Revolutionizing Marine Science & Technology...

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2006

OCEANS

BOSTON

Program

MTS/IEEE

Oceans '06

Conference & Exhibition

September 18-21, 2006

Hynes Convention Center
Boston, MA USA

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For more information, visit **www.oceans2006.org**

Canada

The Innovation Wave

www.boston.gc.ca

Canada

is a breaking wave of innovation in marine technologies! Shaped by three of the world's oceans and the Great Lakes, Canada is committed to marine and ocean science.

Canada's strong presence at Oceans '06 showcases our cutting-edge technologies, research institutions, companies and universities.

Connect with Canadians at Oceans '06

Find Partners
Network
See Our Products

- Canadian Product Showcase and Technical Track
- Canadian Technology Pavilion
- Canada Reception, B2B Breakfast

See Canadian organizations and activities at Oceans: www.boston.gc.ca

E-mail: boston.commerce@international.gc.ca

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ROMOR ATLANTIC LIMITED

Message from the Oceans '06 Chairman

Conference Chair **John Irza**, Bluefin Robotics Corp

Greetings colleagues and friends and welcome to the final program for Oceans '06 MTS/IEEE Boston! The Conference Committee has worked diligently to organize a world-class event where you can network with peers and clients, see results from the latest progress in ocean science and technology, and survey new product offerings from industry.

In addition to the Oceans '06 venue, we welcome you to our fine city of Boston and the surrounding New England region during our most enjoyable weather of the year! With so many activities to do and places to see, we are certain your trip to Oceans '06 will be filled with good memories for many years to come!

Please say "hello" and "thank you" to the hardworking volunteers and Conference Committee members that you will see at the Conference. Through the tireless effort of members of MTS New England, the IEEE/OES Boston Chapter, and local industry leaders, we have created an exceptional event.

I would like to state my deepest gratitude to everyone who has participated in the planning and execution of this event including the Conference Committee, IEEE Conference Management Services, and most importantly the spouses and families of everyone who spent their available time organizing this Conference.

Peace,

John Irza

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Meet the Oceans '06 MTS/IEEE Boston Conference Committee

Technical Program Co-chair:
Dr. Vincent Premus (Chair)
OASIS, Inc.

Publicity Co-Chair:
Maggie L. Merrill
Marine Marketing Services

Technical Program Co-chair
Dr. Albert (Sandy) Williams 3rd
Woods Hole Oceanographic Inst.

Publicity Co-Chair:
Margo Newcombe
MLN Marketing

Exhibits Chair:
Michael Stewart
MJ Stewart Assoc., Inc.

Tutorials Chair:
Dr. Ferial El-Hawary
BH Engineering Systems Ltd.

Finance Chair:
Robert Lobecker
Technical & Marketing Services

Student Program Chair:
Dr. Alexandra Techet
Massachusetts Institute
of Technology

Publications & Information
Services Chair:
Jim Case
University of New Hampshire
Center for Coastal and Ocean
Mapping

Volunteers Coordinator:
Dr. Diane DiMassa
Massachusetts Maritime Academy

MTS Liason:
Richard Butler
Aanderra Instrument

OES Liason:
Dr. Stan Chamberlain
IEEE OES

Enjoy all that historic Boston, Massachusetts has to offer...

Boston is a great destination to enjoy just about anything. The fall weather is crisp and invigorating. For the adventurous, there are fantastic trips within 1-2 hours to enjoy pristine hiking in the White Mountains of New Hampshire; the quaint sunny beaches of Cape Cod, or the many local opportunities for whale watches, island tours, fishing and sailing.

A small sample of the world class institutions with marine science and technology programs that call New England home include: MIT, Harvard, Boston University, Northeastern University, Woods Hole Oceanographic Institution, University of Rhode Island, University of New Hampshire, New England Aquarium, University of Massachusetts Boston and Dartmouth. Faculty and students from all these institutions will be on hand in the technical sessions as well as visiting the exhibits.

If its art and culture one desires, Boston hosts many Broadway shows, musicals, and symphony performances. Museums such as the Museum of Fine Arts, Isabella Stuart Gardener Museum, the Peabody Museum of Art, Peabody Essex Museum and many others offer days of artistic inspiration and delight.

The trolley tours or our famous Duck Boat Tours provide a unique view of Boston's history and ambiance and are a must for visiting guests. Walking the famous Freedom Trail is like stepping back in time and rounds out the historic treasures of the revolutionary war period that New England embraces.

To make reservations to visit these events contact www.boston.com.

