

A Case Study

Volume 1, No. 1

Real world Solutions
from Teledyne Benthos

*Real-time acquisition of
current profile data from
two remote acoustic
Doppler current profilers*



TELEDYNE BENTHOS

A Teledyne Technologies Company

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Teledyne Benthos Equipment: Acoustic Modems

Customer: BMT Scientific Marine Services (end user: Williams)

Application: Underwater Wireless Data Transfer

Depth: 1700+M

Range: Up to 2000M

Data Rate: 1,200 bits/sec data throughput with error correction convolutional coding

Host Sensor: Teledyne RD Instruments Acoustic Doppler Current Profiler, Workhorse Long Ranger 75 kHz (ADCP)

Overall, BMT SMS found the perfect solution to meet the complicated deployment requirements.

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The Problem

BMT Scientific Marine Services was contracted by Williams to operate two Acoustic Doppler Current Profilers (ADCPs) that the U.S. Mineral Management Service (MMS), required them to install around the Devils Tower Spar located in the Mississippi Canyon Plot 773. MMS requires that the current data be collected every ninety days and be archived. To recover the data from these ADCP's the units would have to be either cabled to the platform or recovered every ninety days to have the data recorders downloaded and archived.

Repeated recovery and redeployment of these units would be very expensive and could also result in the data not being archived on schedule due to the busy operations in the Gulf of Mexico (GoM). So recovering the units was not an option to Williams because of cost, potential

scheduling issues on the GoM with work boats, and the issues associated with deploying equipment every ninety days. It was determined that for the equipment to be deployed economically it needed to remain in the water for at least one year or more, if possible. A different option was needed.

Real time wireless communication was the best option for a one year minimum deployment. Cables are possible for the 2000+M runs needed to get the data from the ADCP's, but the logistics of these cables was just too difficult. Running long fragile cables around oil platforms is not a good practice because of weather, frequent boat traffic loading and off-loading equipment from the platform, and overall cost of these cables.

The Solution

The U.S. Mineral Management Service requires the current profile data collected around Oil Platforms in the Gulf of Mexico to be monitored and posted on a website for archiving every three months or sooner. For Williams to meet the needs of MMS and reduce costs the ADCP's had to stay in the water for one year or more. BMT Scientific Marine Services needed a real time communications system to telemeter the data from the ADCP's to the platform through the water. This was a perfect application for acoustic modems.

BMT SMS selected the ATM-885 series acoustic telemetry modem in the medium frequency band operating from 16 to 21 kHz and using Multiple Frequency Shift Keying for data transmission through the water. The unit is depth rated to 2000M so

the 1700+M depth rating was no problem. External battery packs are optional so the one year deployment time was easy. The modems are addressable so installing multiple ADCP's and multiple modems in the water was standard procedure. Overall, BMT SMS found the perfect solution to meet the complicated deployment requirements.

Two moorings needed to be designed for the ADCP's, acoustic modems, batteries and beacons required to relocate the moorings when they are being recovered. The modem needed to be mounted so as to not interfere with the 20° beam departure of the ADCP transducers. A unique mooring design was created by BMT SMS and was used on both moorings (See figures 1 & 2). The sea floor mooring

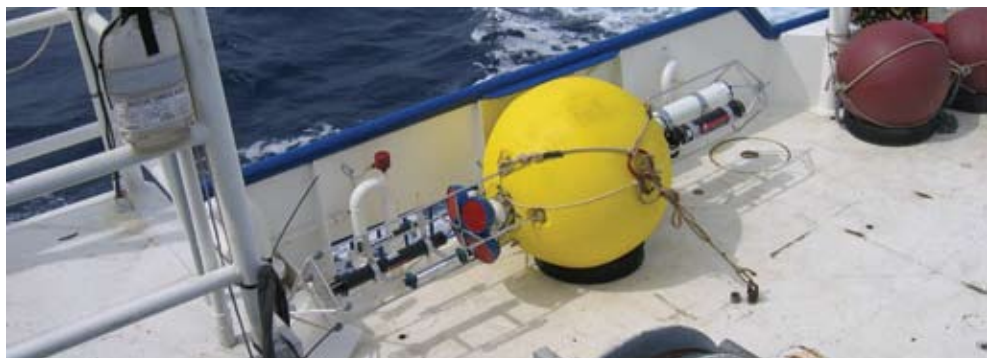


Figure 1 Mid-column mooring

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was designed to carry enough batteries for a two year deployment and the mid column mooring was designed to carry enough for one year.

The mid column mooring used a syntactic foam float to hold the ADCP, and a stainless steel frame work to hold the modem. The transducer design on the mid column mooring is omni directional and has a 180° beam width. The mid column mooring can be seen in [figure 1](#). The sea floor mooring used a lander style design and held the modem in the same overhead design but used a different transducer design. The transducer on the sea floor mooring is a directional transducer with

60° beam width, that's 30° each side of center. The sea floor mooring can be seen in [figure 2](#).

The topside modem was integrated into the existing structure attaching the transducer to a now unused ballast pipe as seen in [figure 3](#). The transducer cable was run down this pipe and then run to the electronics elsewhere on the platform. The data was then sent off to be archived. The topside modem is a standard rack mount ATM-891 Deck Box, 200M armored cable and AT-408 Omnidirectional Transducer. Approximately 1200 bytes of data was acoustically transmitted every 20 minutes.

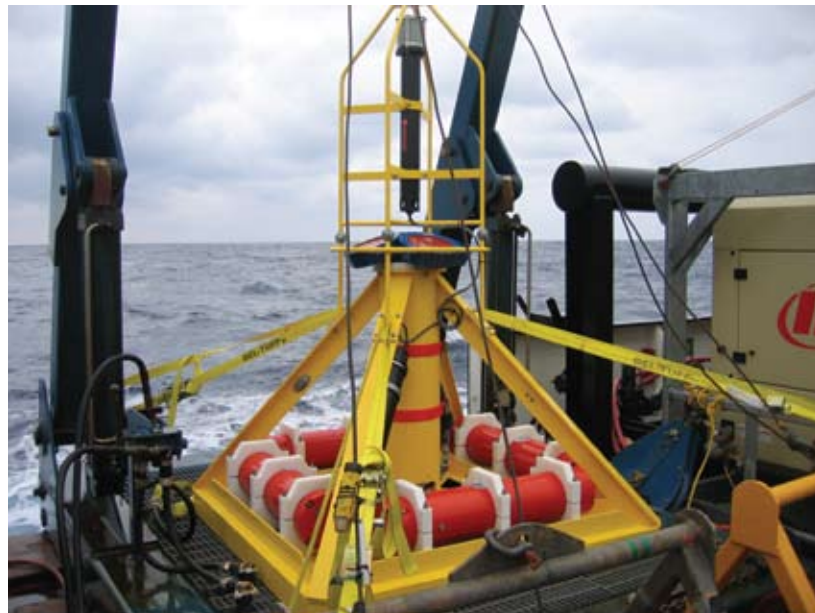


Figure 2
Sea floor mooring



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Figure 3
Topside
modem
integration

