



# Oceanic Engineering Society Newsletter

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EDITOR: FREDERICK H. MALTZ

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OCEANS'06 Asia Pacific IEEE - Singapore

Singapore, The Starbuck - Singapore, 16-19 May 2006



## Call for Papers, Tutorials, and Student Posters

This next OCEANS ASIA, to be held in Singapore is designed to be a premiere international conference that is of interest to the ocean community and aims to be the world's primary staging location for significant breakthroughs that will change the paradigm for future ocean sciences and marine technology operations.

It provides a forum for delegates to meet and gain an understanding of mutual concerns and the challenges in the ocean arena. An exhibition will be held in conjunction with the conference.

Please join us!

**Please see pages 28 & 29**

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## Table of Contents

<i>The President's Corner</i> .....	3
<i>Distinguished Technical Achievement Award</i> .....	5
<i>2004 Distinguished Service Award</i> .....	6
<i>2005 Distinguished Service Award</i> .....	7
<i>Pre-college Education Committee (PEC) 2004 PEC Teacher-Engineer Partnership Award Winners</i> .	8
<i>OCEANS 2005 MTS/IEEE – One Ocean</i> .....	9
<i>OCEANS 2005 Photos</i> .....	10
<i>OCEANS 2005 MTS/IEEE Student Poster Program</i> .....	14
<i>The Hawaii Underwater Robot Challenge</i> .....	16
<i>National Ocean Sciences Bowl Demonstration</i> .....	20
<i>Report to the IEEE OES on the Administrative Committee (AdCom) Meeting</i> .....	20
<i>Homeland Security Technology Workshop</i> .....	22
<i>2005 IEEE OES Homeland Security Workshop (Call for Abstracts)</i> .....	24
<i>Jocara</i> .....	26
<i>IEEE Oceans '06 Asia Pacific</i> .....	28
<i>Oceans '06 (Call for Papers)</i> .....	30

## President's Corner

The past year has been an event filled one for the society. Our constitution and bylaws were voted on by the membership and passed. This means that we now have some changes to our officer selection. There are now four vice president positions – technical, professional, conference development, and conference operations. The impetus for this was the initiation of two major conferences each year. If one considers the life of a conference—about 4 years prior to and one year post – there are on the order of six conferences in being at any given time. Therefore, it was deemed appropriate to separate the development and implementation processes. In addition, the Treasurer and Secretary are now elected positions.

Our conference web tools are progressing and the registration module is about to come online. The only concern is the establishment of merchant accounts to handle the funds, especially with currency conversion. We intend to hold a meeting with IEEE headquarters in the next few weeks to work out a solution to this concern.

Our second conference for this year, OCEANS 05 – Washington—was well attended and featured an educational outreach track for teachers of k-12 students to explain the vagaries of our technologies and to encourage them to pre-



pare the students for technical career options. There was a demonstration of the MATE roV competition, which OES supports, displaying the vehicles of two local high school teams. In addition, the National Oceans Science Bowl, run by CORE, had a demonstration of their competition using two teams of high school students. As usual the technical paper sessions were more than informative. The exhibitors were in full force with their products on display and the attendee interaction was good. It should also be a financial success.

In keeping with the educational theme, the society once again assisted with the planning and implementation of the 8th International Submarine Races held at the David Taylor Model Basin, Carderock MD. This U.S. Navy facility has been the site for the last few events. The overall winner was a team from the Netherlands—WASUB. OES awards a financial stipend to the winning team and did so this year. You can see a nice write up on the event in SEA TECHNOLOGY if you are interested in more detail.

The society has established a technical committee for the GEOSS project so that we can stay abreast of the daily happenings in this ambitious project. Sandy Williams plans to attend a

related meeting in Geneva focused on Tsunami warning systems. This is just one of the areas that the project is concerned with.

Bob Bannon and I attended a Homeland Security in Gdansk that was held at the Technical University of Gdansk. One of the technical cosponsors was a group from Region 1 in the Boston area. The symposium attracted a varied set of attendees. Another such meeting is being planned for next October in Istanbul, Turkey that will be focused on harbor protection. OES will be a technical cosponsor. Keep your eyes peeled for the call for papers.

Our third Homeland Security Technical Workshop chaired by Bob Bannon and Pam Hurst, will be held in Newport, RI on 6-8 December. Besides the technical program and networking this is a nice place to visit at this time of the year as the mansions are in full bloom for the Christmas season. If you haven't done so, make your plans to attend.

The society would like to congratulate the following members that were elevated to Senior Member at the September selection committee meeting:

Archie Todd Morrison III	Region 1
James Newman	Region 1
Jean-Pierre Hermand	Region 8
Ning Mia	Region 10
Kun-Chou Lee	Region10

There are approximately 360,00 members in the IEEE worldwide. Of these there are on the order of 29,000 Senior members so that this election is significant.

**Jim Barbera, IEEE/OES President**



**Explore**

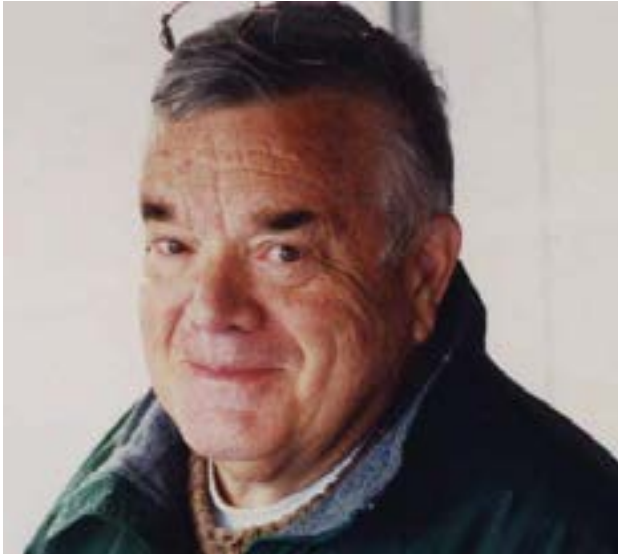
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# Distinguished Technical Achievement Award Oceanic Engineering Society OCEANS 2005



Douglas C. Webb

Mr. Webb is a creative, practical, and pragmatic engineer with a deep understanding of the physics behind the instruments that he has brought into being. Mr. Webb is perhaps best known for his low frequency underwater sound sources for tracking motion of the deep water of the ocean, most recently enhanced by using a variable frequency resonator that combines high efficiency and broad effective bandwidth. Through his technical innovation, from drifting floats to underwater gliders, Mr. Webb is changing the way that we observe the oceans.

Mr. Webb is a shining example to young ocean engineers, inspiring young people to think, to question, to be sure that they understand properly their arguments.

Vision, innovation, and persistence have made Mr. Webb singularly effective in enriching ocean instrumentation practice all over the world.

## Oceanic Engineering Society Distinguished Technical Achievement Award

- 1975 Robert Frosch
- 1976 Werner Kroebel
- 1977 Howard A. Wilcox
- 1978 Richard K. Moore
- 1979 David W. Hyde
- 1980 Neil Brown
- 1981 No Award
- 1982 Ira Dyer
- 1983 Alan Berman
- 1984 John B. Hersey
- 1985 William N. Nierenberg
- 1986 Robert J. Urick
- 1987 James R. McFarlane
- 1988 Chester M. McKinney
- 1989 Victor C. Anderson
- 1990 Robert C. Spindel
- 1991 Henry Cox
- 1992 Arthur B. Baggeroer
- 1993 William J. Plant
- 1994 Edmund J. Sullivan
- 1995 Mack O'Brien
- 1996 Frederick H. Fisher
- 1997 Newell Booth
- 1998 Burton G. Hurdle
- 1999 William M. Carey
- 2000 Albert J. Williams
- 2001 Werner Alpers
- 2002 James Candy
- 2003 Georges Bienvenu
- 2004 John P. Craven
- 2005 Douglas C. Webb

**Oceanic  
Engineering  
Society**  
Distinguished  
Service Award

- 1975 Arthur S. Westneat
- 1976 Frank Snodgrass
- 1977 Calvin T. Swift
- 1978 Edward W. Early
- 1979 Richard M. Emberson
- 1980 Donald M. Bolle
- 1981 Loyd Z. Maudlin
- 1982 Arthur S. Westneat
- 1983 Elmer P. Wheaton
- 1984 John C. Redmond
- 1985 Joseph R. Vadus
- 1986 Stanley G. Chamberlain
- 1987 Stanley L. Ehrlich
- 1988 Harold A. Sabbagh
- 1989 Eric Herz
- 1990 Anthony I. Eller
- 1991 Frederick H. Fisher
- 1992 Gordon Raisbeck
- 1993 Edward W. Early
- 1994 Daniel Alspach
- 1995 David Weissman
- 1996 Glen Williams
- 1997 Ferial El-Hawary
- 1998 Norman D. Miller
- 1999 Pierre Sabath
- 2000 Frederick H. Maltz
- 2001 Claude Brancart
- 2002 James Collins
- 2003 Joseph Czika
- 2004 William M. Carey

**Distinguished Service Award  
Oceanic Engineering Society  
OCEANS 2004**

William M. Carey Ph.D.



