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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 25 years of experience in the fields of oceanography, coastal engineering, sediment transport, and near-shore 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
1981-1986	Raytheon Service Company, Senior Field Engineer

Education

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

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

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

1991 – B.A.
Engineering and Applied Science/Electrical Engineering
Harvard

Professional Affiliations

- Institute of Electrical and Electronic Engineers (IEEE) Senior Member
- IEEE/OES and MTS Award for Service to the OCEANS Community 2015

Publications & Presentations

51

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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, Noble Bob Douglas
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

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KEY PROJECTS (CONTINUED)

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.

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.

PUBLICATIONS & PRESENTATIONS

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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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Morrison, A. T., III, A. J. Williams, 3rd. 1994. "STRESS II BASS Data Archive", CD-ROM, NetCDF binary and ASCII files, MATLAB binary and ASCII files, December 1994.

PUBLICATIONS AND PRESENTATIONS (CONTINUED)

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Williams, A. J., 3rd, A. T. Morrison III. 1996. "Shallow-Water Messenger-Line Recovery System", *Proceedings OCEANS '96*, MTS/IEEE/OES, September 1996, Vol. II, pp. 646-649.

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.

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Morrison, A. T., III, E. A. Cowen, P. L.-F. Liu. 1999. "Velocity Profile Measurements in the Crest of a Breaking Wave Using the BASS Rake Acoustic Velocity Sensor", *Proceedings of the IEEE Sixth Working Conference on Current Measurement*, IEEE/OES, March 1999, pp. 221-226.

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Morrison, A. T., III, A, J, Williams, 3rd, A. C. Waterbury, C. M. Tierney. 2002. "Analog Output from a Differential Travel-Time Current Meter", *Proceedings OCEANS 2002*, MTS/IEEE/OES, October 2002, pp. 708-712.

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Williams, A. J., 3rd, E. A. Terray, A. T. Morrison, III. 2004. "Bottom Stress Measurements in Shallow Water Under Waves", *Proceedings of the First US-Baltic International Symposium*, IEEE/OES, June 2004.

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Williams, A. J., 3rd, A. T., Morrison, III. 2005. "Near Bottom Measurement of Wave Environment in a Tidal Current", *Proceedings OCEANS 2005 Europe*, IEEE/OES, June 2005.

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Williams, A. J., 3rd, A. T. Morrison, III, J. E. Farrell, J. E. 2007. "Measurements of Surf Zone Currents and Waves in Support of Madaket and Sankaty Head, Nantucket, Beach Nourishment", *Proceedings OCEANS 2007 IEEE Aberdeen*, IEEE/OES, June 2007.

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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.

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.

Magnell, B. A., A. T. Morrison, III. 2016. "Improved Current Profiling Systems for Offshore Rigs", *Ocean News and Technology*, September 2016.

Magnell, B. A., L. I. Ivanov, R. J. Ramos, A. T. Morrison, III, T. A. Ball. 2016. "Modeling the Performance of a Winged Sub-Surface Float for Acoustic Profiling and Wave Measurements", *Proceedings OCEANS 2016 Monterey*, MTS/IEEE, IEEE/OES, September 2016.

Magnell, B. A., L. I. Ivanov, A. T. Morrison, III, R. J. Ramos. 2017. "Extrapolation of Subsurface Current Observations to the Sea Surface: Applicability and Limitations of Basic Algorithms", *Proceedings Offshore Technology Conference 2017*, OTC 27598, Houston, TX, May 2017.

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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.

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