



MIM Simplifies CAIDD/USDA Telemetry Monitoring System

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In February 2006 field tests began on the SonTek® Modbus Interface Module (MIM.)

These tests were conducted by the Central Arizona Irrigation District (CAIDD) of Eloy, AZ and the USDA's U.S. Arid-Land Agricultural Research Center from Maricopa, AZ (formerly the U.S. Water Conservation Laboratory in Phoenix).

In August of 2002, CAIDD decided to upgrade their telemetry system. To date, they have outfitted 118 regulating structures with new remote terminal units (RTS's). They also upgraded their homegrown SCADA system to GE iFix. Communication with the field devices is through serial Modbus over new spread spectrum radios. This configuration provided an excellent environment to test the MIM.

The test location is on the first pool of CAIDD's NC lateral. The device is installed approximately 60 meters upstream from a sub-lateral offtake and 90 meters upstream of the first check structure on the NC lateral. It was known that the proposed meter location in the backwater upstream of the check and that reflection waves would probably be seen in the data when flow changes were routed through the lateral. As this was primarily a test of the MIM device, site selection was based on available infrastructure as opposed to optimal flow measurement.

The nearby sub-lateral offtake structure is currently oper-

ated manually. However, it was originally designed to be operated as part of a remote control system. The site has AC power, a pole to mount a radio, an empty RTU box to mount the MIM, and fencing to provide protection from vandalism. A shallow trench was dug from this site to the location of the device upstream. To minimize vandalism and rodent problems, the MIM was connected to the Argonaut with extended distance serial cable in buried conduit. A junction box was installed in the conduit near the meter to connect the Argonaut cable to the extended distance serial cable.



The CAIDD SCADA system polls the MIM every five minutes through the GE MB1 Modbus driver. The device has been under continual operation since installation and has performed almost perfectly. In over 30,000 polls, the SCADA system has only issued four retry polls. In all cases, the second poll successfully retrieves the data so there are no lost samples (this is done automatically).



To date, the CAIDD district personnel manage their system solely on water level information. With the addition of this test device in the first pool, SCADA operators have come to realize the benefit of knowing the inflow to laterals. Once they get the inflow set, the matter of managing the downstream water levels, as well as velocity, is greatly simplified.

For more information on this application note, or the MIM, email SonTek® at inquiry@sontek.com.

Note: the reference to CAIDD and the USDA in the article does not constitute US Government endorsement of this product.

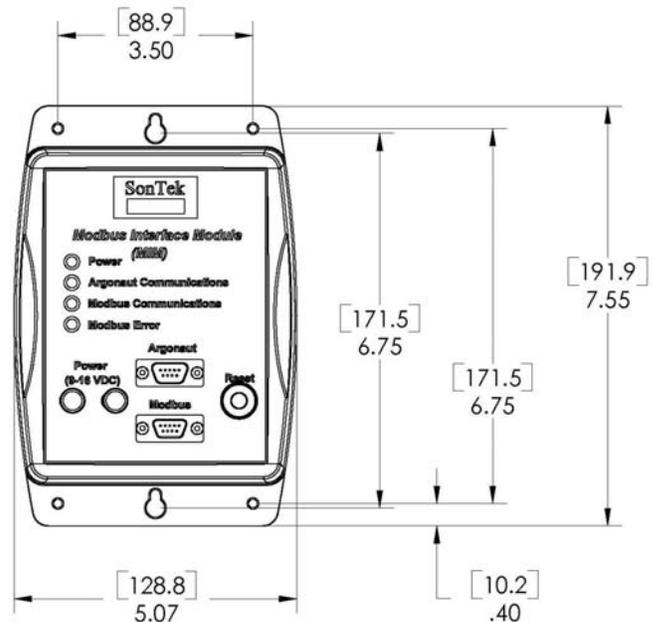
Modbus Interface Module (MIM)



SonTek's MIM enables quick and easy integration of your Argonaut-SL/SW/XR into any Modbus-enabled system using Modbus RS-232 protocol. Acting as an RTU slave device, the MIM stores the Argonaut data in a series of specific Modbus registers so that the data can be reported to the master unit in real time.

Flow Rate	Total Volume
cfs or ft ³ /s (cubic feet per second)	acre-ft
gpm (U.S. gallons per minute)	gallons
mgd (million of U.S. gallons per day)	gallons
m ³ /s (cubic meters per second)	m ³ (cubic meters)
l/s (liters per second)	liters
mld (millions of liters per day)	m ³ (cubic meters)

Product Dimensions



For SCADA systems compatible with Modbus, the MIM offers access to a wide range of output variables that provide a more comprehensive view of your Argonaut data.

Features/Specifications:

- Standard Modbus Status LEDs
- Reset switch
- Argonaut and Modbus serial ports (DB9)
- Argonaut-SL/SW/XR compatible (firmware v11.3 or later)
- Input power: 9-16 VDC (commonly the same supply as the Argonaut)
- Typical power consumption: 0.4 W

MIM Data Parameters

The Argonaut data parameters are stored in a sequential series of Modbus input registers on the MIM. Primary Argonaut parameters are always found in the same register locations. The only data not available through the MIM is multi-cell (profiling) data and raw pressure time series used for wave height spectra.

Primary Output Parameters

Sample number	Stage	Mean Velocity	SNR Beam 1
Sample time	Flow Rate	Temperature	SNR Beam 2
X velocity	Total Volume	Pressure	SNR Beam 3
Y velocity	Flow Area	Battery voltage	Cell End
Recorder Space			

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. Additional information can be found at www.sontek.com

Water Quality Monitoring Project in Hong Kong

University of Hong Kong

July, 2002 – The University of Hong Kong's Civil Engineering Department has been monitoring water quality and velocity since January, 2000 in sub-tropical coastal waters using a SonTek Argonaut-XR (Extended Range) and a YSI Multi-Parameter Sonde.



