

Review of ONR/MTS Buoy Workshop March 2010 Monterey, CA

Mission and Purpose

The Buoy Workshop mission is to foster the technology and experience exchange in the highly specialized field of oceanographic and other buoy systems, and take advantage of the informal workshop environment to ease open and focused presentations, discussions and exchanges for the mutual benefit of all attendees

Speakers and attendees are encouraged to report about their new developments, and share their experiences, failures, and successes. The Buoy Workshop provides unique exchange opportunities for oceanographic buoy technologists and researchers worldwide, as well as for ocean engineering students, and professionals in other disciplines. The workshop will give a timely update of what is going on in oceanographic and other buoy technology, an exciting and challenging area of expertise with near endless possibilities

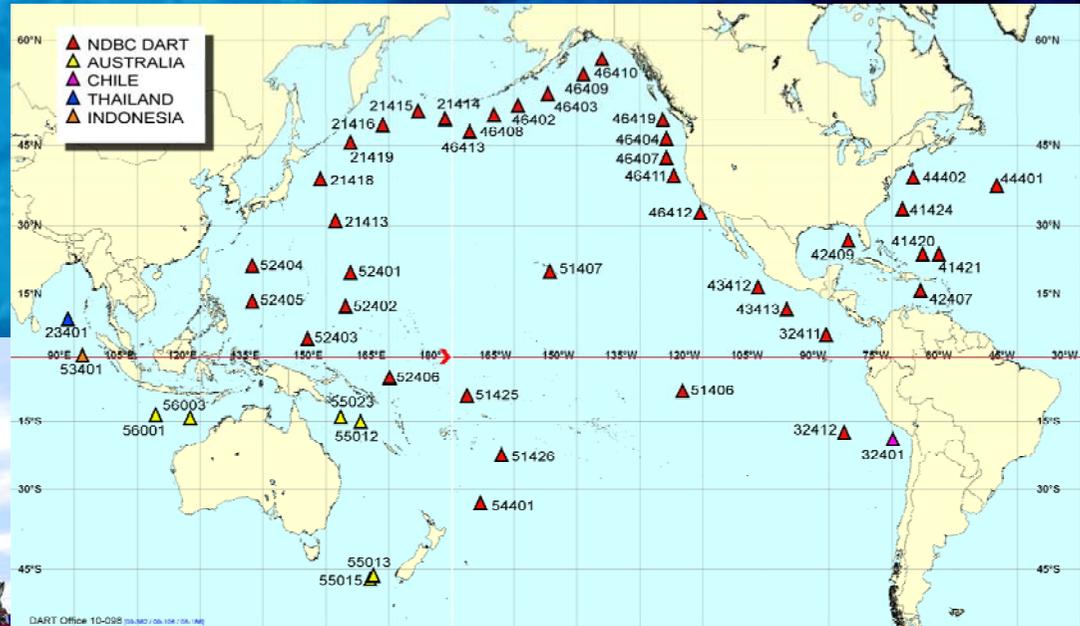
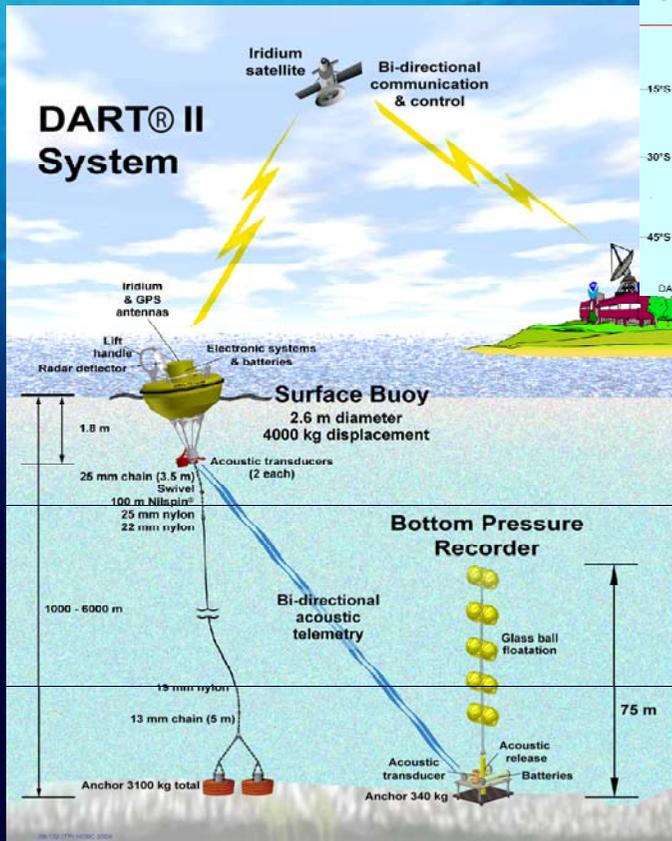
- Meets every two years, in even years
- This was the 8th workshop; organized by WHOI but held around the US at buoy centres
- The last few still have web pages up. CD's are available of past meetings proceedings
- Well attended in 2010 with 120 attendees. Host institute was MBARI
- It is an International meeting although dominated by US participants
- Other countries represented were Australia, Canada, China, France, Korea, Norway, Spain and the U.K.
- The 2010 workshop clashed with OI 2010
- 26 presentations