The Conference Venue

OCEANS '06 MTS/IEEE Boston will take place at the **Hynes Convention Center**. Situated right in the heart of Boston's beautiful and historic Back Bay, the Hynes is also connected to a mega-complex of nearly 4,000 hotel rooms, shopping malls, restaurants, theaters, and more. The Hynes is easy to reach by all modes of transportation. When arriving from Boston's Logan airport, your travel time will be less than 15 minutes. The address is:

Hynes Convention Center
900 Boylston Street, Boston, MA 02115

Conference Accommodations

Centrally located in the heart of Boston's historic Back Bay, the award-winning Boston Marriott Copley Place hotel provides for all the needs of business and leisure travelers. Recently renovated guest rooms boast numerous amenities, including lofty duvets, down pillows, crisp cotton sheets, 27" TVs, high-speed internet, complimentary tea & coffee service, and a personal refrigerator.

Copley Marriott meeting attendees enjoy over 65,000 square-feet of flexible, high-speed internet-ready meeting and exhibit space; restaurants and lobby areas have wireless internet access. Dining options include three restaurants, a cocktail lounge, coffee bar and 24-hour room service. This Copley Square hotel also offers an indoor pool, health club, business center, gift shop, car rental desk, tour desk, valet service and guest laundry. World-class shopping is steps away via enclosed skyways connecting the hotel to the Copley Place and Prudential Center malls.

Access to Oceans '06 at the Hynes Convention Center is completely indoors via enclosed skyways.

The Boston Marriott Copley Place is the appointed hotel for Oceans '06 MTS/IEEE.

BOSTON MARRIOTT COPLEY PLACE HOTEL

110 Huntington Avenue
Boston MA 02116

Hotel Reservations Phone: 1-617-236-5800
http://marriott.com/property/propertypage/BOSCO
Group Rate: $229/night

Rooms must be reserved by August 25, 2006 to ensure the group rate. Please reference the Oceans '06 MTS/IEEE Boston conference when booking.

Alternate negotiated hotel accommodations are available at:

THE COLONNADE HOTEL

120 Huntington Avenue
Boston, MA 02116

Hotel Reservations Phone: 1-800-962-3030
Conference Rate: Single/Double Room: $195.00

Getting there—travel information

Traveling by Air

Air travel is via several major airports in the area:

Logan Airport, Boston Massachusetts is the closest to the Conference site and is mere minutes away by private car, taxi, bus, or subway.

Worcester Regional Airport, Worcester, Massachusetts is located approximately 40 miles West of Boston.

TF Greene Airport, Warwick, Rhode Island is located a few miles South of Providence, Rhode Island. "Green" often times has air fares substantially less than those for flights into Logan. It is approximately a one hour drive from Green Airport to the Conference site and hotels.

Manchester Airport, Manchester, New Hampshire is located approximately 50 miles North of the Conference site. Manchester Airport is another economical alternative to Logan Airport often times has air fares substantially less. It is approximately a one hour drive from Manchester Airport to the Conference site and hotels.

Traveling by Auto

Driving to the Hynes Convention Center at: 900 Boylston Street, Boston, MA 02115

From Logan International Airport:
Follow these directions from Logan to the Hynes Convention Center. If you have any questions about how to exit the airport to other destinations, go to www.massport.org to get the updated information on tunnel repair detours.

- Follow direction sign from terminals to Sumner Tunnel/Rte.93 North
- Take the Rte. 93 North ramp as you exit the Sumner Tunnel
- Exit at Storrow Drive (26 B)
- Follow Storrow Drive approximately 2 miles to the Fenway/Kenmore Exit (1st exit after Massachusetts Ave., on left)
- Stay left as you exit Storrow Drive going toward the Fenway
- Continue to 1st set of lights, staying left, going onto Boylston Street
- Go through 4 sets of lights on Boylston Street
- The Hynes Convention Center's main entrance driveway will be on the right immediately after going through the 4th set of lights.

Logan International Airport is a mere four miles from the Hynes Convention Center and can be reached by subway for a $1.25 fare or by taxi for approximately $20.00.

Driving directions from other locations can be found at www.oceans06mtsieeeboston.org.

Registration Information

All attendees, including speakers, session chairs and exhibitors are required to register. Advanced registration is strongly encouraged and will facilitate check-in time at the conference.

Registration Fees:

Full conference registrants and exhibitors (one per exhibiting company) are entitled to all technical sessions, admission to the exhibit hall, ice breaker reception, exhibit hall reception, MTS/IEEE awards luncheon, evening dinner event and a copy of the conference proceedings.

