# C3D Deep Tow

## SIDE SCAN, BATHYMETRY, SUB-BOTTOM PROFILE

# 6000m Mapping Solution

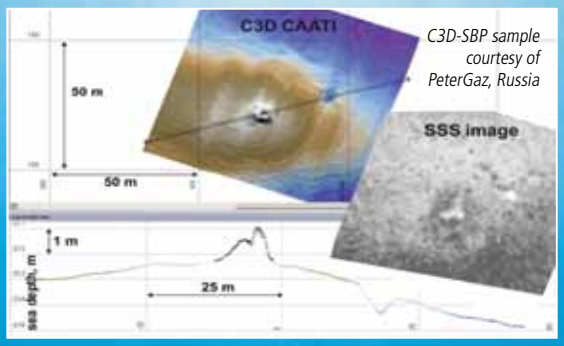
### An in depth view of the Seafloor

The Teledyne Benthos C3D Deep Tow system incorporates Side Scan Sonar, Wide Swath Bathymetry, and Sub-bottom technologies into one co-located towed system. It is capable of acquiring high-resolution side scan data along with Computed Angle of Arrival Transient Imaging (CAATI) interferometric bathymetry data. These data sets can be used to produce highly accurate 3D maps and images of the ocean floor. The C3D Deep Tow also generates sub-bottom data with a built-in high-resolution Chirp technology sub-bottom profiler. The combination of the three data sets provides the operator with a comprehensive view of the seafloor.

The C3D Deep Tow combines multiple technologies to produce images that clearly depict contacts which would be difficult or impossible to detect using side scan sonar alone. In addition, the system employs high-speed fiber optics to deliver reliable uplink and down link communications.

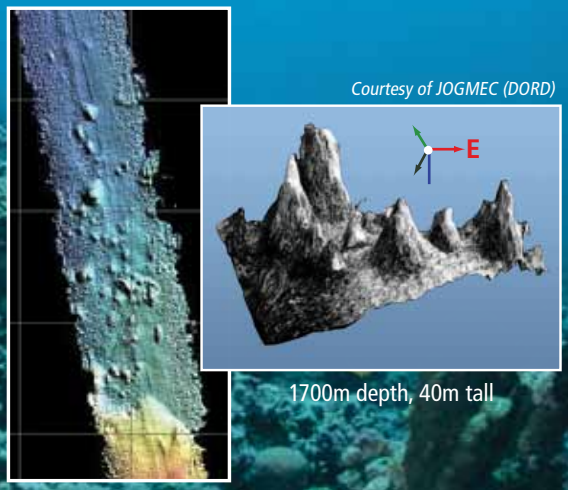
## Applications

- Deep Sea Mining
- Oil and Gas Research
- Cable and Pipeline Surveys
- Search and Recovery


*C3D-SBP sample courtesy of PeterGaz, Russia*

Modern Technologies of the Geophysical Investigations on the Shelf for the Purposes of Geohazards Detection. *A. Fyodorov, S. Mironyuk, S. Kleshchin (Peter Gaz Ltd., Russia)*




*Courtesy of JOGMEC (DORD)*

1700m depth, 40m tall

INNOVATIVE UNDERSEA SYSTEMS TECHNOLOGY

TELEDYNE BENTHOS
A Teledyne Technologies Company

# System Specifications

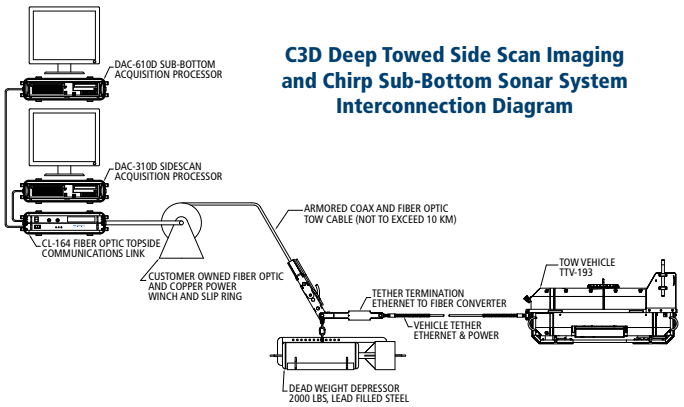
The Teledyne Benthos C3D Deep Towed (6000-Meter) Side Scan Imaging and Chirp Sub-bottom Sonar System includes the DAC-310 Side Scan Processor, the DAC-410 Chirp Sub-bottom Processor, the CL-164 Topside Interface Unit, and the TTV-193 Tow Vehicle. All specifications are subject to change without notification.

