

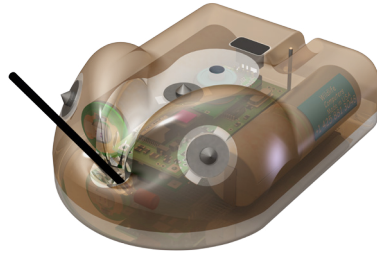


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SPLASH TAGS PRODUCT SHEET

The SPLASH10 is a data-collecting Argos satellite tag, similar to our earlier SPLASH tag. The difference is that this tag combines the sampling and detailed data storage functions of the Mk10 archival tag, rather than the Mk9, with the Wildlife Computers Argos transmitter.



SPLASH10-309

The SPLASH10 includes sensors to measure depth, temperature, light level, and wet/dry periods (to determine surfacing). During the deployment, depth and temperature data are collected, analyzed, summarized, and compressed for transmission through the Argos satellites. Data throughput is maximized by flexible, user-programmable transmission regimes. The SPLASH10 is configured with 1 GByte of non-volatile memory available for the archived data. The SPLASH10 tag must be recovered in order to retrieve the entire raw archived data set.

Controller features

The Mk10 has a low-power design that is optimized for long battery life. The controller contains a real-time clock, up to eight 12-bit analog-to-digital converters, 512 KBytes of low-power static RAM, support for FLASH data memory, and 128 KBytes of program FLASH memory. The operating code of the Mk10 resides in this code memory and can be upgraded. This means it can always have the most up-to-date version of on-board software, regardless of when the tag was purchased.

Sensors

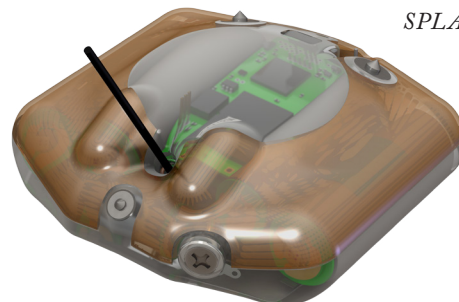
The SPLASH10 is configured with multiple sensors. One or two bytes of memory are required to store each sensor reading depending on how the data compress.

Depth — A 12-bit analog-to-digital converter is used, which provides highly-accurate measurements from -40 to $+1000\text{m}$, with 0.5m resolution and an accuracy of $\pm 1\%$ of the reading. In addition, measurements from 1000 to 1500m are made with a lesser degree of accuracy.

Internal Temperature — A 12-bit analog-to-digital converter is used, providing an actual measured range of -40 to $+60^\circ\text{C}$, with 0.05°C resolution and an accuracy of $\pm 0.1^\circ\text{C}$.

Light Level — The light sensor measures blue light on a logarithmic scale. It is a relative measurement of light intensity with bright sunshine reading approximately 225. Tests have shown that we can determine dawn/dusk events from light readings taken by this sensor as deep as 300m in clear ocean waters.

Wet/Dry — The wet/dry sensor allows the tag to recognize when it is dry to control sampling and transmissions.



SPLASH10-296

This is a small representation of our available tags. Tag features and specifications subject to change without notice.

SPLASH Tags Product Sheet – continued

User-programmable sampling protocols

Sampling is controlled by a user-specified protocol. The researcher programs the sample rate, and whether or not sampling is suspended when the wet/dry sensor reads dry. Different channels can be sampled at different rates, so slowly-changing sensor readings can be sampled less frequently than fast-changing sensor readings.

Memory and data retention

Collected data is stored in non-volatile FLASH memory. Data is maintained for at least 25 years, even if the battery is exhausted. The amount of data storage is 1 GB which allows the SPLASH10 to store about 50 million samples (sensor readings). Each sample occupies one or two bytes of memory, depending on compression. The memory will allow 5 years of data storage when sampling depth, temperature, and light-level every 10 seconds.

Transmitter

The SPLASH10 incorporates a specialized Argos transmitter developed by Wildlife Computers. It generates 0.5W of radiated power output. The high-efficiency and frequency stability of this transmitter maximize the messages quantity and quality.

Transmitted data

Researchers can program the SPLASH10 to selectively transmit time-at-depth, time-at-temperature, maximum depth and dive duration histograms, depth-temperature profiles, timelines, behavior, and light-level curves. For the histograms, the researchers can configure the collection period (1 to 24 hours) and bin ranges (up to 14 bins). Other parameters are user-programmable and provide customizable data collection to achieve different experimental objectives.

Location accuracy

Service Argos provides the locations with best

accuracy as good as $\pm 250\text{m}$.

Battery Life

Efficient power management is attained by using a low-power microcontroller and flash memory. Actual battery life depends on the sampling regime and temperature conditions. Under most deployment conditions, the battery can be expected to provide enough power to read the sensors every second for a year. Batteries can be replaced in most configurations for extended instrument life.

Tag activation

The SPLASH10 will auto-deploy. The tag senses its environment using the wet/dry sensor. When in standby mode, tags will “auto-start” when the depth sensor reads a 20m change in depth or the wet/dry sensor senses a pre-set minimum change in conductivity. As with other Wildlife Computers tags, a magnet can be used to change or indicate the mode of the tag. The LED flash sequence indicates the current mode.

Communication

Wildlife Computers provides an interface to the SPLASH10 that runs on a PC. This interface allows the researcher to set up the tag for deployment, and download the data after recovery.

Data decoding and analysis

Wildlife Computers-designed PC-based WC-DAP software helps collect, prepare, and analyze the data returned from the tag through Argos or from the tag's archive. DAP can automatically collect Argos data from the Argos servers, decompress the messages into readable data, generate CSV files of the data, generate KML files of the track for Google Earth, and generate PXP files for visualization and further processing by Igor Pro (Wavemetrics).