	On or before Aug 18	After Aug 18
Full Conference Fees:		
Member*	$475.00	$575.00
Non-member	$550.00	$650.00
Student member**	$80.00	$110.00
Student non-member**	$130.00	$155.00
Life/Emeritus Member*	$80.00	$100.00
One Day Fees:* **		
Member*	$175.00	$215.00
Non-member	$225.00	$265.00
Student member**	No fee	$80.00
Student non-member**	No fee	No fee
Exhibit Passes:** **		
Exhibits pass only	$0.00	$20.00
Tutorial Fees:		
Member full day*	$225.00	$275.00
Member half day*	$125.00	$175.00
Non-member full day	$275.00	$375.00
Non-member half day	$175.00	$275.00
Student full day**	$100.00	$125.00
Student half day**	$65.00	$85.00

Additional Social Events:

Student Reception	$20.00
Ice Breaker Reception	$30.00
Exhibit Hall Reception	$45.00
IEEE Awards Luncheon	$55.00
MTS Awards Luncheon	$55.00
Gala	$99.00

On Site Registration Hours:

Sunday, September 17 . . . . . 2:00 pm - 5:00 pm
Monday, September 18 . . . . . 7:00 am - 7:00 pm
Tuesday, September 19 . . . . . 7:00 am - 5:00 pm
Wednesday, September 20 . . . . . 7:00 am - 5:00 pm
Thursday, September 21. . . . . 7:00 am - 12:00 pm

* Member of MTS or IEEE

** Student members and non-members must show a valid student ID and are entitled to attendance at all technical sessions, admission to the exhibit hall, and a copy of the proceedings.

*** One day registrants are entitled to attendance at technical sessions and exhibits for selected day. No social events or proceedings are included with this registration.

**** Exhibits only registrants are entitled to admission to the exhibition only.

Cancellation Policy:

IMPORTANT: Registration cancellations received prior to 18 Aug will receive a refund equal to 80% of their amount paid. Cancellations received after 18 Aug and before 4 Sept will receive 50% of their amount paid. No refunds will be given after 4 Sept. Please send cancellation/refund requests to Oceans06Reg@ieee.org.

Schedule at a Glance

MONDAY, SEPTEMBER 18, 2006

7:00 am - 7:00 pm
Registration

8:00 am - 8:00 pm
Exhibitor Move-in

8:30 am - 4:30 pm
Tutorials and Workshops

6:00 pm - 7:30 pm
Welcome Reception & Registration

TUESDAY, SEPTEMBER 19, 2006

7:00 am - 5:00 pm
Registration

7:00 am - 8:30 am
Speaker's Breakfast

8:00 am - 9:45 am
Plenary: "Ocean Observing Systems"

10:00 am - 6:30 pm
Exhibit Hall Hours

9:45 am - 10:15 am
Morning Coffee Break

10:15 am - 12:00 pm
Morning Technical Program

10:15 am - 12:00 pm
Student Poster Sesssion

12:00 pm - 1:15 pm
MTS Lunch

1:15 pm - 5:15 pm
Afternoon Technical Program

3:00 pm - 3:30 pm
Afternoon Coffee Break

3:30 pm - 5:15 pm
Afternoon Panel Session

5:00 pm - 6:30 pm
Exhibitors Reception (Open to all)

WEDNESDAY, SEPTEMBER 20, 2006

7:00 am - 5:00 pm
Registration

7:00 am - 8:00 am
Speaker's Breakfast

8:00 am - 9:45 am
Plenary: "Revolutionizing Marine Technology"

9:00 am - 5:00 pm
Exhibit Hall Hours

9:45 am - 10:15 am
Morning Coffee Break

10:15 am - 12:00 pm
Morning Technical Program

12:00 pm - 1:15 pm
IEEE OES Lunch

1:15 pm - 5:15 pm
Afternoon Technical Program

3:00 pm - 3:30 pm
Afternoon Coffee Break

3:30 pm - 5:15 pm
Afternoon Panel Session

4:30 pm - 6:30 pm
MTS New England Reception

6:30 pm - 7:30 pm
Canada Reception at Museum of Science

7:30 pm - 9:30 pm
Oceans '06 Gala at Museum of Science

THURSDAY, SEPTEMBER 21, 2006

7:00 am - 12:00 pm
Registration

7:00 am - 8:00 am
Speaker's Breakfast

8:00 am - 9:00 am
Plenary: Marine Technology–
Looking Back, Looking Ahead

8:00 am - 12:00 pm
Morning Technical Program

9:00 am - 3:00 pm
Exhibit Hall Hours

9:45 am - 10:15 am
Morning Coffee Break

12:00 pm - 3:00 pm
Secondary School Lunch & Tour

1:15 pm - 3:00 pm
Afternoon Technical Program

1:15 pm - 3:00 pm
Afternoon Panel Session

Conference Highlights

Monday, September 18, 2006 kicks off with a lineup of tutorials and workshops during the day and concluding with advance registration and welcome reception in the evening.