**William M. Carey** (M'85-SM'91-F'96) received the B.S. degree in Mechanical Engineering, the M.S. degree in Physics, and the Ph.D. degree in Nuclear Science from The Catholic University of America, Washington, DC, in 1965, 1968, and 1974, respectively.

He was the Editor and currently serves as an Associate Editor of the Journal of Oceanic Engineering. He is also an Associate Editor for Underwater Acoustics, the Journal of the Acoustical Society of America. Currently he is a Professor of Mechanical Engineering at Boston University, an Adjunct Professor of Applied Mathematics at the Rensselaer Polytechnic Institute, Troy, NY, an Adjunct Scientist at the Woods Hole Oceanographic Institution, and a Physicist with the Naval Undersea Warfare Center. Previously, he was a Physicist with the Advanced Research Projects Agency and was assigned to the MIT Department of Ocean Engineering, where he taught Acoustics. He has also been a Research Physicist and Engineer at the Naval Underwater Systems Center, The Naval Oceanographic Research and Development Activity, and the Naval Research Laboratory. At the University of Chicago's Argonne National Laboratory, he was an Associate Scientist and Section Manager of acoustic surveillance. He has been a consultant to both industry and government in the areas of nondestructive testing, nuclear science/environmental measurements, and applied ocean acoustics.

Dr. Carey is a Fellow of the Acoustical Society of America, a full member of Sigma Xi, a member of the Connecticut Academy of Science and Engineering, and also a member of the Cosmos Club. In addition to being an IEEE-OES Fellow he has also received the IEEE-Oceanic of Engineering Society's Distinguished Technical Achievement Award and an IEEE Millennium Award.

# Distinguished Service Award Oceanic Engineering Society OCEANS 2005

Claude P. Brancart



Claude Brancart has served the OES in many ways over the past two decades.

- Chair of the Unmanned Underwater Vehicle technology committee
- Chair of the biennial Autonomous Underwater Vehicle Workshops
- Society President 1996-1997
- Society Secretary 1992-1995
- OCEANS Conference General Chair 1995 & 2000
- Society Representative to the Offshore Technology Conference Technical Program Committee
- Chief Judge for the International Human-Powered Submarine Races eight times

## Oceanic Engineering Society Distinguished Service Award

- 1975 Arthur S. Westneat
- 1976 Frank Snodgrass
- 1977 Calvin T. Swift
- 1978 Edward W. Early
- 1979 Richard M. Emberson
- 1980 Donald M. Bolle
- 1981 Loyd Z. Maudlin
- 1982 Arthur S. Westneat
- 1983 Elmer P. Wheaton
- 1984 John C. Redmond
- 1985 Joseph R. Vadus
- 1986 Stanley G. Chamberlain
- 1987 Stanley L. Ehrlich
- 1988 Harold A. Sabbagh
- 1989 Eric Herz
- 1990 Anthony I. Eller
- 1991 Frederick H. Fisher
- 1992 Gordon Raisbeck
- 1993 Edward W. Early
- 1994 Daniel Alspach
- 1995 David Weissman
- 1996 Glen Williams
- 1997 Ferial El-Hawary
- 1998 Norman D. Miller
- 1999 Pierre Sabath
- 2000 Frederick H. Maltz
- 2001 Claude Brancart
- 2002 James Collins
- 2003 Joseph Czika
- 2004 William M. Carey
- 2005 Claude P. Brancart

# Pre-college Education Committee (PEC) 2004 PEC Teacher-Engineer Partnership Award Winners



IEEE-USA Managing Director, Chris J. Brantley (left) presents the second IEEE-USA Teacher-Engineer Partnership Award to Mark Rognstad (right).

IEEE-USA's Pre-college Education Committee is proud to present the second winning team of the IEEE-USA Teacher-Engineer Partnership Award, William G. Speed, Jr. (teacher) and Mark R. Rognstad (engineer) from Kailua, Hawaii (Region 6). Speed and Rognstad won for providing mentorship, support and encouragement to students interested in science, technology, and mathematics through engineering competitions at the local, regional and national levels.

William and Mark's partnership started in 1999. Together, they coached high school students for the Test of Engineering Aptitude for Mathematics and Science, known as "TEAMS." Their partnership grew throughout the years to include mentoring students for a robotics competition sponsored by the Marine Advanced technical education or "MATE."

Participating in the "FIRST" and "MATE" competitions was very costly for the Hawaii high schools since they had to travel to the continental US. William and Mark solved this problem by creating the Hawaii Underwater Robot Challenge, known as "HURC." This program allowed Hawaiian students to participate in a robotics competition without enduring the heavy travel costs.

In December 2003, twelve teams competed in HURC, giving engineering presentations and submitting technical reports.

With over 100 students competing, the HURC competition became so popular that it is now recognized as a regional competition for MATE.

William and Mark's award was presented at the IEEE Oceanic Engineering Society Conference on 24 September 2005 in Washington, District of Columbia.



William G. Speed, Jr., co-recipient of the IEEE-USA Teacher-Engineer Partnership Award

Editors note: See page 15 of this newsletter for The Hawaii Underwater Robot Challenge

Mark R. Rognstad, University of Hawaii at Manoa  
Hawaii Mapping Research Group

Honolulu, Hawaii

William G. Speed, Waipahu High School

Waipahu, Hawaii



## OCEANS 2005 MTS/IEEE – One Ocean



Opening of the Exhibit Hall with the two society presidents, Jim Barbera (OES) and Jerry Streeter (MTS) with members of the committees.

IEEE OES and the Marine Technology Society (MTS) presented the joint Oceans 2005 Conference in Washington, D.C. during September 18-23. The conference committee brought together all of the traditional elements of the annual conference with some unique opportunities of meeting in Washington to produce a sensational conference.

The conference was attended by over 2000 participants in 250 events during a six day program that included about 500 technical papers, nearly 200 exhibit booths, 25 plenary presentations from senior leaders in Washington and throughout the community, 9 focus sessions that brought together those both familiar and unfamiliar with specific topics to engage dialogue, a wide range of tutorial sessions, special presentations from Smithsonian and National Geographic, student poster competition with incredible posters, a broad spectrum of social events to encourage networking including a banquet with keynote speaker Jim Connaughton, Chairman of the White House Council on Environmental Quality, and a special video welcome from Sir Arthur C. Clarke, and a first-ever Town Hall meeting on Friday morning that was the capstone event for the conference.

The committee dedicated a special focus on education and outreach during the conference with a dynamic program that included a MATE/ROV demonstration, a full day of tutorial sessions for local educators, plenary session on education, a

presentation of the NOSB competition, luncheon dedicated to education with a special presentation by Philippe Cousteau, a live webcast careers panel, and the largest ever group of education-focused technical paper presentations.

The One Ocean theme was chosen for this conference to recognize that our global ocean is not only in peril because of the direct actions of mankind, but it is also more tightly interwoven with the current state and future of our global society than most people even realize. Ocean issues of national security and terrorism, global commerce and transportation, food resources, jobs, mineral resources, discovery of new medicines, climate change, coastal stresses from population migrations, and many other challenges directly impact our day-to-day lives and the future for our children. We must engage the public and stress the necessity of maximizing our understanding of the ocean, balancing our use and stewardship, and looking forward with new and exciting science and technology to meet and overcome these challenges. It is time to transition from “consultants” to “resultants” and make a difference now for the future of our One Ocean. For a more in-depth discussion of One Ocean read the Soapbox article in the August 2005 edition of Sea Technology.

- Barry Stamey, Fred Klein, and Steve Holt



Jim Barbera welcoming educators at conference dedicated Education Day



Jim Barbera at OES Luncheon



Barry Stamey



VADM Conrad Lautenbacher



David Sampson, Deputy Secretary of Commerce



Robert Winokur, Oceanographer of the Navy



John Irza, Oceans '06, Boston General Chair



Lydia Thomas





Jim Barbera presents the Distinguished Service Award to Claude Brancart



Jim Barbera presents the Distinguished Technical Achievement Award to Doug Webb.



Mark Rogstad receiving the IEEE-USA Teacher-Engineer Partnership Award.



