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Trevor Ball, B.S.

Mechanical Engineer

EXPERTISE

Design and development of mechanical components for a variety of oceanographic equipment including; tethered and moored profilers, CTD deployment systems, ADCP Systems, and ROV platforms. 2D and 3D CAD experience with a variety of software packages.

QUALIFICATION SUMMARY

- Ten years of design, assembly, and fabrication experience
- Experienced with a variety of CAD packages including AutoCAD, SolidWorks, and ProE.
- Familiar with individual part fabrication and the operation of a number of machining tools including mills, lathes, etc.
- Experience in collaborating with both scientists and machinists in the development and fabrication of project components.

WORK EXPERIENCE

2012-Present	Mechanical Engineer, Woods Hole Group
2004-2009	Engineering Assistant, Woods Hole Oceanographic Institution

Education
2011 – B.S.
Mechanical Engineering
University of Massachusetts - Lowell

Licenses and Registrations
N/A

Professional Affiliations
-N/A

Publications & Presentations
N/A

Trevor Ball
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KEY PROJECTS

Real-Time Metocean Mooring System, Gulf of Mexico, BP – Mechanical Engineer

Aided in the design of internal structures and modeling for the entire system, for the combined current, wave, and wind measurement buoy in the Green Canyon area of the Gulf of Mexico. The purpose of this buoy is to generate current profile measurements required by the U.S. Department of Interior, Bureau of Ocean Energy Management. The current data are generated by a number of devices. This includes a single point current meter 30 meters above the sea-floor, a pair of upward and downward looking ADCPs inside a subsurface float located at 450 meters below the surface, and an ADCP located on the underside of the surface buoy. The various current profiles created by this equipment, in addition to the near surface current profiles, as well as wind and wave data, are transmitted by satellite to the Woods Hole Group in Falmouth, MA. This information is then organized and plotted and made available to BP and the NDBC.

Physical Oceanographic Real-Time System (PORTS), Jacksonville Florida, Jacksonville Marine Transportation Exchange – Mechanical Engineer

Responsible for modeling conceptual versions of monitoring stations along St. Johns River. Collaborating with NOAA personnel to meet various safety and sustainability criteria. Involved in design and drafting of a variety of custom parts and equipment for the installation of these stations. The purpose of this project is to develop the real-time awareness aspect of a comprehensive, planned and real-time, domain awareness program for the Port of Jacksonville. The Physical Oceanographic Real-Time System (PORTS) will provide real-time oceanographic and meteorological data to ensure the complete and accurate picture of active factors affecting the port.

This PORTS system integrates approximately 30 oceanographic and meteorological sensors including water level, water current, visibility, conductivity/salinity, wind, barometric pressure, air temperature, and air draft in an open architecture network that is compatible with the soon to be implemented command and control integration system for comprehensive domain awareness. This integration supports anomaly detection and deterrent response actions.

This system delivers critical environmental detail for recovery and trade resumption following a port shut down incident cause by terrorist incident or natural disaster. Critical air draft clearance information for bridges, as well as accurate real-time water level sensors, allow for an informed vessel transit start-up process during the recovery stage.

Real-Time Metocean Mooring System, Colombian Caribbean, Ecopetrol – Mechanical Engineer

Responsible for complete design overhaul of metocean buoy platform, addressing previous issues with original Watchdog buoy design. Many aspects of the system required redesigns, including most of the tower, bridle, internal electronics housing, and the mounting schemes for most instrumentation and solar panels. The purpose of this buoy is to generate current profiles, along with wind, wave, and a variety of meteorological data for the Colombian national petroleum company “Ecopetrol”. The Buoy provides data for “Block RC9” in the Colombian Caribbean. The current data are generated by a single, downward looking TRDI 300 kHz Workhorse

KEY PROJECTS (CONTINUED)

ADCP, mounted in the bridle of the surface buoy. The data are stored on site and transmitted in near real-time to the WHG offices where they are made available to Ecopetrol via FTP.

Real-Time Metocean Mooring System, Campos Basin, Brazil, Chevron – Mechanical Engineer

Responsible for further redesign of the V2 Watchdog buoy. The depth of operation for this particular mooring required a change in instrumentation to obtain a comprehensive current map. This primarily involved changes to the buoy bridle for mounting a new ADCP. Additional changes were made to the tower structure to match client data needs. The purpose of this buoy is to generate current profiles, along with wind, wave, and a variety of meteorological data for Chevron's Frade Field, in the Campos Basin. The current data are generated by a downward looking Nortek Signature 55 ADCP, mounted in the bridle of the surface buoy, and an Aquadopp single point current meter, 20m above the seabed. The data are stored on site and transmitted in near real-time to the WHG offices where they are made available to Chevron via FTP.

ADCP Launch and Recovery System, Helix Q5000, Gulf of Mexico, Helix – Mechanical Engineer

A variation of Woods Hole Group's previous drillship based ADCP deployment system. The ADCP LARS is comprised of an instrument sled which holds a pair of ADCPs. An upward looking TRDI 300 kHz Sentinel, and a downward looking 38 kHz Ocean Observer ADCP. These instruments connect to an electronics housing onboard the sled, which connects to the ship via a pair of electro-mechanical cables which support the sled underwater, and provide power and communications. The two ADCPs provide a current profile of the water column the ship is operating in. this information is transmitted to the NDBC as per regulatory requirements, and to the ship itself, providing critical information for various well operations. This particular job involved a dramatic change in the design of the winches and hydraulic system. The winches were designed to operate without level winds, while still properly spooling the electromechanical cable. Close collaboration with out machine shop was required to make these desired changes to the system.

Winged Float Lift & Drag Study

Woods Hole Group scientists and engineers have devised a concept for a relatively small winged float utilizing current-generated lift to minimize drawdown in very high currents, while also maintaining a stable attitude for the sensor. The winged float design consists of a streamlined body with wings (double wings are shown), having modest static buoyancy, with a low drag coefficient and tail fins to control the body's attitude while maintaining a near-constant angle of attack by its wings. The float is connected with an S-tether to the sea floor or to a "false-bottom" subsurface float at some intermediate depth. The winged float is assumed to reside at depth of about 25m under zero-current conditions. Responsibilities consisted of the initial design of the streamlined body and wing profiles, as well as initial lift and drag calculations to use as a baseline comparison for the computer model.