Tuesday, September 19, 2006 will mark the official commencement of the Technical Program and opening of the Exhibition Hall. The Tuesday morning plenary session, introduced by Andy Clark of Oceans.US, will focus on Ocean Observing Systems and will feature Dr. Margaret Leinen, the Assistant Director for Geosciences at the National Science Foundation; Dr. Richard Spinrad, the Assistant Administrator of the National Oceanic and Atmospheric Administration; and Dr. Jose Achache, the Group on Earth Observations (GEO Secretariat Director).

We will be reprising an Oceans feature that first debuted in Providence in 2000: a session track called the "Exhibitor Product Showcase," which will allow registered exhibitors an opportunity to present highlights from applications and new developments associated with the products and services they offer.

A panel/roundtable session on Ocean Observing will follow later and the popular Exhibit Hall reception will close out the events of the day.

Tuesday, September 19–Thursday, September 21, 2006 This year we offer over twenty technology-oriented presentations given by exhibiting companies. The Exhibitor Product Showcase will take place in Rm. 111 located directly outside the Exhibit Hall. Admission to these sessions is free and encouraged by all.

Wednesday, September 20, 2006 begins with a plenary session focused on the theme of Oceans '06, "Revolutionizing Marine Technology." A great deal of technical innovation has sprung forth from the mission-driven challenges of developing and deploying advanced technologies in the world's oceans. This plenary will highlight the advances of the past decades, from applications ranging from military to commercial, and manned to unmanned.

MTS New England is holding a networking reception on Wednesday afternoon from 4:30 to 6:00. All MTS national and section members, national staff, and OCEANS '07 Vancouver representatives are invited, as well as new and perspective members, including students. Section activities and membership advantages will be highlighted

Wednesday evening will feature a Canadian Reception followed by the Oceans Gala which will be held at the Boston Museum of Science. The entire Blue Wing of the museum is reserved for our use as well as the "Theatre of Electricity" which offers the opportunity for hardy souls to travel up in the air in a wire cage and have life-sized lightning bolts discharged at them!

Our Canadian colleagues will be providing the pre-gala reception at the Museum, featuring some of the finest samplings of food and drink from the Great White North. The highlight of the evening will be a very special speaker that will captivate and inspire everyone, no matter what their specialization of ocean science and technology may be.

Thursday, September 21, 2006 is the final official day of technical sessions and exhibition. A brown bag lunch and tour of the exhibit hall will be provided for secondary school students and educators, offering them an opportunity to be introduced to marine technology in a hands-on manner.

Canadian Activities at Oceans '06

Tutorials: High-Profile Ocean Science Projects

Monday 2:00-4:00pm
Hynes - Room 111

Chair: **Paul Lacroix**, Executive Director, Canada's Ocean Science & Technology Partnership (OSTP)

Learn about cutting-edge ocean science projects in Canada. Session focuses on Canada's capabilities in underwater observation, sensors, and data integration and management. High-profile projects affecting Canadian waters will be presented.

Placentia Bay Demonstration Project: Technology Solutions for Integrated Management
Neil Cater, Director, SeaComm; CCMC, St. John's, Newfoundland and Labrador

The St. Lawrence Global Observatory - Collaborators working together to offer the most accurate and complete data for the global ecosystem of the St. Lawrence
Paul Bellemare, Director, Québec Region, Canadian Hydrographic Service,
Institut Maurice Lamontagne, Mont-Joli, Québec

Coastal Ecosystem Research in the Northwest Atlantic
Dr. Albert J. Plueddemann, Associate Scientist, Department of Physical Oceanography,
Woods Hole Oceanographic Institution, Massachusetts

VENUS - The Technology behind Interactive, Real-time Ocean Research
Paul Macoun, Project Instrument Engineer, VENUS Project,
University of Victoria, British Columbia

Investment Forum on Marine Technology

Monday 4:30-6:00pm
Hynes - Room 111

Moderator: **Dr. Linda S. Plano**, Associate Director, Massachusetts Technology Transfer Center (MTTC)

Where's the money? Start-ups and established companies need to understand the investment climate in marine technology. The session will feature a short presentation and panel discussion on key issues in the areas of investment, strategic partnerships and technology development. Companies in the marine sector that have successfully dealt with funding challenges will offer advice on how they managed to survive and thrive. This panel is organized by the Canadian Consulate General in Boston.

Canadian Product Showcase

Tuesday 10:15am - 12:00
Hynes - Room 111

Chair: **Clayton Burry**, Director, Industry Development, CCMC, St. John's, Newfoundland and Labrador

This is an opportunity to witness a dynamic showcase of new technologies and the latest in ocean science projects under development in Canada. Eight presentations by Canadian companies and marine organizations will be presented, including the evolving world of renewable ocean energy.