Session 1

NOAA NDBC buoy systems

- NOAA National Data Buoy Centre - 200 buoy systems deployed.
- Taut line moorings
- 20 - 5000m water depths
- SAIC are technical services contractor providing ships and technicians
- Moorings designed with OSCAR (ocean surface current analysis real-time) program
- Tropical Atmosphere Ocean array (TAO)
- 116 buoys-3 large arrays

- Deep-ocean Assessment and Reporting of Tsunamis (DART®) satellite communications.
- 39 buoy and BPR (separate Lander) installations
- Service interval: 1yr buoy; 2 yr BPR
- DART contact vessels
- Replaced nil spin wire to cut resistant synthetic
- Flat line speed of sound profile (sos not corrected)
- Scope important



<http://noc.ac.uk>

- Ranging from 20m-5,600m water depths
- Various designs - semi taut and S-tether
- Total of 264 failures since 1986
- Various materials being used, remove weak points i.e. shackles. Use long splices instead. One swivel on some designs.
- Shark bite - an issue
- Vandalism - an issue (large)
- Some endurance tests done, i.e. leave until something breaks
- 1-5 years Hawaii
- 2 years N. Pacific
- Wear characteristics are important –looking at Spectra

Session 2

- More buoy systems –i.e. surface buoys
- Buoy effects on EM cable network
- Indian Ocean, Chesapeake Bay and coastal mooring platforms for US Integrated Ocean Observing Initiative
- Coastal Data Information Program (CDIP) (Scripps & US Army) – 42 Datawell Directional Waverider buoys
- Failures through dissimilar metals
- AXYS Watchkeeper platform – Chesapeake Bay Interpretive Buoy System (CBIBS). Shallow water but large public buy-in

Session 3

Wave technology harvesting from buoys

Sonobuoy Wave-Energy Module (SWEM) uses wave energy to prolong power to US Navy sonobuoys

Columbia Power developing wave energy converter (WEC) that converts both heave and surge wave energy directly into rotary motion

Session 4

- Buoy communications, power and telemetry
- Argos-3 - RS-485 compatible & high data rate, increased constellations planned
- Argos-4 - in development
- MBARI PUCK PROTOCOL Interoperability of Ocean Sensors - for real-time data internet protocol is preferred
- Plug sensors into systems 12 commands to talk to sensors
- SBE, RBR, Nortek have incorporated PUCK into firmware
 - PUCK Memory Map
 - Header and ID
 - Puck payload
- Deployed on AXYS Technologies buoy
- Nortek Aquadopp Z-cell profiler
- Nortek IM (coupled with SeaBird IM)

Session 5

- PLOCAM real-time coastal monitoring in the Macronesian region
- NOC & SAMS UK overview
- Gateway buoys and experience of compliant mooring systems
- Elastic mooring member (WHOI Right Whale)
- Tyre cord layered at spiraled angles
- Only one manufacturer close wound-more stretched
- \$5/6k – 2000lb in couplings break strength
- 30-40% stretch range depending on cord winding tightness

Session 6

- SAIC – taught line moorings
- Rope length 1.5% less than depth
- Scope 0985:1 depends how much wire (wire top/nylon lower)
- 8 plant nylon lynch cordage
- Treated (steamed and stretched) for better elasticity

Session 7

- Handbook of underwater cables and winches
- DUARRY Meteo-buoy ocean racing buoy
- Texas A&M University Mooring Course
- Henry Berteam –books on buoy engineering
- Yale cordage pre-stretch Nylon
- Florida, Spain and WHOI Right whale (elastic) moorings.