Tamaki Ura, Fred Maltz and Jim Collins



Sandy Williams and Norman Miller



Joe Czika, Van Czika, Glen Williams and Claude Brancart



Lucy Maltz, Jim Candy and Faith Collins



OES Awards Luncheon



AdCom At Work



Notre Dame Prep School Team B



Rich Seesholtz, Richard Spinrad and Jim Barbera



Donna Kocak and Frank Caimi



Joe Vadus, Andy Clark and Mary Clark



OCEANS 06 Singapore Booth with Stan Chamberlain



Ken Ferer at OES Booth



Brian Horsburgh and John Watson at OCEANS 07 Aberdeen Booth





Pam Hurst, Jerry Carrol and Joe Vadus



John Potter, Stan Chamberlain and Barry Stamey



K. Takagi and S. Sakou (delegates from Japan),  
VADM C. Lautenbacher, J. Vadus and H. Nakahara  
(delegate from Japan)



Jerry Streeter, Alain Dupuis, Ferial  
El-Hawary, Mike Clark and Jim Barbera



Mike Clark (Canadian Embassy in Wash., D.C.), Ferial  
El-Hawary (General Co-Chair, OCEANS '08 Americas)  
and Alain Dupuis (Canadian Embassy in Wash., D.C.)



Joe Vadus, Sylvia Earle and Capt.  
Craig McLean



Joe Vadus, Ken Ferer and Todd Morrison



Joelle Garelo and Todd Morrison

# OCEANS 2005 MTS/IEEE Student Poster Program



Another successful and interesting Student Poster display was presented at OCEANS 2005 in Washington, D.C. 24 students were present to display and explain their posters. For the first time a High School student presented a poster and there were students from Brazil, China, Egypt, the Philippines, Taiwan and New Zealand as well as students from Europe and the United States. 28 abstracts had been received and 24 students selected. The Student Poster Program was organized by Justin Manley and was supported by a grant from the Office of Naval Research. The posters were displayed in the Exhibits Hall and were well visited throughout the Conference. The students and their posters were:

Madalina Barbu, University of New Orleans, USA  
*"Fractional Fourier Transform for Sonar Signal Processing"*

Ronan Bellex, ENSIETA/E312, France  
*"Repeat-track SAS interferometry: Feasibility Study"*

Cecile Berron, E312 Laboratory EA3876 ENSIETA, France  
*"Theoretical Performance Estimation of Multi-frequency Seabed Geoacoustical Parameters Inversion"*

Emily Brownlee, Calvert High School, Maryland, USA  
*"The Use of Clay to Remove Algal Blooms from Chesapeake Bay Waters"*

Heather Brundage, Massachusetts Institute of Technology, USA  
*"Design of a Compact, Battery-Powered, and Fiber Optic Controlled Remotely Operated Vehicle"*

Elizabeth Burg, South Dakota School of Mines and Technology, USA  
*"Analytical Parametric Study on Horizontal Loading Capacity of Suction Piles"*

Emmi Capili, Manila Observatory, Philippines  
*"Climate Change Impacts and Adaptation of Philippine Coasts"*

Jenna Carlson, Ocean Technology Foundation, USA

*"Hands on Learning Opportunities at the Ocean Technology Foundation"*

Cyril Chailloux, ENST Bretagne, France  
*"Fusion of NonSymbolic Methods on SONAR Images for AUV Relocalization"*

Tsung Chen, National Chung Hsing University, Department of Civil Engineering, Taiwan  
*"Three-Dimensional Finite Element Modeling for Wave-Seabed Pipeline Interaction"*

Jesse Davis, Florida Institute of Technology, USA  
*"Examination of Bioluminescent Excitation Responses Using Empirical Orthogonal Function Analysis"*

José-Estaban García, University of Hanover, Germany  
*"Positioning of Sensors in Underwater Acoustic Networks"*

Jonathan Janer, California State Los Angeles, USA  
*"Minicone Penetration Testing of Seafloor Soils"*

David Kerneis, ENST de Bretagne, France  
*"Comparison of Sensor Fusion Methods for Seabed Classification"*

Kaizhou Liu, Shenyang Institute of Automation, China  
*"A Comparison of Digital AUV Platform Results with Lake Experiments"*

Paul Mahacek, Santa Clara University, USA  
*"Autonomous Surface Vehicle"*

Anna Michel, MIT/WHOI, USA  
*"Oceanic Applications of Laser Induced Breakdown Spectroscopy: Laboratory Validation"*

Mario Muñoz-Gutiérrez, Universidade de São Paulo, Brazil  
*"An Eigenpath Underwater Acoustic Communication Channel Simulation"*

Maria Palmese, University of Genoa, Dept of Biophysical and Electronic Eng. (DIBE), Italy  
*"Analysis of Buried Objects in 3D Underwater Acoustic Images by Volumetric Segmentation Algorithm"*

Edward Pilbrow, University of Canterbury, New Zealand  
*"Autofocus of Active Beacons for Measuring the Tow-Path of a Synthetic Aperture Sonar: Sea Trials Results"*

Ann Polsenger-Thomas, Caltech, USA  
*"Synthetic Jet Propulsion for Underwater Vehicles"*

Nayrah Saltout, National Institute of Oceanography and Fisheries, Alexandria, Egypt  
*"The physico-chemical characteristics of different water types in El-Mex Bay, Alexandria, Egypt"*

Daniel Walker, Massachusetts Institute of Technology, USA  
*"Implementation for a High Maneuverability Remotely Operated Vehicle"*

Ian Wang, Cornell University, USA  
*"Autonomous Underwater Vehicle Group Modular Infrastructure for Autonomous Underwater Vehicle"*

The winners of the Student Poster Competition were announced at The "OneOcean" Banquet on Wednesday evening. The winning students were

First Place - Anna Michel, MIT

2nd Place - Maria Palmese, University of Genoa  
2nd Place - Emily Brownlee, Calvert High School

3rd Place - Elizabeth Burg, South Dakota School of Mines and Technology

3rd Place - Jesse Davis, Florida Institute of Technology

3rd Place - Nayrah Saltout, National Institute of Oceanography and Fisheries

Following the presentation of the Awards all of the Students were asked to stand and were given a round of applause for their participation in the program.

**Norman D. Miller, P.E.**  
**IEEE/OES Student Activities Coordinator**



Ferial El-Hawary has received the Compass International Award of the Marine Technology Society for 2005.

From their web site: (Compass International Award)  
For an individual's outstanding contributions to the advancement of the science and art of oceanography and marine technology (non U.S. citizens).

This was just on Sept. 20 in Washington DC, Sept'05 during the (MTS) Luchon Awards of OCEANS'2005 Annual Conference that is sponsored by the Institute of Electrical and Electronic Engineers (IEEE) and the Marine Technology Society (MTS)



# The Hawaii Underwater Robot Challenge

**Mark R. Rognstad, University of Hawaii at Manoa**  
**Hawaii Mapping Research Group**  
**Honolulu, Hawaii**  
**William G. Speed, Waipahu High School**  
**Waipahu, Hawaii**

***Abstract** - The Hawaii Underwater Robot Challenge (HURC) is modeled after (and inspired by!) the IEEE Robot Challenge, a program created by the Baltimore, Maryland section of IEEE, and by the Marine Advanced Technology Education (MATE) Center's ROV Competition. Like the Baltimore competition, high school teams are provided a kit of parts for building a robot. As in both programs, students build their robots and prepare a written report about their robot project; the robots are brought to a competition where they are judged on their robot's design and construction, give an oral presentation, and test their robot's performance. Scoring of the competition is based on all four components. The great interest in the ocean surrounding Hawaii led to the idea of having the students build underwater robots, similar to those of the MATE competition. The parts kit includes a video camera as well as motors, wire, propellers and switches, and the robots' performance is tested in a pool by carrying out tasks under remote control, such as activating switches or valves, collecting objects and returning them to the surface, and surveying the bottom. The first HURC was held in December 2003, with 12 teams participating; in 2004 14 teams competed. The 2004 HURC became a regional competition for MATE's national ROV Competition, so top scoring teams earn the right to participate with teams from across North America.*

## I. INTRODUCTION

Students of all ages are fascinated by robots, whether remotely controlled or operating autonomously, and building robots can show students how the skills they learn in mathematics and science classes have real-world applications. One of the earliest robotics competitions for students is the now-legendary MIT mechanical engineering course, 2.007 "Design and Manufacturing".[1] In 1991, a competition similar to 2.007 was developed for high school students, called FIRST[2] (For Inspiration and Recognition of Science and Technology). In these competitions, the student receive a kit of parts that includes motors, control electronics, bearings, etc. and must build a robot to carry out particular tasks that change from year to year.

While the FIRST competition is exciting, educational, and indeed inspirational, the cost of entering is very prohibitive for high schools located in Hawaii. The parts kit contains many expensive parts, so the fee for entering the competition is well over \$5000. Teams in Hawaii must travel to the continental United States to compete; since teams might be made up of one or two dozen students, the travel costs can be tens of thousands of dollars. In 2002, the Marine Advanced Technical Education

(MATE) Center first held a Remotely Operated Vehicle (ROV) competition for high school and college students across North America.[3] Not only did the MATE competition not have an entry fee, but thanks to their generous sponsors, provided some funding to teams for ROV parts and travel to the competition venue at Kennedy Space Center and Brevard Community College. No parts kit was provided, and within some common-sense safety restrictions, the ROV can be built with any materials.