Jacques St. Pierre – Multi-Electronique (MTE) Inc., Rimouski, Québec
Custom marine electronic equipment.
Discover Multi-electronique

Bart Geleynse – RBR Ltd., Ottawa, Ontario
Manufacturer of precision instruments for oceanography, limnology and cryospheric studies.
RBR Ltd: A major presence in the world oceanographic market

Stephen Dodd – GRI Simulations Inc., St. John's, Newfoundland and Labrador
Simulation and real time visualization systems.

Paul Hill – Xeos Technologies Inc., Bedford, Nova Scotia
Designs, manufactures and supports data collection and telemetry products for environmental scientific research requirements.

Jeremy Nicholson – CARIS, Fredericton, New Brunswick
Developer of marine and hydrographic software; 'Ping-to-Chart' solutions.
The Use of CARIS Software in the Oceanographic Domain

Deron Johnston – Deep Development Corp., Abbotsford, British Columbia
Land and submersible high resolution Digital Video Recorders.
Feet Wet Security Applications

Anjuna Langevin – Maritime Innovation, Rimouski, Québec
OPTIDE Software: Using the Tides to Optimize Ship Transit

Chris Campbell, Ph D. – Ocean Renewable Energy Group, Nanaimo, British Columbia
Canada's place in the world of renewable energy

Technology Transfer Dialog between Academia and Industry

Tuesday 2:00-4:00pm
Hynes - Room 204

Chair: **Abi Barrow**, Ph.D., Director, Massachusetts Technology Transfer Center

This cross-border dialog will facilitate collaboration, cooperation and partnerships in research, technology transfer and commercialization. Researchers, academics, professional technology transfer officers and industry representatives discuss key issues, opportunities and challenges. Join us for this discussion on technology transfer in the oceans and marine technology sector. Participants will include academia, research organizations and industry from the U.S. and Canada.

Canada Reception

Wednesday 6:30-7:30pm
Blue Wing, Museum of Science, Boston

All OCEANS '06 attendees are invited to gather in The Blue Wing at the Museum of Science for the Canada Reception, which precedes the Gala Dinner to be held at the Museum. Don't miss this opportunity to network with other attendees and especially with the many Canadian participants who represent companies, research institutions and universities from across Canada.

To find partners, network with our researchers, company executives and technologists, come to the Canada Reception!

B2B Breakfast Networking Event - Are partners closer than they appear?

Thursday 7:30-9:30am
Hynes - Room 203

Chair: **Andrew Walls**, Oceans Champion, British Columbia Innovation Council

Come for breakfast and stay to interact with US and Canadian oceanographic professionals. You'll learn about two networking success stories and hear more about Oceans '07 in Vancouver, British Columbia. Come to find out just how close good partners are. Due to a very high demand for this event, we can't take online requests. Come to the Canadian Technology Pavilion - Booth 901: ask at the counter if space is available if your name can be added to the confirmed list.

Partnership – A Key to Growth
Geoff Lebans - Brooke Ocean Technology Ltd., Dartmouth, Nova Scotia

Partnering for Success – A Case Study
Don Bryan - AXYS Technologies Inc., Sidney, British Columbia

Oceans 2007: On the Edge of Tomorrow
Chris Roper - Exhibit Chair, Oceans 2007, Vancouver, British Columbia, Canada

Visit to Woods Hole Oceanographic Institution

Thursday 9:30am-3:30pm
Hynes Entrance

If you are a Canadian participant at the Conference, you can join us for a pre-arranged visit to New England's premier oceanographic institution. Learn about their current projects, initiatives and how they can partner with you. Meet bus at Boylston Street Entrance of the Hynes. Space is limited and reservations are required by contacting Terry Dooner, Canadian Consulate General, Boston.