## Side Scan Sonar and Bathymetry Components

| | |
|---|---|
| Sonar Frequency: | 100 kHz |
| Maximum Operating Depth: | 6000 meters |
| Side Scan Range: | 25 to 500 Meters per side |
| Bathymetric Range: | 10 to 12 times altitude |
| Resolution (across track): | Side Scan Sonar - 5 cm<br>Bathymetry - 5 cm |
| Beam Width: | 1.25° horizontal, 110° vertical |
| Pulse Length: | 25 µsec to 3 msec (depending on range) |
| Repetition Rate: | Up to 30 pings/sec |
| Transducer Angle: | 20, 30 or 40 degrees |
| Transmit Source Level: | Maximum 224dB re: 1µPa@1M |

## Sub-bottom Sonar

| | |
|---|---|
| Transmitter transducer: | Benthos AT-3.5E1C low frequency transducer |
| Receiver hydrophones: | Two 8-element hydrophone arrays |
| Acoustic source level: | 204 dB re 1µPa@1m, user adjustable attenuation from 0 to -21 dB in 3 dB steps |
| Range: | 10 to 750 meters |
| Chirp Frequency range: | Sweeps in the 2 to 7 kHz band |
| CW Frequency: | 1.5 kHz, 2.5 kHz, 3.5 kHz and 5.0 kHz, operator selectable |
| Transducer radiation: | 35° fore and aft, 45° port and starboard combined transmit and receive |
| Receiver gain: | User adjustable from 0 to 42 dB in 6 dB increments |




**C3D Deep Towed Side Scan Imaging and Chirp Sub-Bottom Sonar System Interconnection Diagram**

## CL-164 Topside Interface Unit

| | |
|---|---|
| Power input: | 100–125 VAC or 220–240 VAC (auto sensing), 50–60 Hz, 80 watts nominal |
| Output Power: | Voltage: 270 VDC nominal, 375 VDC factory set maximum |
| Power: | 750 watts maximum @ 375 VDC |

## Software

| | |
|---|---|
| CAATI: | Proprietary (standard) |
| Acquisition: | Triton Isis (standard)<br>Side Scan/Bathymetry<br>Triton SB-Logger (standard)<br>Sub-bottom |
| Post-Processing: | All third party available |
| Format: | XTF and SEG-Y |

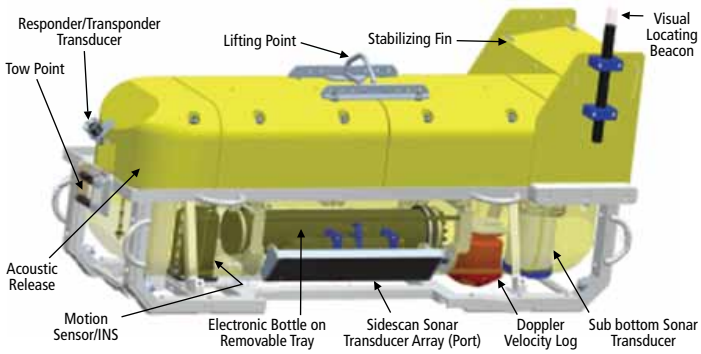
## Auxiliary Sensors:

| Standard | Optional | |
|---|---|---|
| • Pressure/Depth/CTD | • Altimeter | • DVL |
| • Heading | • Magnetometer | • Responder |
| • Pitch | • Optical Gyro | • Transponder |
| • Roll | • Motion Reference Unit/Heave/INS | |

## TTV-193 TOW VEHICLE

### Physical Characteristics

| | |
|---|---|
| Construction: | Aluminum frame with attached syntactic foam sections for buoyancy. |
| Dimensions: | 239 cm (94 in.) long by 84 cm (33 in.) wide by 114 cm (45 in.) high |
| Weight in air: | 1300 lb (590 kg), approximate |
| Weight in water: | 200 lb (91 kg) buoyant |
| Depressor: | Lead filled steel construction, 2000 lb (1497 kg) weight in air |
| Tether: | 50-meter Kevlar reinforced |
| Operating depth: | 6000 m |
| Towing speed: | 1 to 5 knots operational |
| Input Power: | 375 VDC, 600 watts max, 375 watts nom |

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