The most immediate inspiration for HURC was the IEEE Robot Challenge, a program sponsored by the Baltimore, Maryland section of IEEE.[4] In this competition, a simple and inexpensive kit of parts for building a walking robot is provided without charge to any public high school in their area. Students build their robots and prepare a written report about their robot project; the robots are brought to a competition held on a weekend at the Baltimore Museum of Industry, where they are judged on their robot's design and construction, give an oral presentation, and test their robot's performance on an obstacle course. Scoring of the competition is based on all three components.

## II. HURC 2003

The first Hawaii Underwater Robot Challenge was held during the fall 2003 semester. The fall semester was selected because almost all other robotic competitions and similar events such as science and engineering fairs and electric car races are held in the spring semester. Both teachers and students expressed a preference for holding the event earlier in the academic year, where there would be fewer schedule conflicts.

Like both the MATE competition and the Baltimore robot challenge, part of the scoring was based on a written report and an oral presentation, in addition to the performance of the robot itself. The 2003 MATE competition introduced the "mission scenario" to the competition, in which a story provides the context for the tasks the robot must accomplish in competition. The scenario for the 2003 competition involved entering the wreck of the Titanic and recovering "data acquisition probes" that had been installed during an earlier mission. We adopted the mission scenario idea, and developed the following for HURC 2003:

"The SS Okolehao, sailing in the Pacific with a small cargo of environmentally lethal chemicals has grounded on a protected environmentally rich reef in shallow water. Although topside is above water, below the vessel is completely flooded. Access through compartments and passage ways is obstructed by a



variety of debris. The cargo is stored in a digital-keypad accessible (on a timer) vault at the end of a passageway that is alarmed and set with automatic hatch closures.

“The timer was set to open the vault at voyage end for unloading. The timer is still functioning and is set to open the vault 0800 HST December 21st. It has been determined that the keypad to the vault has to be reset (locked/sealed) and that alarms with automatic hatch closure devices are still active and must be deactivated along the passageway.

“The Challenge mission for your ROV will be to maneuver through this obstructed passage using its payload device deactivating alarms and closures along the way and reset the vault closure device. You’ll have ten minutes from launch to recovery to accomplish the mission. Guidance and sketches of obstacles your ROV will have to maneuver through and around, what actuation devices it will encounter, and how to reset them and the vault is being developed by another salvage team and will be provided by October 1st.”

The concept of an inexpensive kit of parts, made available without charge, was something borrowed from the Baltimore IEEE section’s competition. While there are resources on the Internet with information about building underwater robots, and a book by Harry Bohm[5], providing some of the basic parts to the student teams makes entering the competition less daunting. The contents of the parts kit are listed in Table 1; it includes those parts for building an ROV that would be difficult to find in a hardware store. The standard kit included a monochrome video camera, but teams could substitute a color video camera by paying the difference in cost. No parts for the structure of the robot are provided; for most teams, common PVC pipe and fittings are used, although some have been built of wood or plastic sheet.

TABLE 1  
ROV KIT OF PARTS, HURC 2003

Qty	Description	Cost
3	12 volt DC bilge pump motor	\$24.00
3	6” diam x 4” pitch plastic propeller	\$4.00
3	DPDT center off momentary switch	\$3.00
1	12Volt, 15 A-hr battery, with fuse	donation
1	battery charger AC > DC	\$16.00
30 ft	CAT 5, 8 conductor cable	donation
30 ft	coaxial, video cable	donation
6 ft	18 AWG 2 cond to switches	\$1.00
5	connections to battery and video	\$7.00
1	monochrome video camera	\$20.00
	<b>Total cost of parts kit:</b>	<b>\$75.00</b>
1	color video camera	\$50.00
	<b>Total cost with color substituting for monochrome camera:</b>	<b>\$105.00</b>

Some teachers incorporated the competition into their curriculum, in some cases purchasing additional kits for the classroom, but in other schools, the competition was an after-school club activity. A few schools with previous experience in FIRST robotics competition inquired about using the robot control system from that competition to control their underwater robot. That control system, manufactured by Innovation First, Inc.[6] is quite powerful and sophisticated, with proportional control of DC motors and model radio-control type servo motors, actuation of relays, a wide variety of control inputs such as joysticks and switches, and the capability for students to reprogram the control system for custom and even autonomous function.

While the use of such a sophisticated control system would make control of the ROV less difficult and open up additional opportunities for learning, the cost of these control systems is far beyond our budget – the entire competition did not cost much more than one of these systems. We wanted to encourage the schools with these systems (and others that might use other proportional control systems, like those from model boats and airplanes) to make use of them without disadvantaging those teams with the simple switches, so we established two divisions in the competition, the Dolphin division for teams with advanced control systems and the Shark division for the basic controls.



Fig. 1. Students from Sacred Hearts Academy test their ROV at HURC 2003.

The ideal for a competition like this would be to have at least one engineering mentor for each school. Recruiting mentors is a perennial problem, however, and although some did volunteer, we didn’t have enough for all schools. In order to compensate, we held workshops on weekends during the fall semester, open to both teachers and students, where we demonstrated construction materials and building techniques.

The competition took place on December 20, 2003 at the public pool at Waipahu District Park. Twelve teams competed, with close to 100 students participating.

### III. HURC 2004

The top scoring team in the Dolphin division (Waipahu High School) and the second place team in the Shark division (Moanalua High School) entered the MATE ROV Competition regional in San Diego, where they finished first and second, qualifying them for the MATE National Competition. (The top scoring Shark team, Punahou School, was unable to make the trip to San Diego.) We discussed with MATE the possibility of HURC becoming a regional competition for MATE and were welcomed with enthusiasm. HURC does not quite fit in the



Fig. 2. One of the ROVs in action at HURC 2003.

mold of other regionals, however, in that other regionals are held near the end of the spring semester. We wanted to keep our fall semester schedule, but the mission scenario for the MATE competition is usually developed during the fall semester. Once again we put together our own mission scenario, based in part upon MATE's 2004 scenario, exploring "Mystery Reef" in the Florida Keys National Marine Sanctuary.

"This competition scenario and mission tasks will test your engineering skills. You will need to design and construct an ROV to explore an area of Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (NHICRER), an imaginary underwater reef site located in French Frigate Shoals Hawai'i. The mission reef is made up of features that could be found on one or more of the many different types of reefs found within our national marine sanctuaries."



Fig. 3. Students from Moanalua High School prepare their ROV for competition at HURC 2004.

"The NOAA exploration expedition has just completed preliminary side scan sonar, sub-bottom profiler, and drop camera surveys of French Frigate Shoals (FFS) in NHICRER. The expedition team has surveyed site in an area of hydrothermal vents to establish semi-permanent network of monitoring sites for reef qualities such as temperatures, salinity, dissolved oxygen, clarity, etc. Adjust and open/close valves at an experimental fish-feeding network. A physical survey of some unique bottom features using an in place grid is needed."

"This is a performance and exploration and working mission. Performance means that the ROV will have to demonstrate several operational capabilities prior to exploration and work. Exploration means discovery of the new – and the unexpected. Working means your ROV will be finding, surveying and collecting samples, carrying and setting up new sensor(s) in a network, opening and closing valves to a distribution system, connecting and disconnecting power sources. This competition will push your imagination and technical skills. Enter the event with the spirit of the men and women explorers who have set out into the unknown. Take on the challenges with gusto, enthusiasm, and excitement. Design your ROV to be robust, mobile, reliable, and multi-functional so that it can perform varied mission tasks. Do your research, document your work, pay attention to detail, and learn from your mistakes."



Fig. 4. As judges and team members observe, a student ROV pilot carries out the mission tasks.

"There are six mission tasks which may be accomplished in any order. One operations performance task is also required. The mission tasks are summarized:

- 1) Task: to conduct a Physical Survey by camera of a selected sea bottom area for NOAA's Biogeography Program. The survey will identify, document and map marine biotic life (plant, corals, and animal), manufactured debris, and geologic formations. In order to precisely locate findings, the expedition team has installed a temporary overlaying grid system on sea bottom at the project site.
- 2) Task: to place a multi function remote sensor down-current of new hydrothermal vent site. This sensor must be activated on the surface and then placed by ROV in an upright position, on its tripod power base, in a predetermined location in order to maximize its effectiveness. A team member in Control Center must map sensor placement.
- 3) Task: to search, locate and map, and collect a unique crustacean ("FFS Spheroncone" crustacean). It's believed that the crustacean prefers a certain area near the hydrothermal vent. A team member in Control Center using the map form in Mission Logbook must map specimen location. ROV will place crustacean in sample basket for analysis on the surface.
- 4) Task: to search, locate and map, and collect a unique,



extremely low metabolic rate fish (“FFS Elomer” fish). It’s believed that this fish prefers a certain area near the hydrothermal vent. A team member in Control Center must map the specimen location. ROV will place a fish in sample basket for analysis on the surface.