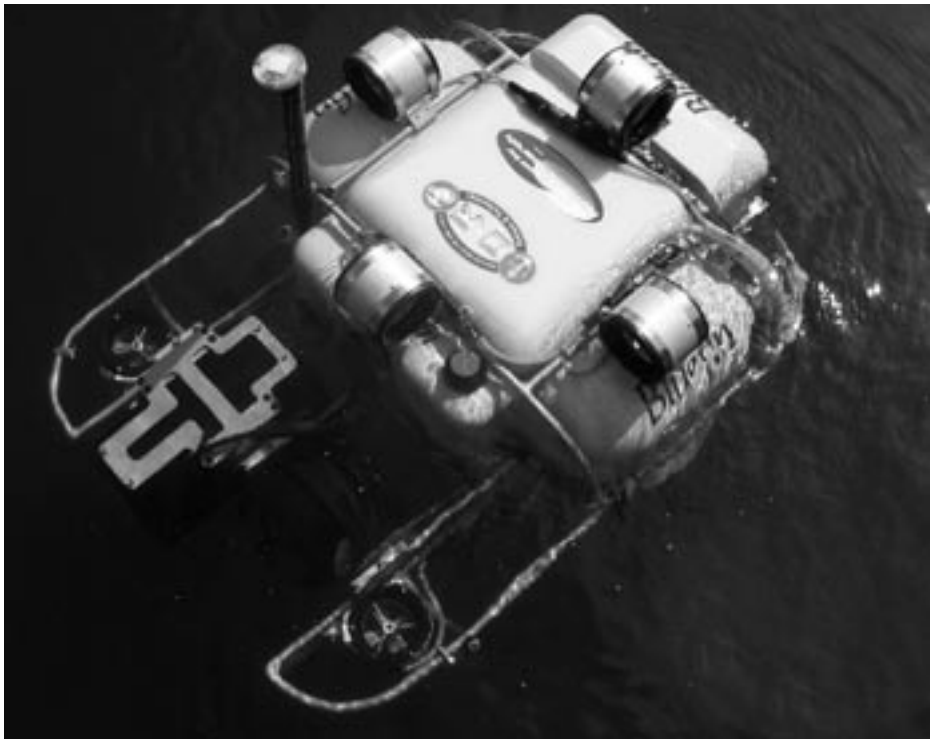
Canadian Activities at Oceans '06

September 18-21, 2006

Tutorials: High-Profile Ocean Science Projects	Monday	2:00 pm - 4:00 pm	Hynes Room 111
Investment Forum on Marine Technology	Monday	4:30pm - 6:00pm	Hynes Room 111
Canadian Product Showcase	Tuesday	10:15am - 12:00pm	Hynes Room 111
Technology Transfer Dialog (academia and industry)	Tuesday	2:00pm - 4:00pm	Hynes Room 204
Canada Reception at Oceans '06	Wednesday	6:30pm - 7:30pm	Museum of Science
B2B Breakfast Networking Event*	Thursday	7:30am - 9:30am	Hynes Room 203
Visit to Woods Hole Oceanographic Institution**	Thursday	9:30am - 3:30pm	Hynes Entrance

* RSVP required

** Canadian exhibitors—advance registration required



Workshops

Sunday, September 17, 2006

4:00 p.m. -7:00 p.m.

Partners in Ocean Science Education (POSE): The Ocean is Largely Unexplored Workshop & Reception at the New England Aquarium

Sponsors: The Center for Ocean Science Education Excellence-New England (COSEE-NE), a National Science Foundation (NSF)-funded partnership among The New England Aquarium, the Woods Hole Oceanographic Institution, and The University of Massachusetts-Boston.

When ocean scientists and educators work together, great things can happen. POSE offers a fun way to envision how you can foster education and outreach about both ocean science and technology by facilitating partnerships between technical experts and classroom teachers.

New technologies, sensors, and tools are expanding our ability to explore the ocean. Ocean scientists and engineers are relying more and more on satellites, drifters, buoys, ocean observatories and underwater vehicles. The Centers for Ocean Science Education Excellence-New England (COSEE-NE) will offer concurrent sessions based on the ocean science literacy essential principles developed by the National Geographic Society (NGS), National Oceanic and Atmospheric Administration (NOAA), the Centers for Ocean Sciences Education Excellence (COSEE), and the National Marine Educators Association (NMEA).

Each session will include a presentation by an ocean scientist who will highlight their current research relative the ocean science literacy strand, "The Ocean is Largely Unexplored," followed by a hands-on activity delivered by an educator; and a group discussion led by a facilitator, who will lead the audience in making connections between ocean science, curriculum frameworks, and their own work. After the workshop sessions, participants will gather in a plenary session to reflect on how ocean scientists, engineers, and business people might best reach out to increase the public's knowledge of the ocean and awareness of its importance to their lives.

This event will conclude with a reception to be held in the New England Aquarium's "Amazing Jellies" exhibit, which features the eerily beautiful creatures known as sea jellies.

COSEE-NE has created a community of ocean scientists, facilitators, classroom teachers, and informal educators engaged with one another in diverse ocean science programs. For more information, contact Kim Frashure at kjfrash@adelphia.net

Monday, September 18, 2006

8:30 a.m. -12:00 p.m. Room 102

Telling Your Story Workshop

Most scientists and engineers are accustomed to presenting their research to colleagues or lecturing college or graduate students, but when asked to speak in front of a classroom full of elementary school or junior high school students, many feel considerably less comfortable. How should they prepare? What should they say? What types of questions are the students likely to ask? The Telling Your Story (TYS) workshop, developed by the New England Center for Ocean Science Education Excellence (COSEE-NE) gives you new ideas and tools to answer these questions.

