![Woods Hole Group logo]

Archie Todd Morrison, III, Ph.D, O.E., M.S., B.A.
Senior Ocean Engineer

Expertise

Instrument and system design and development, particularly for oceanographic investigation and environmental monitoring, electrical engineering, oceanography, real-time telemetry, signal processing, mechanical design, materials, computer and microprocessor interfaces and programming, data acquisition, analysis, and display, system documentation.

Qualification Summary

- More than 20 years of experience in the fields of oceanography, coastal engineering, sediment transport, and nearshore processes
- Instrument systems and software for biogeochemical and physical oceanographic investigations, fisheries research, and medical investigations
- Experienced with a range of current measurement technologies
- Acoustic differential travel time instrumentation to study the velocity structure of the continental shelf wave bottom boundary layer
- Interactive and expert system software and communications circuitry to provide real-time display and interpretation of dynamic fishnet behavior
- Interactive model data extraction and plotting software to support protected species research and by-catch analysis
- Real-time oil rig based current measurement systems including launch and recovery gantries
- Real-time moorings and bottom installations for harbors, coastal areas, and the deep ocean
- Analysis of collected measurements
- Writes and works with assembly and higher level (e.g., C, Matlab) languages for microprocessor control, data collection, data analysis, numerical calculations, and simulations

Work Experience

2009-Present	Woods Hole Group, Inc., Senior Ocean Engineer
2000-Present	Nobska Development, Inc., Senior Engineer / Vice President for Engineering
2006-2007	Webb Research Corp., Senior Engineer
2003-2009	Integrated Statistics, Inc., Oceanographic Engineer
1998-2003	McLane Research Laboratories, Inc., Senior Engineer for Electronic Systems
1997-2014	Woods Hole Oceanographic Institution, Visiting / Guest Investigator
1987-1989	St. Luke's Community Kitchen, Director of Mail Services
1981-1986	Raytheon Service Company, Senior Field Engineer

Education

Ph.D., Oceanographic Engineering – 1997 Massachusetts Institute of Technology and Woods Hole Oceanographic Institution

O.E., Oceanographic Engineering – 1994 Massachusetts Institute of Technology and Woods Hole Oceanographic Institution

M.S., Ocean Engineering – 1994 Massachusetts Institute of Technology

B.A., Engineering and Applied Science / Electrical Engineering – 1981 Harvard University, *cum laude*

Professional Affiliations

Institute of Electrical and Electronic Engineers (IEEE) Senior Member

IEEE/OES and MTS Award for Service to the OCEANS Community 2015

Publications and Presentations

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Key Projects

Real-Time Wave and Current Monitoring System Port of Altamira, Mexico, Project Manager
The Altamira system consists of bottom mounted instrumentation reporting acoustically to a surface buoy that in turn communicates by radio modem to the Port Authority's harbor control and operations tower. The measurements and derived quantities, such as significant wave height, are displayed in real-time on computers connected to the harbor operations intranet. The decision to open or close the harbor, one of the busiest in Mexico, is based on this information.

Launch and Recovery System for Current Measurement Pacific Santa Ana Drill Ship, Gulf of Mexico, Project Manager
The PSA LARS is based around a rail and sled system. A current profiler mounted in a sled frame is deployed along rails to the curve of the bilge. The rails, approximately 25 meters in height, are secured to the side of the hull. The sled is controlled with a hydraulic winch and an electromechanical cable that carries power, control signals, and data. The winch and other system components are supported by an A-frame mounted to the deck at the top of the rails. The system provides current profiles in real-time to support drilling operations and future design work.

Wave, Current, and Marine Mammal Monitoring Garden State Ocean Energy, Project Manager
Our customer required a baseline study of physical oceanographic characteristics and marine mammal activity at the site of a planned offshore wind farm. The bottom mounted equipment is internally recording with quarterly servicing, data harvesting, and analysis/reporting.

Analysis and Quality Control of Gulf of Mexico Deepwater Current Measurements DeepStar Research Consortium, Database Search Tools
DeepStar is a consortium of oil companies operating in the Gulf of Mexico. Since 2005 BOEMRE (formerly MMS), a US Government agency, has required deep water operators to provide real-time current profiles to an archive at the National Data Buoy Center (NDBC). WHG was contracted to perform a complete analysis and QA/QC of the data archived from 2005 through 2010, to construct a database of clean data with consistent formatting, and to construct search tools for that database.

Real-Time Current Measurement Systems BP, Project Manager DS3 (Deep Ocean Ascension), DS4 (Deep Ocean Clarion) West Auriga, West Vela, West Capricorn, Helix Q5000
The WHG designed system provides thousand meter current profiles in real-time to the vessel and to the National Data Buoy Center. Upward and downward looking ADCPs are mounted on a frame suspended from two electro-mechanical cables that are positioned with dual hydraulic winches. An articulated A-frame supports the winches and sheave blocks. The system, which is largely automatic, provides power and control signals to the instruments, collects and processes data, and provides real-time displays to operators over the on-board CCTV network.