- 5) Task: to find, identify and open a valve activating a specific feeding line at Oceanic Institute’s PFSS Site. There are four unique separate feeding pipelines at the site supplied from their individual tanks on Teal Island. Mission task specific pipeline will be provided in Mission Logbook.
- 6) Task: to find, identify and close a valve de-activating a specific feeding line at Oceanic Institute’s PFSS Site. There are four unique separate feeding pipelines at the site supplied from their individual tanks on Teal Island. Mission task specific pipeline will be provided in Mission Logbook.”

“Additionally, the HURC ROV Development Committee has asked that an ROV operations performance task be demonstrated as part of their design progress program. Each team will demonstrate a controlled inverted ROV ‘flight’ of at least 5 seconds enroute to, or from the mission site.”

The kit of parts supplied was very similar to that from the first year, with two exceptions – first, four electric motors and propellers were included, so that ROV’s could be built with a pair of vertical thrusters to allow roll motions. Second, all of the video cameras purchased were color instead of monochrome; a few monochrome cameras were left over from the year before, and they were offered to the teams that might want to substitute two monochrome cameras for the color one in the kit.

The second annual HURC was held on December 5, 2004,



Fig. 5. Last minute adjustments to an ROV before the dive.

at the University of Hawaii’s Duke Kahanamoku Aquatic Complex (DKAC) rather than at Waipahu District Park. The DKAC has more space, and includes classrooms which we used for conducting the engineering presentations. Fourteen teams from

eight high schools participated, including for the first time two teams from another island.

## VI. FUTURE COMPETITIONS

As of this writing, planning for HURC 2005 has begun, and we are looking for ways to increase the complexity of the competition by providing a sensor for the teams to integrate into their ROVs. A temperature sensor would be an inexpensive addition to the parts kit, and could be read with a voltmeter at the surface. Pressure sensors are another option that would make it possible to incorporate depth measurements into the mission tasks.

Another addition to future competitions would be to include a programmable motor controller, similar in some ways to the Innovation First controllers, but smaller and less expensive. All teams would be able to have proportional controls for their ROVs’ motors, and could program additional functions such as maintaining a fixed depth or heading. We might be able to add a division for autonomous underwater vehicles – one reason for developing a programmable controller that would be small enough to include in an AUV.

Another objective for the future is to make competitions accessible to students throughout the state of Hawaii. The entry of two teams from the island of Hawaii was a start, but they were handicapped by not being able to participate in the workshops. There does appear to be interest in running a separate competition on that island. Additional funding would make possible the option of holding workshops on other islands and/or subsidizing travel costs for teachers and students to travel to Honolulu for workshops and for the competition itself.

## ACKNOWLEDGEMENTS

We would like to thank the IEEE Oceanic Engineering Society for providing the funding to get HURC started and to the IEEE Hawaii Section for additional funding. Funds and moral support have also been provided by MATE, and through MATE by the Marine Technical Society’s ROV Committee. The School of Ocean and Earth Science and Technology at the University of Hawaii has made space and materials available, not only for the competition but for workshops and mentoring students. Finally, we would also like to thank the teachers, mentors, judges, and most of all the students who have participated.

## REFERENCES

- [1] <http://web.mit.edu/newsoffice/2005/inaug-2007-0504.html>
- [2] <http://www.usfirst.org/>
- [3] [http://www.marinetech.org/rov\\_competition/index.php](http://www.marinetech.org/rov_competition/index.php)
- [4] <http://robotchallenge.com/index1.html>
- [5] H. Bohm and V. Jensen, Build Your Own Underwater Robot and Other Wet Projects. Vancouver, Canada: Westcoast Words, 2003.
- [6] <http://www.ifrobotics.com/>

## National Ocean Sciences Bowl Demonstration

With the emphasis on education at OCEANS 2005, it was most appropriate to have a "One Ocean" Education Luncheon that highlighted the work of the Consortium for Oceanographic Research and Education (CORE) in the sponsorship of the National Ocean Sciences Bowl. The top two high school teams from the 2005 National Ocean Sciences Bowl, which was held in Biloxi, MS in April, were invited to attend OCEANS 2005 and demonstrated the rigor of the competition through a re-match of the final game. Cranston West High School from Cranston, RI, the First Place Team, and Lincoln Sudbury High School, Sudbury, MA, the Second Place Team were matched in a demonstra-



tion. The two teams have been competing in the NOSB for many years and have been consistent winners in the program. This replay of the 2005 Competition found Lincoln-Sudbury High School the winner of the demonstration match. Both teams enjoyed competing and being able to take part! in the OCEANS 2005 Conference. It was also important for the Conference attendees to witness the demonstration as both Societies are sponsors of the annual event.

**Norman D. Miller, P.E.**  
**IEEE/OES**  
**Student Activities Coordinator**

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## Report to the IEEE OES on the Administrative Committee (AdCom) Meeting

The IEEE Oceanic Engineering Society (OES) Administrative Committee (AdCom) Meeting was held in Washington, DC from 18-19 September 2005 during the Oceans 2005 Conference. It was conducted at the Marriott Wardman Park Hotel where the conference was held. The high points from the meeting were:

- Jim Barbera, the OES President, opened the meeting by giving a detailed presentation on ten separate issues. They were:
  - Because of Hurricane Katrina, the OES decided to provide a grant of \$10,000 to the Gulf Coast Research Laboratory in Oceans Springs, Mississippi.
  - The week before, Jim attended a meeting of the IEEE Systems Council. Jim was elected to Vice-President for Conferences. Sandy Williams and Steve Holt will also serve on this Council.
  - The IEEE Electric Ship Technologies Symposium (ESTS 2005) was held in July, 2005 in Philadelphia, PA and Jim attended. It was a success with 240 attendees. This workshop may be repeated in 2006.
  - Jim described the Marine Advanced Technology Education (MATE) program and Norm Miller gave a short talk on it.
  - The Global Earth Observation System of Systems (GEOSS) is a major interest for the OES, and our society is a founding member of the IEEE Council on Earth Observations (CEO) Working Group for GEOSS. GEOSS is also now a new technical committee area.
  - The Eighth International Submarine Races (ISR) were held from June 27-July 1 at the Naval Surface Warfare Center's (NSWC) Carderock Division in Bethesda, Maryland. A really good article on the races was published in



Sea Technology magazine.

- The IEEE is trying to break into China, however, there have been some issues with them.
- To reimburse the webmaster for certain costs incurred, we need to open a line item in the budget for out-of-pocket expenses.
- For the Finance Committee, the IEEE has tried to come out with a new software system. It has not been sent to the Society Treasurers yet. However, more work needs to be done on it. This effort has been cancelled.
- For Homeland Security, Jim described an upcoming conference in Poland. We also have our upcoming OES Homeland Security 2005 Workshop, which will be held in Rhode Island this December.
- Jim asked Norm Miller to discuss the Student Scholarship Program.
- Jerry Carroll gave his presentation as the OES Treasurer. For further information, please contact him for further details.
- Jim Collins gave his presentation as the Chapter Coordinator. Jim wanted to develop the Chapters to better communicate for mutual support with the main organizational groups of the OES. For further information, please contact him for further details. .
- Stan Chamberlain gave his presentation as Vice-President of Technical Activities. He mentioned that the 1999 MTS/IEEE Conference Guidelines document are currently being updated. The updated document is envisioned to contain three levels of detail. Joe Czika is developing an initial outline of the document.
- Stan also introduced Jim Candy, who gave a presentation about an upcoming workshop at Cambridge University, England in September 2006.



