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White Paper
SonTek-SL Series

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THE NEW SONTEK-SL™ (3G) DOPPLER FLOW METER



SonTek continues its leadership in the velocity and flow measurement field with its latest, third-generation (3G) of compact, side-looking acoustic Doppler current profilers (ADCPs). The new SonTek-SL (3G), successor to the internationally successful Argonaut-SL, is sleek and streamlined—not just in its entirely new, low-profile design, but in every aspect of its functionality.

Incorporating state-of-the-art electronic components—including a faster Doppler engine—new software and extensive input from customers in the field, the new SonTek-SL(3G) delivers low-noise, high-accuracy velocity data and unsurpassed discharge calculations with unparalleled ease. The new system is easy to set up, operate, clean and maintain, and its data are easier than ever to download and review.

Compact, powerful and user-friendly, the new SonTek-SL (3G) literally and figuratively takes side-looking ADP technology where it has never gone before.

Electronics Upgrade

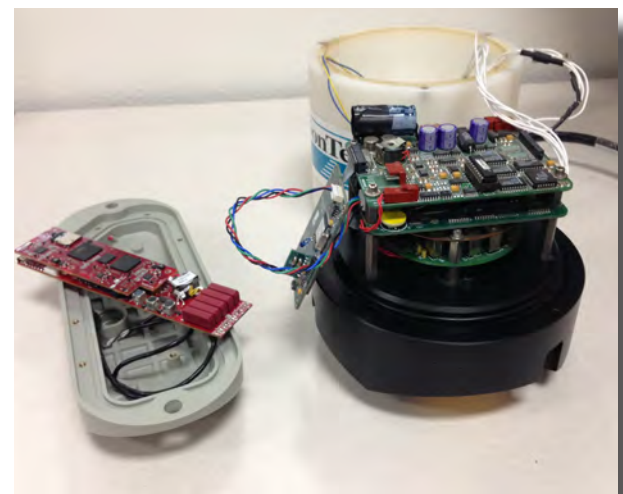
At the heart of the new SonTek-SL (3G) is a faster Doppler engine, which permits a higher ping rate—at least four times faster than previous models. Sound speed profiling cells are smaller—down to 4 cm—and the new SonTek-SL(3G) has up to 128 sound cells to work with. The new cell configuration and smaller-than-ever form factor allow the SonTek-SL (3G) to fit smaller channel dimensions than ever before, permitting the instrument to suit any measurement location with precision.

From any site, the new SonTek-SL (3G) delivers higher-resolution data, faster data processing and, ultimately, cleaner data than ever before.

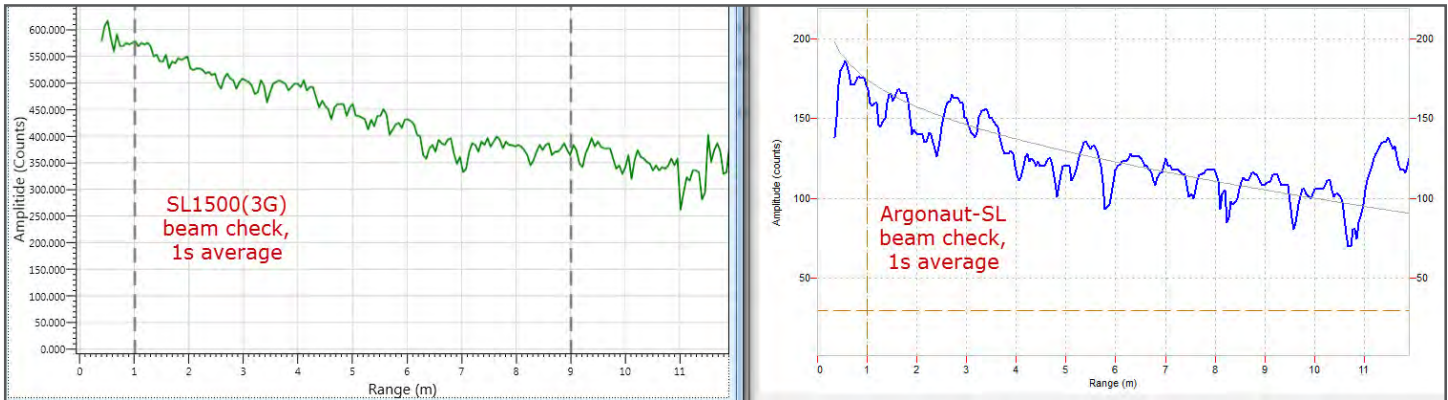
The difference is immediately apparent in the two charts below. The broad deviations in the curve on the right reflect the random noise common to older narrowband instruments. Compare that to the curve generated by the new SonTek-SL(3G) on the left—the faster pinging rate of the new system significantly reduces ambiguity created by random noise.



