

TrackLink 5000

Integrated USBL Tracking and High Speed Acoustic Communication Systems

5000 Meters of Range, Highly Robust, Accurate and Cost Effective

The TrackLink 5000 systems are medium frequency long range TrackLink USBL systems, the world's best selling USBL positioning systems. Capitalizing on its benchmark **Broadband Acoustic Spread Spectrum (BASS)** technology, LinkQuest provides the end users with solutions for long-range deepwater underwater tracking and communication at sharply reduced cost and increased robustness and accuracy. An extensive line of models is available to suit the users' specific application requirements and budget constraints.

The cost of a complete system, including a ship mounted transceiver, a transponder/responder, the PC tracking software, a 70 foot cable and a transit case, starts from 34,900 US dollars.

TrackLink 5000LC

This system is a low cost yet highly robust system. This system brings the convenience of an USBL system to the users who typically do not have the budget for an expensive deepwater USBL tracking system.

TrackLink 5000MA

This system is a cost-effective, medium accuracy tracking system. The accuracy of the system is 1 degree. The TrackLink 5000MA System provides a highly robust solution to cost conscious users who require improved positioning accuracy.

TrackLink 5000HA

This system is a high accuracy USBL tracking system. The accuracy of the system is 0.15 degree.



➔ Main Features

- ❑ Sharply reduced cost to end users and improved system robustness.
- ❑ Utilize LinkQuest's benchmark **Broadband Acoustic Spread Spectrum (BASS)** Technology.
- ❑ Strong rejection to multipaths and ship noise.
- ❑ Integrated with LinkQuest's most advanced high speed acoustic communication modems.
- ❑ Advanced power-efficient DSP technology.
- ❑ PC Windows tracking software.
- ❑ Interface directly to the transceiver. No need for a heavy proprietary deck unit.
- ❑ Small and light weight transceiver for ease of installation on a ship.

System Specifications

➔ Positioning Accuracy:

TrackLink 5000HA: 0.15 degree (better than 0.3% of slant range)

TrackLink 5000MA: 1 degree (better than 2% of slant range)

TrackLink 5000LC: 3 degrees (better than 5% of slant range)

➔ Slant Range Accuracy: 0.3 meter

➔ Targets Tracked: 8

➔ Operating Frequency:

14.2 kHz - 19.8 kHz without acoustic modem option

12.75 kHz - 21.25 kHz with acoustic modem option

➔ Operating Beamwidth: 120 degrees

➔ Operating Temperature: -5 to 45 °C

➔ Storage Temperature: -25 to 75 °C

➔ RS-232 Configuration: 9600 baud, 1 start bit, 1 stop bit, no parity bit, and no flow control

➔ Working Range With Ship Noise:

up to 5000 m with TN5015 transponders

up to 4000 m with TN5010 transponders

➔ Optional High Speed Acoustic Modem Data Rate:

up to 4,800 baud

➔ Transceiver:

Maximum Depth: 20 meters

Transmit mode power consumption: 40 Watts

Receive mode power consumption: 2 Watts

Hydrophone Array Dimension: 26 cm x 12.6 to 16 cm (d)

Acoustic Transmitter Dimension: 28 cm x 14 cm (d)

Hydrophone Array Weight in water: 2.3 kg

Acoustic Transmitter Weight in water: 3.6 kg

➔ Transponder:

Transmit Mode Power: up to 1000 Watts

Sleep Mode Power Consumption: 8 mwatts

Maximum depth: 2000, 4000 or 7000 meters

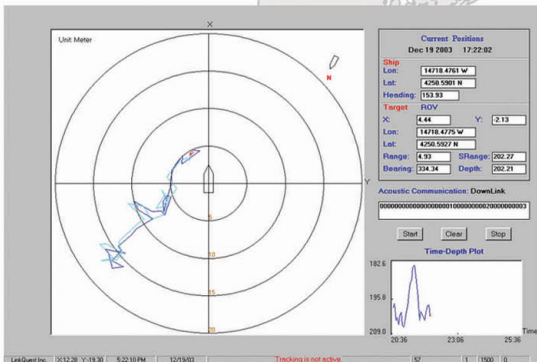
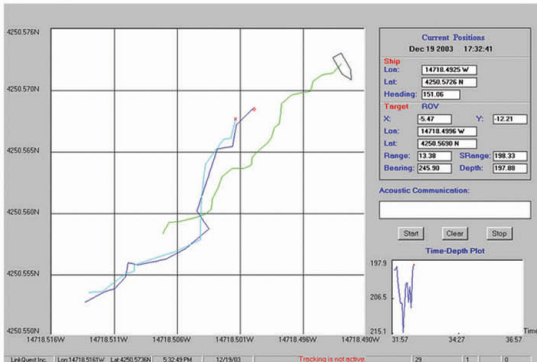
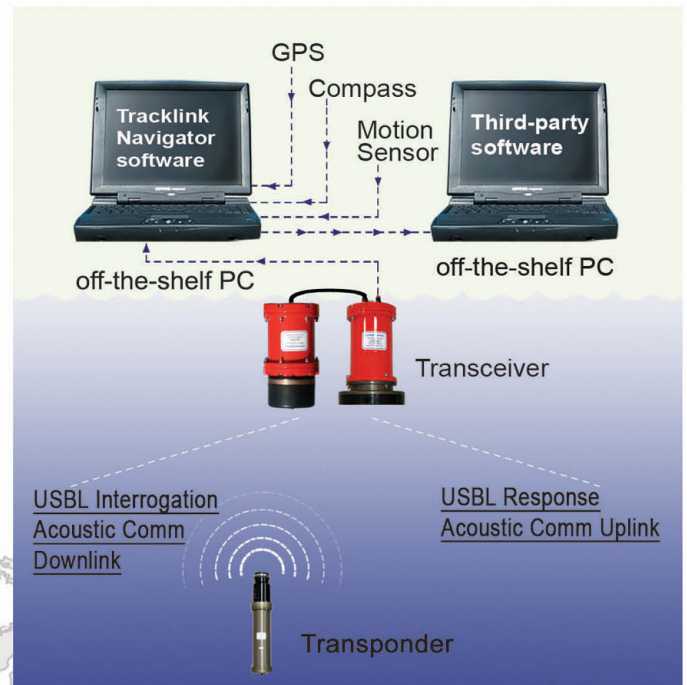
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TrackLink 5000 Transceiver And Software

→ Applications

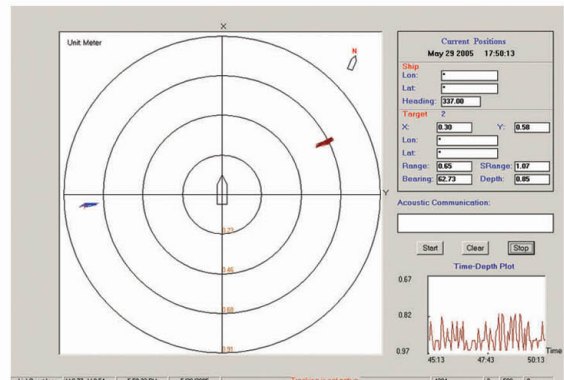
- ROV Tracking and Navigation
- AUV Tracking and Communication
- Manned Submersible Tracking and Communication
- Survey Towfish Tracking
- Underwater Construction
- Moored Instrument Relocation



The TrackLink Navigator Windows software integrates the TrackLink USBL transceiver with the ship's GPS/DGPS, compass and motion sensor using serial communication. The software displays the positions of the ship and the targets in various plots and textual displays. It also interfaces to other computers for acoustic communication data and sends position data to other computers in predefined formats.

The TrackLink software works smoothly with third party software such as **HYPACK™**, **WinFrog™** and **HYDROpro™**.

The TrackLink Navigator software runs on any off-the-shelf PC. No cumbersome "Deck Unit" is needed to operate the system. The software is simple to use and highly robust. A few clicks from the mouse will start your tracking session smoothly.



The industry's smallest and lightest deepwater USBL hydrophone array. The high power acoustic transmitter is detachable from the hydrophone array. Only the hydrophone array needs to be installed when the TrackLink 5000 system is operated at the Responder mode.

The industry's only USBL systems capable of reliably tracking targets in highly challenging acoustic environments inside small water containers. Picture shows tracking transponders address 1 and 2 in a 2m x 2m (d) water tank over two hours of testing time (over 4200 points).

TrackLink 5000 Series

Intelligent High Power Transponders



(left to right) TN5010C transponder and TN5015A transponder.

A wide range of high power transponders is available for the TrackLink 5000 acoustic tracking system. All the transponders use a state-of-the-art DSP to manage the power usage efficiently. The **Broadband Acoustic Spread Spectrum (BASS)** technology used by the TrackLink system further decreases the power consumption. The DSP is programmed to stay in the standby mode most of the time and wake up to intercept acoustic signal periodically. After the transponder is awakened by the surface TrackLink transceiver, it transitions to the active mode and ready to respond to surface transceiver interrogation. The transponder will return to the standby mode after a prolonged period with no signal reception.

Each transponder has 8 configurable addresses stored in the flash memory and the user can conveniently use the RS232 interface to configure addresses and other parameters.