- Tom Wiener discussed the OES Awards for Distinguished Technical Achievement and Distinguished Service. The winner of the former was Douglas C. Webb, and the latter was Claude P. Brancart.
- Tamaki Ura discussed a possible symposium on Underwater Technology which could be held in Tokyo, Japan in 2007.
- Ken Takagi gave a presentation on a possible conference which could be held back in Kobe, Japan in 2008.
- Tom Wiener then conducted the OES elections process. Rene Garello ran for the office of Vice President for Conference Operations; Joe Vadus ran for the office of Vice President for Conference Development; Christian de Moustier ran for the office of Editor-In-Chief; Jerry Carroll ran for the office of Treasurer; Steve Holt ran for the office of Secretary; and James Collins and Ferial El-Hawary both ran for the office of Vice President for Professional Activities. Except for the latter contested office, all of the candidates ran unopposed and were elected through a motion for acclimation by the AdCom members. The latter position was secured by a vote from the AdCom members, with the result that James Collins was elected with the majority of votes.
- Bob Wernli delivered his RECON Committee Report. For further information, please contact him for further details.
- Jim Collins gave his presentation on Policies and Procedures. He asked if a new committee of ten was required for the ExCom. The new committee would consist of the President, VP Conference Planning, VP Conference Operations, VP Professional Activities, VP Technical Activities, Editor of the Journal of Oceanic Engineering, Secretary, Treasurer, Junior Past President, and Senior Past President. For further information, please contact him for further details.
- Rene Garello gave a presentation on his JOAB Activities. He stated that the JOAB has achieved two main goals: the first one consisted of defining the scope of both RECON and JOAB and the second one was dealing with the implementation of a fully operative Website along with a contractor for helping the management of the conference.
- Rene also gave a report of the recent Oceans '05 Conference in Brest, France. His final report was distributed to the AdCom members. For further information, please contact him for further details.
- Christian de Moustier gave his presentation as the OES Journal of Oceanic Engineering (JOE) Editor. For further information, please contact him for further details.
- Fred Maltz gave his presentation as the Newsletter Editor. For further information, please contact him for further details.
- Todd Morrison gave his presentation as the OES Webmaster. For further information, please contact him for further details.
- Norm Miller gave a report on the OES Scholarship Program. For further information, please contact him for further details.
- Bob Bannon gave the presentation for the Homeland Security Technology Workshop 2005 to be held in Newport, Rhode Island.
- Bob also made a presentation on the Scientific Submarine Cable 06 (SSC'06) workshop to be held February 6-8, 2006 in Dublin, Ireland.
- Several members either gave their presentations for several upcoming conferences, or forwarded them for inclusion into the record. The presentations were given or prepared for Boston (John Irza); Singapore (John Potter); Vancouver, British Columbia (Ray Murphy); Aberdeen, Scotland (John Watson); Quebec City (Ferial El-Hawary); Japan (Tamaki Ura); Biloxi, Mississippi (Jerry Boatman), and Christoph Waldmann (Bremen, Germany).
- Stan Chamberlain also described his work on the OES History Project, which calls for those responsible for the various major activities of the society over the past 20 years to summarize their activities.
- Albert (Sandy) Williams gave a presentation as the Technical Committee Coordinator. For further information, please contact him for further details. It was also announced that Sandy has been conferred the title of Fellow by the IEEE. The OES members responded with tumultuous applause.
- Daniel Sternlicht gave a presentation based on his role as the OES Publicity Chair.
- Elizabeth Creed did not give a presentation on the IEEE Expect Now system, but she did send her presentation to the OES Secretary for inclusion into the report.
- The Oceans 2005 Conference Wrap-Up (or "Hot Wash") was held on Friday afternoon, 23 September. It was conducted by the three conference co-chairs, the two Presidents of the Society, and the Joint Oceans Advisory Board (JOAB).
- The next OES AdCom Meeting will be held in Singapore in May, 2006.
- There were eighteen (18) motions and no action items generated at this meeting, which are not listed here.
- The meeting was then adjourned at 4:20 PM on 19 September, 2005.

# Homeland Security Technology Workshop December 6-8, 2005 in Newport, RI

by Robert Bannon and Pam Hurst, IEEE OES HS Technical Chairs

The IEEE – Oceanic Engineering Society (IEEE-OES) and NAVSEA-Naval Undersea Warfare Center (NUWC) will co-host the IEEE-OES Homeland Security Technology Workshop - Ocean and Maritime Technologies for Infrastructure Protection at the Marriott at Newport, RI on December 6, 7, and 8, 2005. The theme for the third annual workshop is “Under the Water, On the Water, and Over the Water”.

The purpose of the workshop is to once again bring together small technology companies, and large defense contractors, military, government, academia, and not-for-profit institutes who are developing technologies and products for Ocean and Maritime Technologies for Infrastructure Protection. This annual IEEE-OES workshop continues to provide an unprecedented opportunity to network with engineers, scientists, maritime legal experts, and local, state, and federal government personnel who all share a common concern and goal in providing advance technologies to protect vital maritime infrastructure and provide for the safety of our ports, harbors, coastal eco-systems and our oceans. Arlene Specter, Senator - PA in his letter of introduction stated that HSTW'04 was the leading maritime Homeland Security workshop of its kind.

Pam Hurst and Bob Bannon return as co-Chairs of this technology forum. The Honorable Curt Weldon, U.S. House of Representatives – R-PA 7th District, who is serving his 10th term in the U.S. House of Representatives, and is a member of the House Homeland Security and Armed Forces Committees, will once again address the conferees on the state of the war on terrorism. Other Congressional Luncheon Speakers will include Jim Langevin - D-RI 2nd District and Rob

Simmons - R-CT 2nd District, who both serve with Congressman Weldon on the House Homeland Security and Armed Forces Committees.

The technical program will offer two full days, of multi-track PowerPoint presentations and papers covering topics below:

- Underwater Telecommunications Protection Issues and International Legislation
- Sensors and Underwater Vehicle Technology for Protecting our Ports, Waterways, and Coastlines
- Preempting and Disrupting Terrorist Threat
- Maritime Domain Awareness
- Biometric and Screening – including Personnel and Containers
- Technologies for Countering Chemical, Bio-terrorist, Terrorist Attacks on Ocean Industries
- Maritime HLS First Responders
- Beyond Homeland Defense and Homeland Security – Over the Horizon

The 2005 Newport event will feature representatives from the Department of Homeland Security, the Department of the Navy (NAVSEA NUWC), the US Coast Guard, NOAA, ONR, and NRL. The plenary speakers and panel members represented some of the most recognized individuals and organizations from industry, government and academia. Bob Bannon will address underwater infrastructure vulnerabilities identified by European Union Community members- England, France, and Poland, Russia, and the Asia-Pacific Rim views assembled by Japanese delegates. Doug Burnett of Holland & Knight LLP will present changes in laws concerning underwater infrastructure and the evolving views of the UN members concerning the Law of the Sea.



Bob Bannon, Curt Weldon and Pam Hurst at the Wednesday OES Luncheon. Congressman Curt Weldon of PA addressed the attendees for over an hour on the current state of affairs in Homeland Security.



Pam Hurst, Doug Burnett, MaryAnn Mulchan and Shawn James – Members of the Industry Panel on Homeland Security Maritime Concerns.

NAVSEA NUWC will have the SPARTAN Unmanned Surface Vehicle (USV) on display at HSTW05. In addition, we will continue with the tradition of having pool demonstrations of small ROVs, AUVs and advanced sensor suites for port and harbor protection. There will also be panel discussions dedicated to USN, USCG, and Industry Homeland Security issues.

We intend to once again make HSTW'05 the leading technologies workshop for ocean and maritime infrastructure protection with emphasis on underwater telecommunications protection, harbor security and container risk management, maritime first responder issues, interdiction, and unmanned maritime vehicles. Therefore, we invite you to come and participate in HSTW'05; it's your opportunity to become recognized as a Homeland Security leader.



Attendees Luncheon at the Valley Forge Convention Center

## IEEE OES Homeland Security Technology Workshop

Ocean and Maritime Technologies for Infrastructure Protection



*Photo by Tom Sperduto, USCG*

**December 6-8, 2005**

Newport Marriott Hotel, Newport, RI

Contact Siobhan Kern

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## 2005 IEEE OES Homeland Security Technology Workshop Ocean and Maritime Technologies for Infrastructure Protection Call For Abstracts & PowerPoint Presentations

**Location:** Newport Marriott, 25 America's Cup Ave. Newport, RI 02840 (401-849-1000)  
**Date:** December 6, 2005 (Tuesday Evening Reception)  
December 7 and 8, 2005 (Wed and Thurs Program; Wed Evening Reception and Dinner)

IEEE OES HSTW 05: Pam Hurst, Chair, Bob Bannon, Co-Chair, Jerry Carroll, Treasurer

### Technical Program:

The IEEE - Oceanic Engineering Society (IEEE-OES) Homeland Security Technology Workshop Technical Program Committee is accepting abstracts for engineering and scientific PowerPoint Presentations on Homeland Security Underwater and Maritime Infrastructure Protection. The purpose of the workshop is to bring together small technology companies, and large defense contractors, military, government, academia, and not-for-profit institutes who are developing technologies and products for Ocean and Maritime Technologies for Infrastructure Protection. This IEEE-OES workshop provides an unprecedented opportunity to network with engineers, scientists, maritime legal experts, and local, state, and federal government personnel who all share a common concern and goal in providing advance technologies to protect vital maritime infrastructure and provide for the safety of our ports, harbors, coastal eco-systems and our oceans.

