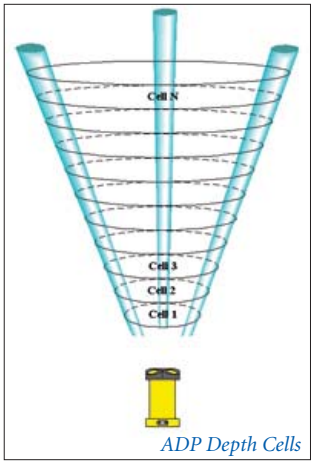
SonTek ADP Expanded Description

The SonTek/YSI ADP (Acoustic Doppler Profiler) is a high-performance current profiler that is accurate, reliable, and easy to use. The ADP measures 3D velocity in a user-specified number of depth cells over a range of up to 220 m. The first current profiler designed specifically for shallow water applications, the ADP has revolutionized the current profiler market since being introduced in 1994. Our Windows-based ViewADP post-processing program makes it easy to display and analyze data.

The ADP is available in a wide range of configurations for applications including real-time current monitoring, detailed current surveys, detailed river surveys (RiverSurveyor System) and long-term autonomous deployments. The ADP uses our proven Doppler technology to make the most accurate and robust current measurements possible. With no moving parts, the ADP is highly resistant to biofouling even in the most challenging environments. The ADP is simple to use, affordable, and does not require recalibration or factory maintenance.

The ADP uses state-of-the-art transducers and electronics designed to reduce side lobe interference problems that plague other current profilers. This allows the ADP to make the near-boundary (surface or bottom) current measurement critical to many shallow water applications. The SonTek/YSI ADP is a breakthrough in price and performance for current profilers. Complete ADP systems are priced competitively with traditional single-point current meters.



ADP Depth Cells

ADP System Configurations

Our ADPs are available in a variety of configurations, and while the SonTek/YSI ADP with three acoustic transducers is one of our most-recognized products, many ADP users are unaware that we also offer 2-beam and 4-beam systems for specialized applications.

Typical ADP Beam Configurations

The 2-beam configuration (SL-ADP) is commonly used in a "side-looking" orientation for horizontal current profiling applications.

Four-beam transducers arranged in a Janus configuration are typically used for applications where wake contamination of one or more beams is possible, such as lowered (L-ADP) systems. The fourth beam also gives data-quality information (because of its redundancy) similar to the standard deviation information we report with our 3-beam systems.

ADPs can also be configured with the fourth beam in a vertical position for water-level measurement (for bottom-mounted ADPs) or depth (when used from a moving boat). Some of the more typical configurations are described below.

SonTek/YSI, founded in 1992 and advancing environmental science in over 100 countries, manufactures affordable, reliable acoustic Doppler instrumentation for water velocity measurement in oceans, rivers, lakes, harbors, estuaries, and laboratories. Headquarters are located in San Diego, California.

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Stand-Alone ADP - Real-Time Current Monitoring

The Stand-Alone ADP is the most popular configuration for real-time current monitoring. The transducers, receiver, processing electronics, and optional sensors are contained within a single canister for simple installation and operation. The instrument uses an external power supply and outputs serial data that can be captured or relayed with a variety of computer, data logger, or telemetry systems. It is used extensively for real-time current monitoring in ports, harbors, rivers, lakes, estuaries, and the near-shore. A single cable (maximum length 1500 m) is used for power and serial communications. An internal recorder is available for backup data storage. The rugged design provides years of maintenance-free operation in the most hostile environments.

Mini-ADP System - Real-Time Current Monitoring

The Mini-ADP is designed for applications where small size is critical. The sensor contains the acoustic transducers, receiver electronics, and optional sensors, while the processing electronics are located in a separate housing (Figure 6). The system operates from external power and outputs serial data for integration with a variety of computer, data logger, or telemetry systems. RiverCat) as the transducer head is easily mounted over the side of a boat (1.5 and 3.0 MHz Systems only).

2D ADP - Horizontal Current Profiling

All ADPs are available as 2D systems for horizontal current profiling (Figure 7). These systems are commonly used for current monitoring from underwater structures such as channel walls and bridge/pier pilings. They can also be used for 2D vertical profiling in narrow channels to avoid interference with channel walls. ADP 2D systems are available in the same frequency and system configurations as the standard 3D profilers.

Autonomous ADP - External Battery Housing

Autonomous ADP deployments use battery power and internal recording for self-contained operation with deployment periods up to one year or more. The most popular configuration uses an external battery housing (with 3 battery packs) connected to the Stand-Alone ADP with internal recorder (Figure 8). Common applications include long-term bottom mounted installations in ports, estuaries, rivers, lakes, and the near-shore. Trawl resistant bottom frames are available.