Incredibly lightweight and easy to transport and mount. The SL's new, slim shape is easy to maintain, stays clean, increases available sample area, and fits into more places.



The new SonTek-SL (3G) takes advantage of the latest advances in electronics technology. The Argonaut electronics platform (right) is already small by ADCP standards; however, the new SL (3G) platform (left) is significantly smaller, faster, and much more powerful. With increased processing power, the SL (3G) can ping faster and operate intelligently in the field using sophisticated SmartPulseHD algorithms..



The smaller, slimmer housing of the new SonTek-SL (3G) also increases the area which can be sampled, allowing the instrument to acquire more data—in any given site, and in more kinds of locations—than any other side-looker on the market.

Comparison plots of beam signal strength for the SonTek-SL1500 (3G) on the left, versus the previous Argonaut-SL1500 model on the right. The new 3G model shows lower noise for a one-second sample. This leads to greater precision in velocity measurements under low-flow and other difficult conditions.

In fact, the new SonTek-SL (3G) maintains its accuracy in a broad range of extremely challenging deployments, including low-flow/no-flow systems, reversing or tidal flow, flashy or fast-changing conditions, and scientific or engineering studies where extraordinary resolution is needed. Low noise, fast pinging and SmartPulseHD™ data technology also ensure that the new SonTek SL (3G) also performs remarkably well in extremely clear water with low scattering conditions.

SmartPulseHD™

SonTek's revolutionary SmartPulseHD feature brings extraordinary intelligence to the SonTek-SL (3G), constantly observing, analyzing and adjusting to ensure optimal performance. SmartPulseHD continually analyzes incoming data on velocity, sampling distance and turbulence, then chooses the optimum signal for measurement in those circumstances—for instance, selecting pulse coherent signal for extraordinary accuracy in slow-moving water, narrowband for fast-moving water and long-range conditions, and broadband for optimal performance at mid-ranges.

Seamless transitions among these three profiling techniques provide clean data as situations change. That allows the SonTek-SL (3G) to deliver more accurate measurement in places that have historically been difficult to profile, such as flashy or tidal sites.

The new SonTek-SL (3G) is available in 1500 kHz and 3000 kHz frequencies. The 1500 kHz system is extremely versatile, with a sampling range from 0.2 meters (0.7 feet) to 20 meters (66 feet). The SL3000 (3G), with its higher frequency signal and minimal blanking distance, will operate in the smallest environments of any side-looking Doppler profile instrument, with a sampling range of 0.1 meter (0.3 feet) to 5 meters (17 feet). More compact than ever, the SL3000 (3G) will operate in channels as narrow as 0.5 meters (1.6 feet) wide.



SonTek performed rigorous comparison testing between (old) Argonaut-SL1500 model and the new SonTek-SL1500 (3G) model. This site in the United Kingdom is just one of many beta testing locations used during the research and development field verification process.

The small profile makes no compromises. In fact, the standard model SL3000 (3G)—unlike the previous model—has been upgraded to include both a tilt sensor and pressure sensor.