The monitoring project focuses on algal blooms and red tides that occur in the region. Because of the inadequacy of routine water quality sampling for this analysis, a fixed continuous monitoring program is essential. Two continuous telemetric monitoring stations have been established along the coastal regions in the New Territories and the islands to the south of Hong Kong. Measurements from these stations have been supplemented by additional bi-weekly water-quality sampling (e.g., direct Chlorophyll-a measurements) to provide accurate research data for analysis and modeling.

The monitoring system is made up using an Argonaut-XR for tidal level and water currents, a Multi-Probe Sonde with PAR sensors for the water quality profile, and a number of additional sensors. These sensors are all connected to a single micrologger and use a modem and telephone line to transmit data to the lab.

This data collection platform has successfully detected algal blooms in the area, and using the collected data, a water quality model is currently under development.

According to the University of Hong Kong's website (http://www.hku.hk/civil/envhydraulics/pro_01.htm), in sub-tropical coastal waters around Hong Kong, algal blooms (the rapid growth of microscopic phytoplankton) are often observed. Under the right environmental conditions there blooms can occur and subside over rather short time scales, in the order of days to a few weeks. Algal blooms often lead to discoloration of the marine water (e.g. red tides), which may lead to beach closures, severe dissolved oxygen depletion, fish kills, and shellfish poisoning. Over the past two decades, massive fish kills due to oxygen depletion have been observed in some of the marine fish culture zones in Hong Kong; toxic algal blooms have, however, been relatively rare. Nevertheless, in April 1998, a devastating red tide has resulted in the worst fish kill in Hong Kong's history – it wiped out over 80% (3,400 tonnes) of fish stocks, with estimated loss of more than HK\$12 million.



Argonaut-XR used for water quality monitoring project.

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Environmental Damage Assessment with YSI Multiparameter Sonde and Argonaut-XR

Kuwait

Fall, 2002 - Four Endeco/YSI EMM700 buoys were delivered to Kuwait as integrated systems (left). Three of the four buoys are deployed within 3 to 15 miles off shore along the Kuwaiti coast, the fourth buoy is 10 miles east of Failaka Island.

These buoys are outfitted with two YSI Multiparameter Sondes for both bottom and surface measurements, as well as a full array of meteorologic sensors. A SonTek Argonaut-XR (right) was used for current and wave monitoring. The data is being telemetered in real time and is being used by a consortium of international companies to help assess environmental damage done to the Kuwaiti waters in the early 1990's.



YSI Multiparamter Sonde



SonTek Argonaut-XR (Extended Range) current meter

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The Complete Solution

YSI/SonTek/YSI Systems and Services

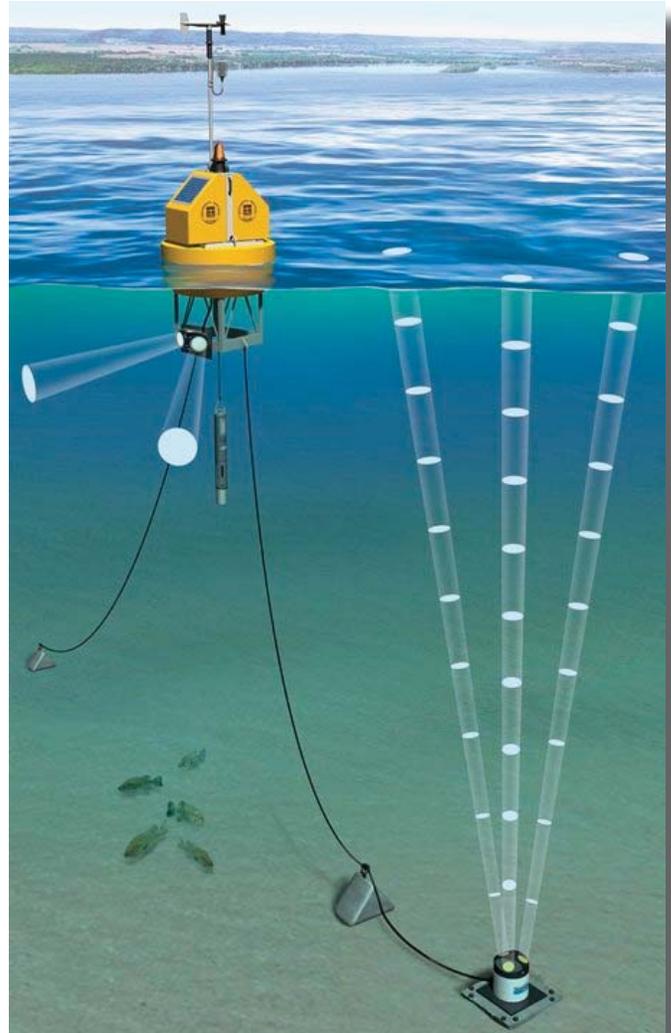
Only YSI Environmental can offer the complete solution for real-time monitoring of currents and water quality parameters in ocean and deep water environments. A wide range of versatile sensors and supplemental equipment, combined with full integration and a wealth of in-house field experience, means you get the best data for your measurement application.

An **Argonaut-XR** integrated into a coastal monitoring platform provides the best solution for real-time measurement of waves and currents. Not only is the XR inexpensive and easy to install, but its versatility and compact design make it the clear and cost-effective choice.

A full range of services, from design-to-manufacturing, and from installation-to-servicing are available for your monitoring applications. Custom systems are also available to fully utilize the broad array of sensors that we have available. Data acquisition and telemetry capabilities can be integrated into your system for remote monitoring.



Argonaut-XR



YSI 6952 Buoy Based Profiling System

Mini-ADP/V-Fin
Integrated System



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