The Autonomous ADP supports highly flexible sampling strategies to meet a variety of measurement needs and deployment lengths. These include reduced duty cycle operation and burst sampling to optimize data storage and battery life. Both alkaline and lithium battery packs are available.

ADP Standard Features

The standard features available with ADPs are described below.

Acoustic Frequency

The most important choice when selecting an ADP is acoustic frequency. This determines the range of the ADP and the resolution

within the profile. Lower frequencies giver longer ranges, while higher frequencies give shorter range with higher resolution. The ADP is available in five standard frequencies – 0.25, 0.5, 1.0, 1.5, and 3.0 MHz.

Programmable Sampling Parameters

All parameters relating to ADP operation can be easily selected by the user. These include depth cell size, number of depth cells, and averaging time for each profile. The ADP also supports a range of flexible sampling strategies for reduced duty cycle operation and burst sampling.

Diagnostic Parameters

All ADPs record extensive diagnostic parameters with each profile. These include signal strength (to determine the effective profile range and estimate suspended sediment concentration) and standard deviation of velocity data (a direct measure of the accuracy of velocity data).

Temperature Sensor

All ADPs include a temperature sensor to automatically compensate for changes in sound speed. The ADP uses sound speed to convert the measured Doppler shift to water velocity.

Input Voltage Measurement

All ADPs measure and record input supply voltage with each profile. This is used to monitor battery capacity on autonomous deployments.

Serial Communication Protocol

All ADPs support RS232 and RS422 serial communication. RS232 is used for operation on cable lengths to 100 m. RS422 is used for cable lengths to 1500 m.

ADP/ADCP Options

The ADP can include a number of optional sensors to greatly expand its measurement capabilities. Typical options are describe below.

Compass and 2-Axis Tilt Sensor

An internal compass and 2-axis tilt sensor allows the ADP to report velocity data in Earth (East-North-Up) coordinates. The sensor has a built-in calibration feature to compensate for magnetic distortion. The user can easily modify the compass installation for up- or down-looking operation.

Internal Recording

A recorder is available for internal data storage on the Stand-Alone ADP. The recorder is available in a range of capacities to meet almost any sampling requirement. For use as a memory backup, an optional buffer mode can be enable that overwrites the oldest data when the recorder is full.

Pressure Sensor (Strain Gage)

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A strain gage pressure sensor can be installed in the ADP housing to measure deployment depth and surface elevation (although it is not suitable for high-accuracy tide or stage monitoring). The pressure sensor is available in a variety of ranges to operate in most any environment.

Pressure Sensor (Paroscientific)

An interface to a user-supplied Paroscientific pressure sensor is available for high-accuracy tide or river stage monitoring. The sensor is externally mounted and connected with a special interface cable. Data collection is controlled by the ADP.

CTD (MicroCat)

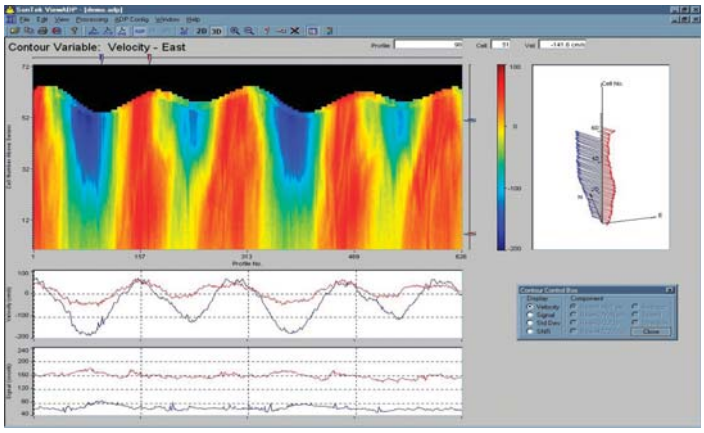
An interface to the SeaBird MicroCat CTD is available. The sensor is externally mounted and is connected with a special interface cable. Data collection is controlled by the ADP.

OBS (D&A)

An interface to the D&A OBS sensor is available. The sensor is externally mounted and is connected with a special interface cable. Data collection is controlled by the ADP.

Custom Systems

In addition to the options listed here, we have constructed several custom ADPs (including systems for full ocean depth deployment). Please contact SonTek/YSI to find a solution to your specialized application.



ViewADP Software

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