**Online Registration** <http://www.oceanicengineering.org> (click on "Conferences & Workshops")

**Early Bird Registration** \$395 for IEEE members  
(by October 3, 2005) \$495 for Government, Industry and Academic participants

**Registration** \$450 for IEEE members  
\$550 for Government, Industry and Academic / \$200 Student Rate with current ID  
*Attendance limited to the first 500 Registrants*  
**Exhibit Booth:** \$750 per 10'x 8' space  
**Corporate Dinner Table:** \$799 per table    **Extra Dinner tickets:** \$80 /each  
**Gold (\$1000) – Silver (\$500) Sponsorship Opportunities for Breaks / Receptions**

**Points of Contact:** Siobhan Kern, 401-849-8900, x-577 e-mail: [KernSH@nptnuwc.navy.mil](mailto:KernSH@nptnuwc.navy.mil)  
Pam Hurst, 401-481-3828 e-mail: [pjhurst@ieee.org](mailto:pjhurst@ieee.org)

**Abstract Deadline:** October 30, 2005

**Abstract Format:** Author(s) Name, Affiliation, Title, Address, Phone Number, and e-mail  
Abstract Topic, 100 Words submitted in MS Word format

**Abstract Acceptance Date:** November 10, 2005 - Presenters must pay registration within 10 days of acceptance  
**Electronic e-mail Abstract Submission ONLY to:** e-mail: [ieee\\_oes\\_hls\\_workshop@oceanicengineering.org](mailto:ieee_oes_hls_workshop@oceanicengineering.org)

**Presentation Format:** Twenty minute Power Point Slides, followed by 5 minute Q & A  
Last year over 80 technical speakers presented with outstanding attendee comments on quality and topics.

**Questions on submittals:** Glen Williams, Ph.D., P.E.  
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# IEEE OES Homeland Security Technology Workshop

## Ocean and Maritime Technologies for Infrastructure Protection

### Topics:

*The technical program offers two days of multi-track PowerPoint presentations or papers covering topics below.*

- **Sensors and Vehicle Technology for Protecting our Ports, Waterways, and Coastlines**
  - Unmanned Maritime Vehicles (UMVs)
  - Sensor and Detection Technology
  - Radar and Sonar Technologies
  - Maritime Security Watercraft and Vehicles
  - UCAV applications for Maritime and Ports
  - Port and Harbor and Coastline Security
- **Preempting and Disrupting Terrorist Threats**
  - Anti-terrorism Issues and Technologies
- **Maritime Domain Awareness**
- **Biometric and Screening – including Personnel and Containers**
  - Personnel ID and Protection Technologies
  - Wireless Role in the Maritime Security Environment
- **Technologies for Countering Chemical, Bio-terrorist, Terrorist Attacks on Ocean Industries**
  - Chemical Sensor Systems
  - Bio-terrorism Risk Assessment and Containment
  - Toxic Sensors
  - Explosive Detection
  - Mine countermeasures
  - IR Sensors
  - Swimmer Detection, Engagement, and Neutralization
  - Ocean and Harbor Forensics Surveillance Technologies
  - USCG Harbor and Port Patrol
  - Harbor Master and Port Agents Security Roles
- **HLS First Responders**
  - Emergency Planning and Response
  - Homeland Security –HSARPA Role
  - Crisis Center Development
  - Communications Standardization
  - Recovery – Business Continuity
- **Beyond Homeland Defense and Global Maritime Security –The Expanding Horizon**

**Keynote Speakers:** Hon. Curt Weldon, U. S. House of Representatives – PA (confirmed), and  
Invited Hon. James Langevin & Patrick Kennedy, U. S. House of Representatives – RI  
Senator Jack Reed – Rhode Island, Senator Joseph Lieberman – CT  
Hon. Robert Simmons, U. S. House of Representatives – CT

*Other speakers and dignitaries to be announced with acceptance of invitations*

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## Report to the OES, IEEE on Jocara Indian Ocean Quest.

A little over a year ago a family of four with their two cats set out in their sailing yacht on an expedition of marine research, education and public awareness. The expedition was granted permission to carry the Explorer's Club flag #33 (which was first used in 1930 and has seen service on the space shuttle), was accredited and supported by the Ministry of Education in Singapore, the Tropical Marine Science Institute and the Department of Biological Sciences in the National University of Singapore. The Singapore Science Centre also partnered JIOQ to bring marine science education to a wider audience through exposure on its 'wall of science' and a major school robotics competition involving some 5000 students.

Like the Owl and the Pussy-cat, they sailed away for a year and a day (well, actually a year and 21 days) to the land where the Bong (Baobab) tree grows. After some 8000 n.m., reaching as far as east Africa (where they spent 3 months in Tanzania and Zanzibar) they returned, all in one piece (though that's not quite true for the boat) still married, relatively sane and with more stories to tell than they can count.

This novel, bold (and some would say foolhardy) personal initiative was sponsored by the Oceanic Engineering Society of the IEEE, for which we have Joe Vadus and others to thank for their vision and belief in our enterprise.

Our mission was to take a personal stand for the marine environment, to see what we could contribute as a family to the efforts of small groups of marine researchers in places we could visit, to reach out to schools everywhere we went (taking a total of 8 classes in Singapore on a virtual trip with us) and to spread the word of the wonder and peril of marine ecosystems. So, after more than a year and 8000 long miles, how did we do?

### Marine Research

JIOQ made arrangements to work with marine scientists in several remote locations along the route, contributing resources (e.g.

diving support, still and video camera equipment, underwater acoustic systems and signal processing capabilities) and expertise to enhance their coastal marine science efforts. These projects are described at <http://www.jocara.net/Research/research.html> and are summarised here:

**Air Sampling.** Jocara took 11 sets of samples for persistent organic pollutant analysis, the first such 'clean' samples from the core of the Indian Ocean in 30 years. Due to the low level of self-contamination (we were able to take samples without any internal combustion engines running, under sail) far from local sources (thousands of miles downwind from the nearest land sources) these samples are of prime value in determining the trends in background organic pollutant levels. We also took some 18 particulate air samples for similar analysis of particulate pollutants.

**Rodrigues.** We worked with Shoals Rodrigues, a marine research, training and education organization, establishing new coral reef survey sites and to resurvey previously established sites. One morning we observed them conducting an octopus survey as part of their pilot project on octopus traps. We also took a group of students on board as part of their 'Club Mer' educational programme.

**Tanzania.** We worked with the Tanga Coastal Zone Conservation and Development Programme who have recently been handling a spate of exciting new Coelacanth sightings in the Tanga area. The Coelacanth is the famous 'fossil fish', thought extinct until the turn of this century. It has not previously been known to occur in these Tanzanian waters. We worked with local authorities to publicise the issue and lobby for a temporary halt to permits to trawl just offshore until this new habitat could be investigated.

**Zanzibar.** We spent two months in the island of Zanzibar working with the Institute of Marine Sciences on the Menai Bay Conservation area and a Dolphin Tourist Interaction project. We observed, photographed and videoed the bottlenose dolphins in



their natural habitat to see if they showed behavioural differences when accompanied by tourists.

**Seychelles.** We worked with the Marine Conservation Society Seychelles, an NGO that aims to improve the conservation of marine ecosystems through scientific, management, educational and training programmes, investigating adult Hawksbill turtle foraging grounds.

**Coral Fluorescence.** We photographed underwater fluorescence on the reef at night using lights and cameras with orthogonal filters. We are studying the usefulness of fluorescence for finding new coral recruits on reefs.



## Education

Wherever we went, we contacted local schools and invited classes to visit our sailboat and to learn about our expedition, what we were trying to do and the threats we saw to our precious marine environment. We showed short films that we had made along the way, and made films of local schools to show students back in Singapore, to create a virtual cultural exchange. Meanwhile we sent back CD-ROMs of images, stories, and reports from our two sons and video for schools in Singapore to use in their curriculum. On our return, we had a closure event with all the participating Singapore schools where the classes displayed the many wonderful poetry, art and science projects they had carried out based on our material. Some of our visitors can be seen at <http://www.jocara.net/Education/visitors.html>

## Public outreach

JIOQ focussed on increasing public awareness about marine ecological issues and the impacts of global warming, pollution and over-exploitation of marine resources through its web pages (<http://www.jocara.net>), articles in Asian Geographic (with whom JIOQ had a Memorandum of Understanding to publish in every issue for a period of 18 months, including 2 feature articles) and via publications in magazines and newspapers. We have had some 50,000 page downloads from our website and have appeared on several radio and TV interviews. Invitations to write for magazines and newspapers continue to arrive.

So all in all, we feel like we've achieved our objectives. It was often harder than we had thought, and we had some disasters. Like the freak squall that hammered us 300 mile offshore an hour before dawn one day and took away our mast and rigging, leaving us powerless and rolling in 4m waves, drilled by rain like bullets in the moonless night. That particular challenge ended 10 days later when we were rescued by a tanker that stopped and gave us enough diesel to motor back to land in the Maldives. From there we sketched out a jury-rig design on a piece of paper and had a couple of Indian welders make it

up out of galvanized scaffolding poles. The sails were sewn out of the ragged remains of the canvas we managed to salvage from the dismasting by a curtain shop in town. They did seat covers, too. This rig and sail combination served to get us the 1400 n.m. from the Maldives to Malaysia, within motoring distance of home.

Even the darkest hour has its jewels. The experience of working together as a team to raise a temporary HF radio antenna to get word out about our predicament, and eventually raising a jury rig mast and sail to make some headway under our own power was a fundamental experience for the whole family in self-reliance and resourcefulness.