Improved Pressure Sensor/Level System

The introduction of pressure sensors to the first generation of Doppler current meters represented a major improvement in the ability to provide level data and allow the computation of discharge. But the first generations of pressure sensor-equipped instruments were not without their challenges. Shifts in atmospheric pressure and dramatic changes in level could confuse the systems, requiring operators to re-calibrate the pressure sensors in the field.

The new SonTek-SL (3G) includes a sophisticated new system to maximize the robustness of its pressure sensors. In the new instruments, the pressure sensor and vertical acoustic beam are in constant communication with each other, using the stream of shared data to continually recalibrate themselves. The resulting performance is comparable with much more expensive vented systems, but no longer requires costly, time-consuming trips to recalibrate pressure sensors.

Streamlined Data Download

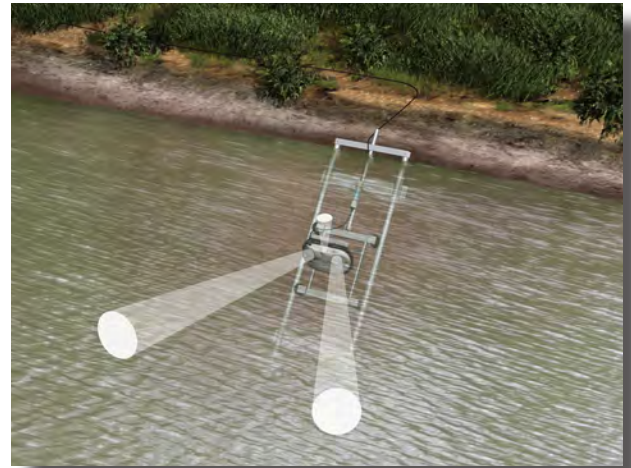
Working in the field is a challenge. Weather, water, equipment, distractions—all can interfere with efficient maintenance and management at the deployment site. That's why SonTek dramatically streamlined the setup, management and maintenance procedures for the SonTek-SL (3G).

Downloading data from the new SonTek-SL (3G) in the field is now simpler than ever. A quick link of the unit's RS232 connector to a laptop begins a smooth download process, without the need to turn off the data collection system or disconnect and reconnect telemetry links. In fact, the new SonTek-SL (3G) continues gathering data during the download procedure—no interruption, no hassle, and no forgotten restarts.

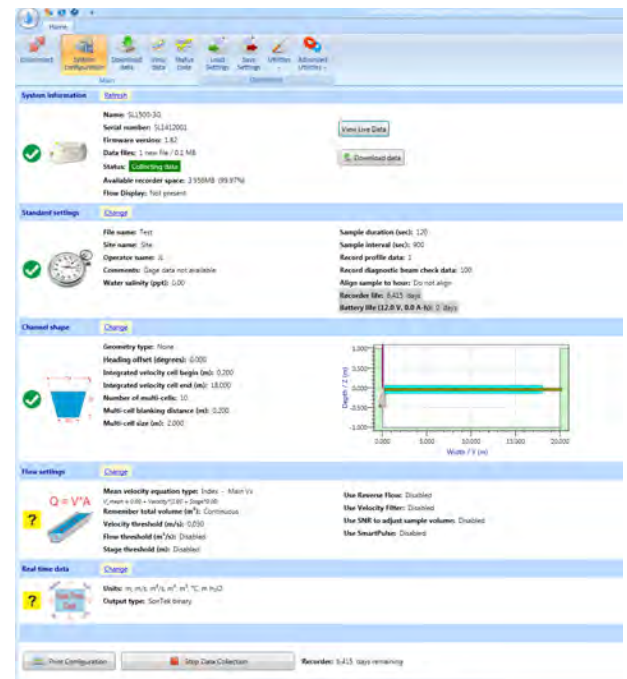
Improved SonTek-SL Software Package

The new SonTek-SL (3G) includes SonTek's improved Intelligent Flow software package, which replaces multiple ViewArgonaut dialog boxes with a single, user-friendly screen.