This workshop prepares you to develop the story of your research, your career, and your organization so that when you visit a classroom or present to a younger or lay audience you will be able to convey the importance and context of your work. Hands-on activities and practical guidelines, plus time to actually work with and strategize with experienced classroom teachers make this workshop valuable for any scientist, engineer, or technician who wants to learn how to communicate their work better. For participants who are interested and who live or work in the greater Boston area, we will assist them in making connections with K-12 teachers who wish to host a classroom visit. Learn more about TYS and read what participants in earlier workshops have said about their experience at http://necosee.net/edu_project_3/index.php.

Monday, September 18, 2006

1:00 pm - 4:30 pm Room 102

Future Development and Application of Crittercam in Marine Science

National Geographic's Remote Imaging Program is dedicated to developing and applying cutting-edge imaging technology to study wild animal behavior. The program's flagship, CRITTERCAM, is an animal-borne imaging and data-logging system that, over the last two decades, has provided novel insights into the secret lives of some 50 species of whales, seals, sharks, turtles - and the charismatic emperor penguin. This workshop will provide an in-depth look at the role of animal-borne imaging in marine behavioral ecology studies by bringing together CRITTERCAM's inventor, Greg Marshall, shark biologist Dr. Phillip Lobel and Hydro Technologies' Corey Jaskolski to present the history, the biology and the technical evolution of CRITTERCAM in ocean sciences. Greg Marshall will present the theory & practice of the CRITTERCAM concept as it has evolved over the last two decades with particular emphasis on biological insights gained by progressive technical developments of CRITTERCAM systems and attachment methods. Dr. Phillip Lobel will present his long-term study on the movement patterns of the grey reef shark, Carcharhinus amblyrhynchos, at Johnston Atoll and the Islands of Palau and will detail the contributions gained by animal-borne imaging technology.

Looking toward the future, Greg will present the new generation of CRITTERCAM systems and Corey Jaskolski of Hydro Technologies will demonstrate the Crittercam 3D Dive Profiling software, a cooperative effort between National Geographic and Hydro Technologies, which will allow scientists to visualize the complex, multi-dimensional data recorded by CRITTERCAM. The fusion of video, sensor data, and 3D visualization technologies allow for a complete and immersive representation of a marine CRITTERCAM deployment.

Greg Marshall, National Geographic Society, Remote Imaging Program;
Dr. Phillip Lobel, Boston University; **Corey Jaskolski**, Hydro Technologies

Monday, September 18, 2006

1:00 pm - 4:30 pm Room 103

Real-time current measurements from Coast Guard navigation buoys in ports, bays, and the coastal ocean

Real-time current velocity measurements are becoming an increasingly vital requirement for the safety and management of ports, bays, and the coastal ocean. These data are used by ship pilots, search and rescue crews, environmental spills teams, research scientists, and the public. However, there are many obstacles to installing and maintaining an operational system in these environments.

One solution to obtaining real-time current measurements is the ATON System. The ATON System is comprised of an acoustic Doppler current profiler mounted with a specially designed clamp to a US Coast Guard Aid-to-Navigation buoy. The data are transmitted from the buoy to shore via RF, GSM or satellite modems. The system has been approved by the Coast Guard for and is presently in operational use by federal and commercial clients in several ports nationwide. The ATON System is particularly effective because it allows direct measurement of currents in highly desirable, but otherwise difficult, locations, such as in navigation channels where additional surface buoys would not be permitted.

The workshop will present an overview of the ATON System, including the following topics:

- Coast Guard approved mounting system
- Real-time telemetry system
- Data quality evaluation
- Operational considerations
- Equipment service schedule
- Coast Guard cooperation

ATON System users will be available to present practical experiences and share their knowledge base.

The conclusion of the workshop will be an open forum to discuss the group's requirements for real-time current measurements in ports, bays, and the coastal ocean, including what products, technology and support are available to meet these requirements.

Biographies:

Mr. Eric Siegel is the general manager of NortekUSA, a leading manufacturer of acoustic Doppler oceanographic equipment for current and wave measurements in the ocean, lake and laboratory. Eric has a background in research and operational physical oceanography, having worked in university and government environments on both the East and West coasts. He holds an M.S. in Marine Science (Physical Oceanography) from the University of South Florida.