All transponders operate at frequency band from 14.2 kHz - 19.8 kHz without the acoustic modem option and 12.75 kHz - 21.25 kHz with the acoustic modem option.

TN5010 is a high power directional transponder. TN5015 is a high power narrowbeam directional transponder. Model A (e.g. TN5010A) is a compact transponder with no batteries. Model C is equipped with alkaline D cells for long term field use. The TN5015 transponder has a remote transducer connected to the main electronics pressure housing by a cable. The TN5010 transponders have a remote transducer option. The letter "R" following the model number, e.g. TN5010CR, indicates the transponder has the remote transducer option.

All transponders can be configured to act as a responder. All internally powered transponders can also be powered externally. If the external power is cut off, the transponder will automatically switch to use the internal battery.

TN5010

Transmit Power: 100 Watts
 Beamwidth: 60 degrees
 Depth Rating: 4000 m
 Typical Range with Ship Noise: 4000 m

5010A:

Dimension: 29 cm x 15.2 cm (d)
 Weight in Water: 4.6 kg
 Weight out of Water: 8.2 kg
 Input Voltage: 18 - 28 V
 Peak Current: 0.6 A

5010C:

Dimension: 71 cm x 15.2 cm (d)
 Battery Storage Time: 5 years
 Battery Operation Time: 3 years
 Active Responding Time:
 8 x 100 hours
 Weight in Water: 10.2 kg
 Weight out of Water: 19.4 kg
 Input Voltage: 26 - 28 V
 Peak Current: 0.6 A

Options:

Integrated Acoustic Modem
 2000 or 7000 Meter Depth Rating

TN5015

Transmit Power: 1000 Watts
 Beamwidth: 30 degrees
 Depth Rating: 4000 m
 Typical Range with Ship Noise: 5000 m

5015A:

Dimension: 40 cm x 15.2 to 20 cm (d)
 Weight in Water: 9.6 kg
 Weight out of Water: 16.2 kg
 Input Voltage: 18 - 28 V
 Peak Current: 0.6 A

5015C:

Dimension: 82 cm x 15.2 to 20 cm (d)
 Battery Storage Time: 5 years
 Battery Operation Time: 3 years
 Active Responding Time:
 130 hours
 Weight in Water: 16.2 kg
 Weight out of Water: 28.4 kg
 Input Voltage: 26 - 28 V
 Peak Current: 0.6 A

Options:

Integrated Acoustic Modem
 7000 Meter Depth Rating

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TrackLink 5000 Systems Set Enviably Track Record Worldwide

➔ **Fugro Geoservices** purchases TrackLink 5000HA system with four transponders to track deepwater towed systems and ROVs.

Fugro Chance orders TrackLink 5000HA system along with comprehensive high speed acoustic modem functions to track the positions of the underwater structure and ROV and monitor in real-time the pitch, roll, heading, precision depth, stress and other operational status of the target.

LinkQuest supplied a TrackLink 5000HA system to **Hawaii Undersea Research Lab** for tracking deepwater manned submersibles Pisces V and Pisces IV.



Courtesy of NOAA



Courtesy of Institute for Exploration

➔ TrackLink 5000 system has joined Dr. Robert Ballard's well-publicized expedition, Return to Titanic, in 2004. The TrackLink 5000 system was used to simultaneously track ROV HERCULES and the towed ARGUS during the two and a half week expedition. The tracking system worked smoothly since day one in the deepwater Atlantic ocean. It was used to track the vehicles at water depths of 3850 meters from NOAA's ship Ronald H. Brown. Jim Newman, who was in charge of ROV operations for the mission, commented: "We are very happy with the TrackLink 5000 USBL tracking system. It has functioned just as advertised."



➔ LinkQuest Inc. provided two deepwater TrackLink 5000 USBL systems to **International Submarine Engineering Ltd**, Port Coquitlam, Canada. A TrackLink 5000HA system will be installed on the Explorer AUV purchased by the University of Southern Mississippi with funds from NOAA. This AUV will support NOAA's need to explore, map and characterize deep-ocean habitats, from polar seas to deep-sea oil and gas seeps in the Gulf of Mexico. A second TrackLink 5000 system will be installed on another deepwater AUV produced by ISE for the Memorial University of Newfoundland, Canada. Both TrackLink systems include state-of-the-art integrated high speed underwater acoustic modems.

➔ **Fugro Seafloor Surveys** has purchased a TrackLink 5000HA system with high speed acoustic modem function for acoustic navigation and communication of its deepwater AUV.

Deep Ocean Expeditions LLC (www.deepoceanexpeditions.com) purchased a deepwater TrackLink 5000HA system to track and navigate its fleet of deepwater submersibles.

University of Mississippi purchased a TrackLink 5000HA system to track towed seismic receivers.

