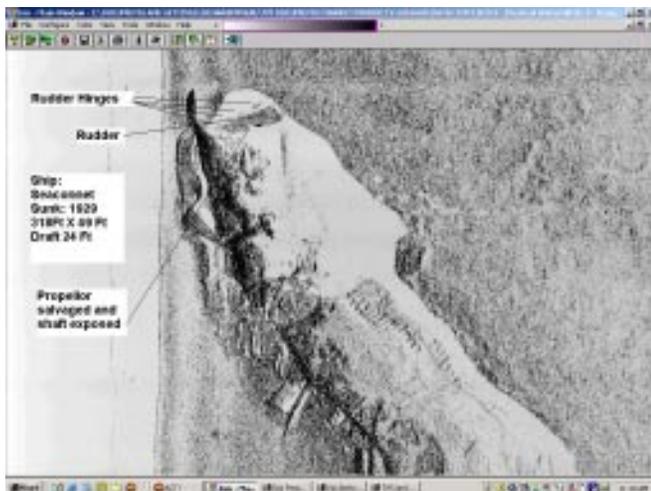
The TTV-196 and TTV-196D Tow Vehicles operate as servers that host the Benthos Sockets Server on a Linux based processor.

Extremely hydrodynamically stable tow vehicle with operating depth to 1,750 meters.

A direct Ethernet 10/100BaseT port is also provided. This port is also used when integrating the SIS-1600 Series Side Scan Sonar system into an autonomous underwater vehicle (AUV) or remotely operated vehicle (ROV).

Features

- Greater dynamic range - high frequency data up to 150 meters
- Enhanced resolution
- Repeatable transmitted waveforms
- Constant temporal resolution
- The pulse characteristics are programmable
- Stainless steel construction



▲ *Seaconnet shipwreck, 400 kHz, 75 meter range*



▲ *Cleveland Ledge Light, Cape Cod, MA, 400 kHz, 100 meter range.*

SIS-1600 Series Side Scan Sonar System

SYSTEM SPECIFICATIONS

Software

Application: Third party data acquisition and display (i.e. TEI "Isis Lite", Chesapeake, "SonarMap")
Operating System: Microsoft® Windows® XP Professional

Processor (optional)

CPU: Intel® Pentium® 4 processor
Memory: 512 DDR SDRAM

I/O Ports: Wireless keyboard/mouse
RS-232 serial
Parallel
Ethernet 10/100 BaseT

Graphics Processor: Integrated high resolution graphics
Data Storage: High capacity hard drive, CD/DVD-RW drive

CL-160 Communications Link

Physical Characteristics

Case Size: 4.4 cm (1.75 in.) high by 48.3 cm (19.0 in.) wide by 44.4 cm (17.5 in.) deep

Case Type: 19-inch standard rack mount
Case Weight: 7.0 kg (15.5 pounds)

Input/Output

Tow Vehicle: Uplink sonar data input
Uplink vehicle status information input
Uplink sensor data input
Downlink commands output
External: Responder key input
Sonar key input
Ethernet 10BaseT
ADSL serial (factory use only)

Power Requirements

Power Input: 100-125 VAC or 220-240 VAC (autosensing), 50-60 Hz, 900 watts
Power Output: 144 VDC, 300 watts nominal, 600 watts maximum

Downlink Commands and Keys

Downlink Commands: Range
Port/starboard side scan sonar on/off
Port/starboard side scan sonar receiver gain
Chirp pattern diagnostics on/off
Chirp/CW
Downlink Keys: Responder
Sonar

Uplink Sonar Data, Sensor Data and Status Information

Uplink Sonar Data: Port/starboard side scan
Uplink Sensor Data: Heading, pitch, roll
Uplink Vehicle Status Information: Port/starboard side scan receiver gain setting, downlink command echo

Optional Uplink Sensor Data: Water temperature
Depth
Magnetometer

Uplink Data Range: Up to 6.0 Mb/Sec.

TTV-196 and TTV-196D Tow Vehicles

Physical Characteristics

Construction: 316 stainless steel
Dimensions: 11.4 cm (4.5 in.) outside diameter by 177.8 cm (70 in.) long
Weight in Air: 34 Kg (75 pounds)
Weight in Water: 25 Kg (55 pounds), approx.
Operating Depth: 1,750 meters
Towing Speed: 1 to 8 knots operational
Input Power: 144 VDC, 32 watts nominal

Side Scan Sonar

Acoustic Source Level: +225 dB re 1uPa @ 1 meter
Range: 25 to 500 meters each channel
Frequency Range (TTV-196): Sweeps in the 190 kHz to 210 kHz band
Chirp Frequency Range (TTV-196D): Simultaneously sweeps in the 110 kHz to 130 kHz and 370 kHz to 390 kHz bands

CW Frequency (TTV-196): 200 kHz
CW Frequencies (TTV-196D): Simultaneous 123 kHz and 383 kHz
Transducer Radiation (TTV-196): 0.5 degrees horizontal, 55 degrees vertical
Transducer Radiation (TTV-196D): 0.5 degrees horizontal, 55 degrees vertical (110 kHz to 130 kHz band), 0.5 degrees horizontal, 35 degrees vertical (370 kHz to 390 kHz band)
Receiver Gain: User adjustable from 0 to 21 dB in 3 dB increments; time varied from -20 to 40 dB

Standard Sensors

Pitch and Roll: Range, +/- 20 degrees
Accuracy, +/- 0.2 degrees
Resolution, 0.1 degrees
Heading: Range, 0 to 360 degrees
Accuracy, +/- 1 degree rms
Resolution, 0.1 degrees

Optional Sensors

Water Temperature: Range, -2 to 38 degrees C
Accuracy, +/- 0.5 degrees C
Pressure (Depth): Range, 0 to 500 PSI or 0 to 1,500 PSI
Accuracy, +/- 0.5% of total range (other pressure sensors available)
Responder: 27 kHz standard configuration,
compatible with ORE Trackpoint II
Magnetometer: Geometrics G880 Cesium Magnetometer or Marine Magnetics SeaSpy

ISO 9001 Certified

Specifications are subject to change without notice.



Benthos, Inc. • 49 Edgerton Drive, North Falmouth, MA 02556 USA
Tel 508-563-1000 • Fax 508-563-6444 • E-mail info@benthos.com
www.benthos.com

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