Real-Time Mooring for the Ross Ice Shelf Woods Hole Oceanographic Institution

To support a planned through/under ice mooring, WHOI required a real-time automated, controller, logger, and satellite telemetry node that could "winter over" at an isolated location where temperatures were expected to regularly drop below -40C, well below the operating range of some of the required electronics. We designed, constructed, tested and delivered, within a window of a few weeks, a heavily insulated node with heaters integrated inside a shipping crate and with a calculated endurance of 14 months at prevailing ice shelf temperatures.

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Key Projects (continued)

Hudson Canyon Oceanographic Measurement Program ExxonMobil Blue Ocean Energy Offshore LNG Terminal, Data Analysis

Two locations in the upper Hudson Canyon were instrumented with bottom and mooring mounted current, wave, temperature, and conductivity sensors. The client had a general interest in characterizing the surface gravity wave and current environment as part of a design study for a proposed offshore floating LNG terminal. However, there was also a specific requirement to detect and characterize infragravity waves (periods from 50 to 150 seconds), high frequency internal waves (solitons), and internal tides. Exciting the characteristic frequencies of the terminal or the LNG carrier and high localized flow differentials were concerns.

Automated Model Database Search Tools National Marine Fisheries Service, Project Manager and Developer

Investigators in the Protected Species Branch of the NMFS were searching for a statistical link between oceanographic characteristics and sea turtle by catch to guide possible regulatory action. In the absence of regular, broad scale measurement programs that could be compared to known by catch events, ocean characteristics were mined from archival model data. The software tools that were developed supported extensive, automated search and extraction based on randomized queries and thus enabled the required statistical analysis.

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Morrison, A. T., III, D. R. Yoerger. 1993. "Determination of the Hydrodynamic Parameters of an Underwater Vehicle During Small Scale, Nonuniform, 1-Dimensional Translation", *Proceedings OCEANS '93*, IEEE/OES, October 1993, Vol. II, pp. 277-282.

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Publications and Presentations (continued)

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Williams, A. J., 3rd, F. T. Thwaites, A. T. Morrison, III. 1996. "Transducer Supports for Acoustic Travel-Time Current Meters - Flow Sampling, Wake, and Potential Flow Distortion Considerations", *Proceedings Microstructure Workshop*, Mount Hood, OR, 1996.

Morrison, A. T., III. 1997. "Development of the BASS Rake Acoustic Current Sensor: Measuring Velocity in the Continental Shelf Wave Bottom Boundary Layer", Ph. D. thesis, Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program in Oceanographic Engineering, June 1997.

Morrison, A. T., III. 1997. "Results from the First Deployment of the BASS Rake Field Prototype", *Proceedings OCEANS '97*, MTS/IEEE/OES, October 1997, Vol. I, pp. 518-523.

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Williams, A. J., 3rd, A. T. Morrison, III, J. D. Irish. 2013. "Vector Averaging in a Wave Field", *Proceedings OCEANS 2013 MTS/IEEE Bergen*, IEEE/OES, June 2013.

Williams, A. J., 3rd, A. T. Morrison, III. 2013. "Adapting to Technology Advances and End of Life Announcements for Current Measurement Technologies", *Proceedings OCEANS 2013 MTS/IEEE San Diego,* IEEE/OES, September 2013.

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Magnell, B. A., L. I. Ivanov, A. T. Morrison, III, E. G. Hasbrouck. 2015. "Current Measurements from a Deep Real-Time Metocean Mooring: Lessons Learned on Real-Time Data QA/QC", *Proceedings of the IEEE/OES Eleventh Current, Waves, and Turbulence Measurement Workshop*, IEEE/OES, March 2015.

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Publications and Presentations (continued)

Magnell, B. A., L. I. Ivanov, A. T. Morrison, III, E, G, Hasbrouck. 2015. "Current and Wave Measurements Off the Coast of New Jersey During the Second Most Severe Storm of the Past 28 Years", *Proceedings of the IEEE/OES Eleventh Current, Waves, and Turbulence Measurement Workshop*, IEEE/OES, March 2015.

Posters:

Taylor, C. D., K.W. Doherty, S. J. Molyneaux, A. T. Morrison, III, I. B. Engstrom, D. W. Pfitsch. 2004. "Autonomous Microbial Sampler (AMS): Device for the Uncontaminated Collection of Microbial Samples from Submarine Hydrothermal Vents and Other Aquatic Environments", *Dark Energy – The Deep Oceanic Biosphere Workshop*, Deep Ocean Exploration and Ocean Life Institutes of the Woods Hole Oceanographic Institution, October 2004.