The centerpiece of the software is the SmartPage for setup and deployment of the SonTek-SL (3G). Its top-to-bottom workflow is easy to scan for quick feedback on the upcoming tasks, each marked with interactive red, yellow and green indicators. And enhanced graphing features, such as color maps, make data visualization a matter of a quick click of the mouse.



A slimmed-down design and SmartPulseHD® makes the SL1500 (3G) the most versatile system available. Collect high-quality data in a horizontal profile, range of 0.2m to 20m (0.7 to 66ft). Get the highest-resolution and data quality possible - even as conditions change - courtesy of SmartPulseHD intelligence applied specifically for side-looking operation.



For 3G models, SonTek-SL "SmartPage" streamlines set-up and data review with one-window operation.

With another click of the mouse, data from the new profiler is as easy as ever to export to SonTek's popular FlowPack hydrology software package for velocity indexing. IQ software also allows data to be quickly exported to MATLAB, opening further opportunities to hydrologists and engineers for high-level visualization, processing and computation.

From intuitive software interface to quick export into velocity indexing tools, SonTek-SL (3G) data follow a streamlined path, an almost effortless flow from raw data to powerful information visualization and decision-making.

Cost Effective Operation

The SonTek-SL (3G) is cost-effective from the perspective of both capital expense and operating expense. Each unit is efficiently built for long, reliable performance in the field to ensure outstanding return on the equipment investment. Meanwhile, the instrument's low maintenance requirements and streamlined data management significantly reduce the operating costs of the new SonTek-SL (3G).

For long-time Argonaut users, the new pricing and operation costs make this an ideal time to update existing portfolios of current measurement instruments.

The new SonTek-SL (3G) brings state-of-the-art electronics, the latest software package, new features and the added security of a two-year warranty. Future upgrades and product support will focus on the new system, making today's investment one that will last for years to come.

Supported by SonTek

In addition to its two-year warranty, the new SonTek SL is backed by SonTek's worldwide, industry-leading capabilities. From in-house engineering and customer service teams to committed support in the field, SonTek instruments are designed, built and backed by industry experts. Those dedicated specialists deliver webinars, recorded trainings, in-person workshops and one-on-one support to ensure that users can make the most of every feature—and achieve their objectives in the field and the lab with complete confidence.

Founded in 1992 and advancing environmental science globally, SonTek manufactures acoustic Doppler instrumentation for water velocity measurement in oceans, rivers, lakes, harbors, canals, estuaries, industrial pipes and laboratories. SonTek's sophisticated and proprietary technology serves as the foundation for some of the industry's most trusted flow data collection systems. SonTek is headquartered in San Diego, California, and is a division of Xylem Inc.

SonTek
9940 Summers Ridge Road
San Diego, CA 92121
Tel: +1 858 546 8327
Fax: +1 858 546 8150
Email: inquiry@sontek.com
Web: www.sontek.com



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SonTek: A Legacy of Leadership

SonTek has been a leader in acoustic Doppler flow metering technology since 1992, constantly adapting and innovating technology to meet users' needs in the field. Here are some milestones in side-looking flow measurement and current profiling

1997: The Argonaut electronics platform ADP technology ever more compact, lightweight and versatile, while the Argonaut-SL adds a side-looking perspective.



2004: SonTek adds a pressure sensor and vertical beam to deliver integrated, robust water level readings. The result: complete flow measurement from a single, compact instrument.



2007: SonTek revolutionizes the industry again by developing the first streamlined housings specifically designed for side-looking operations.



2014: SonTek's innovative SmartPulseHD processing system enables the SonTek-SL (3G) to automatically switch among narrow band, broadband and pulse coherent signals, optimizing measurement based on real-time conditions—all in an ultra-compact housing.



In tandem with its groundbreaking hardware, SonTek has also been a leader in developing user-friendly software, from the ViewArgonaut software modules to the FlowPack velocity indexing package. With the new SonTek-SL (3G), the company has once again brought acoustic Doppler flow metering to a new age.