We set out to make a stand, for ourselves as caring individuals and for the planet. To do something many said was impossible, or at least crazy. To show that even one ordinary family might decide to do something extraordinary to make their statement about how urgently they felt we must change our manners towards this precious and ravaged planet. And in this effort, we found ourselves no longer out of balance with nature, no longer rushing headlong into the next meeting or traffic jam. No longer a part of Koyaanisqatsi, life out of balance. What price sanity?

And hand in hand on the edge of the sand  
They danced by the light of the moon,  
The moon,  
The moon,  
They danced by the light of the moon.

**Best Regards,**

**John Potter**  
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**john@jocara.net**





# IEEE Oceans '06 Asia Pacific

16 - 19 May 2006

Swissotel, The Stamford, Singapore

[www.oceans06asiapacific.org](http://www.oceans06asiapacific.org)



The Oceans cover 70% of our planet, yet we probably know more about the surface of the moon than we do about the underwater world surrounding us, which remains largely unknown and unseen. In the past, exploration of this hostile environment has been constrained partly by limitations in technology and partly by lack of funding. However, most of what we know about the oceans today has been learnt over the last 50 years, and the increasing pace of discovery looks set to continue.

Oceans '06 Asia Pacific - the Next Frontier will seek to bring together ocean professionals from academia, government and industry to provide updates and share information on recent innovations in ocean technology and to discuss the challenges that lie ahead.

An Exhibition will be held in conjunction with the Conference. The Exhibition will take place in the spacious foyer, immediately accessible to the conference sessions. Strategically positioned exhibition stands ensure delegates and speakers have every opportunity to visit you and your company representatives during refreshments and lunch breaks. Traffic is guaranteed as delegates will also have access to the exhibition before and after conference proceedings in the morning and in the evening. For more details on the Exhibition, please visit [www.oceans06asiapacific.org](http://www.oceans06asiapacific.org)

### Submission Deadlines

#### Paper

- 1 December 2005: Abstract
- 15 January 2006: Notification of Acceptance
- 15 March 2006: Camera-ready Full Paper

#### Tutorial

- 6 January 2006: Proposal/Bibliography
- 28 February 2006: Notification of Acceptance

#### Student Poster

- 1 December 2005: Abstract
- 15 January 2006: Notification of Acceptance

#### Exhibition Booking

- 15 March 2006: Early Bird Special

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## TECHNICAL PAPERS

The Technical Program Committee of Oceans'06 Asia Pacific is calling for contributions for scientific and technical papers. Contributions are invited in the form of an abstract of up to 2 pages to be submitted on-line (use the abstract-on-line button on the conference page). The areas of interest (non exclusive list) are listed in the conference web site <http://www.oceans06asiapacific.org>.

Deadline for abstract submission: 1 December 2005  
 Notification of Acceptance: 15 January 2006  
 Final paper submission: 15 March 2006

Several special sessions are currently being planned, namely Acoustics Communications and Networks, Ambient Noise Imaging, Synthetic Aperture Sonar Processing, Underwater Vision-based Navigation, Bio-sonar, UNESCO IOC Tech Transfer guidelines, Asian Tsunami Warning System, Marine Environmental Engineering, Observations by AUVs and etc.

## TUTORIALS

The Conference Committee invites proposals for half-day tutorials in accordance to, but not limited to the following themes:

- AUV/ROV Design
- Acoustic Communications and Networking
- Acoustics and Signal Processing
- Remote Sensing
- Disaster Management
- Marine Environment
- Underwater 3D Mapping
- Environmental Restoration

Submit a proposed course description of up to 1,000 words and your instructor biography of up to 300 words for review at [www.oceans06asiapacific.org](http://www.oceans06asiapacific.org).

Proposal/Biography Deadline: 6 January 2006  
 Notification of Acceptance: 28 February 2006

## STUDENT POSTERS

A student poster program will be held concurrently to encourage active participation of the next generation of ocean scientists, engineers, and technologists. Students at High School, Undergraduate and Graduate levels are invited to submit their abstracts and present their work at a special poster session. Guidelines and topics are the same as that for the Technical

papers. Prizes will be awarded for the top students. Limited funds may be available upon application to support student attendance.

Deadline for abstract submission: 1 December 2005  
 Notification of Acceptance: 15 January 2006

## EXHIBITION

The exhibition will be held at The Padang, Collyer Ballrooms & Raffles Foyer, Raffles City Convention Centre. Strategically positioned exhibition stands ensure delegates and speakers have every opportunity to visit you and your company representatives during refreshments and lunch breaks. Traffic is guaranteed as delegates will also have access to the exhibition before and after conference proceedings in the morning and in the evening. For more details on the Exhibition, please visit [www.oceans06asiapacific.org](http://www.oceans06asiapacific.org).

The following Exhibition Packages are available:

Enhanced Booth (3mx3m)	SGD5,000
Standard Booth (2mx3m)	SGD3,500
Additional Space (per metre square)	SGD500

## SPONSORSHIP

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# Call for Papers

## OCEANS 06 MTS/IEEE - Boston *“Revolutionizing Marine Science and Technology ”*

**September 18-21, 2006  
Hynes Convention Center  
Boston, Massachusetts USA**

The Oceans 06 MTS/IEEE-Boston Conference and Exhibition will be held in Boston Massachusetts from **September 18-21, 2006**. The birthplace of the American Revolution, Massachusetts and the surrounding New England region enjoys a centuries-old relationship with the ocean; from the fishing and whaling ports of Gloucester and New Bedford to the premier technology centers of the Woods Hole Oceanographic Institution and the US Navy's Undersea Warfare Center. Pleasant autumn weather and many tourist sites and activities, combined with a stimulating technical program, will make this Conference a memorable event.

The OCEANS 06-Boston technical program will continue to emphasize the traditional core areas of marine science and technology development. Researchers from academia, industry, and government are encouraged to submit their recent work on topics such as:

- Underwater Acoustics and Acoustical Oceanography
- Sonar Signal / Image Processing and Communications
- Ocean Observing Platforms, Systems, and Instrumentation
- Air and Space Ocean Remote Sensing
- Ocean Data Visualization, Modeling, and Information Management
- Marine Environment, Physical Oceanography, and Meteorology
- Optics, Imaging, and E-M Systems
- Offshore Structures and Technology
- Marine Law, Policy, Management, and Education

In addition, the Boston conference plans to highlight several "hot topic" areas of high current interest to the members of the MTS/IEEE research community:

- Homeland Security Applications
- Tsunami Early-warning Systems
- AUV/UUV/Glider Technology
- Distributed Sensors and Networks
- Tracking and Data Fusion
- Non-acoustic Sensing and Imaging
- Integrated Ocean Observatories
- Marine Mammal Classification
- Arctic Ocean Science
- Optical Properties of Water
- Aquaculture Engineering
- Marine Archaeology

Submissions should include a 500-1000 word extended abstract clearly outlining the technical contribution. All submissions will be competitively reviewed and judged on the basis of technical quality, novelty, and relevance to the technical program. Accepted contributions will be allotted a 20-minute oral presentation. Accepted student contributions will be allotted poster presentations accompanied by oral précis. On all accepted presentations, a minimum of one co-author must be present and registered at the full conference registration fee. In addition, all presenters are

[www.oceans2006mtsieeboston.org](http://www.oceans2006mtsieeboston.org)

# Call for Papers

required to submit a paper for publication in the archival proceedings not to exceed 6-pages, including figures. Final papers must be accompanied by proof of: 1) paid registration, 2) IEEE PDF eXpress compliance, and 3) copyright disclosure.

Please note the following important dates:

- Abstracts Deadline: February 15, 2006
- Author Notification: May 15, 2006
- Paper Submission: July 15, 2006

Abstract submissions will be accepted on the conference web site starting January 1, 2006. Submissions must include title, each author's name and affiliation, and the technical area(s) and sub-area(s) into which the paper falls using the MTS/IEEE topics list published on the conference website. In order to assure accurate abstract handling, authors are encouraged to carefully examine the topics list and choose the technical area(s) that most closely match the area of their work. Further details regarding the electronic submission process will be available on the conference web site, [www.oceans2006mtsieeboston.org](http://www.oceans2006mtsieeboston.org).

The conference committee welcomes additional ideas for special session topics and tutorials. Please email your proposals to the committee at [info@oceans2006americas.org](mailto:info@oceans2006americas.org). Special session proposals should include topic title, a short description of session emphasis and organization, and contact information of the prospective session organizer.

For additional **Technical Program** information contact Technical Program Chair: Dr. Vincent Premus, MIT Lincoln Laboratory at [techchair@oceans2006mtsieeboston.org](mailto:techchair@oceans2006mtsieeboston.org) or at (+1) 781-981-5341

For additional **Student Program** information contact Student Program Chair: Prof. Alexandra Techet, Dept. of Mechanical Engineering, Massachusetts Institute of Technology, at [ahtechet@mit.edu](mailto:ahtechet@mit.edu) or at (+1) 617-452-2266

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