Dr. Bruce Magnell is a Senior Scientist/Senior Oceanographer for the Woods Hole Group, a consulting company specializing in applied physical oceanographic measurements, as well as real-time, marine environmental information systems to support drilling and ship operations for oil companies, port and harbor navigability, weather and ocean forecasting, and ocean resource management. The Woods Hole Group is contracted to support several of the ATON Systems for the NOAA PORTS Program. Bruce holds an Sc.D. in Physical Oceanography from the MIT/WHOI joint program.

Monday, September 18, 2006

3:00 pm - 4:30 pm Room 104

AQUARIUS: NOAA and NASA's Undersea Partnership

The AQUARIUS undersea laboratory, located 3 miles offshore from Key Largo in 65 feet of water, is the only operational undersea laboratory in the world, and has been supporting marine research since 1985. NASA has been conducting space simulation missions in AQUARIUS since 2001, under their NEEMO (NASA Extreme Environment Mission Operation) program. Karen Kohanowich, AQUARIUS program officer and

NOAA Undersea Research Program's (NURP) Deputy Director, participated in the NEEMO 10 mission this July. She will discuss the NEEMO mission, the capabilities of the AQUARIUS, and opportunities for the future of NOAA's "Inner Space Station." During the program there will be a live link to the NEEMO 11 mission and an opportunity to talk with a NEEMO 11 aquanaut.

Wednesday, September 20

8:30 am to 5:00 pm Room 104

Challenges and Complexities in Underwater Imaging; What Terrestrial Vision Can Contribute

The theme of this year's Underwater Imaging Workshop is "Challenges and Complexities in Underwater Imaging; What Terrestrial Vision Can Contribute." The workshop will occupy a full day on Monday, September 18th. The morning session will provide an overview of the state of technology in underwater imaging and present some challenges and complexities found in the underwater domain. Guest speakers are Shahriar Negadaripour (University Miami), Yoav Schechner (Technion – Israel Institute of Technology), Srinivas Narasimhan (Carnegie Mellon University), Sylvain Paris (MIT), and Stefan Williams (University of Sydney). Representing both the underwater and terrestrial vision community, these speakers will present examples of and offer solutions to common issues found in image enhancement, 3-D reconstruction, and simultaneous localization and mapping (SLAM), to name a few. The afternoon session of the workshop will focus on some specific examples from industry and will provide an open forum for discussion. Industry topics will include examples in fluorescent imaging, new camera technology innovations, extended range 3-D mapping, and more.

Wednesday, September 20

1:30 pm to 3:00 pm, Room 202

AUV Fleets for Global Exploration of the Ocean: An Open Forum to Define a Vision

About 95 percent of the sub-surface ocean has not been visited or studied. By 2050, at the current pace of ocean exploration and data collection, we will have only marginally increased our understanding of the ocean, limiting knowledge important to informed decisions about some of our most pressing issues, such as climate change, energy, ecosystem variability, public health, hazard mitigation, and the carbon cycle. Deployment of large numbers of autonomous underwater vehicles (AUVs) may be a powerful solution to greatly increase the pace, efficiency and scope of our ocean literacy. Is this a viable solution? How would it be implemented? Please share your thoughts as we refine this vision.

Message from the Technical Chairs

Welcome friends and colleagues to OCEANS '06 MTS/IEEE Boston! With each year that passes, new innovations in sensing, communication, and computing promise to dramatically improve our capacity to observe and interpret the ocean environment. The pace of these innovations is at times both exciting and unnerving as it challenges us to respond rapidly to an increasingly inter-disciplinary research environment, sometimes extending ourselves beyond what is known and comfortable to us.

That is good news for OCEANS. Of all of the IEEE's and MTS' professional meetings, the OCEANS conference is quite possibly the most interdisciplinary. At an OCEANS meeting one is able to listen to talks ranging from the latest advances in AUV control technology, to optical sensors for oceanographic measurements, to acoustic vector sensor array calibration, and then participate in a panel session on future trends in ocean observing systems - all in the same day.

This year's OCEANS meeting is no exception. Our authors have combined to produce a program that spans the diversity of the oceanic research community, while highlighting the synergy of many disparate but inter-related disciplines. This year, attendees will be pleased to find a number of multi-session sequences on a several hot topics of the day, including Synthetic Aperture Sonar, AUV, UUV, and Glider technology, Aquaculture Engineering, Oceanographic Sensors, Sonar Tracking, and Marine Life and Ecosystems. What's more, many of these technology areas are unified under one of the principal research themes facing the oceanographic community today, Integrated Ocean Observing Systems.

The OCEANS '06 Boston conference will combine a distinguished plenary program and a robust technical agenda, with a new student poster precis format, interactive panel sessions, and a reprise of the Exhibitor Product Showcase Track made popular at the Oceans 2000 meeting in Providence. We think you will find our program stimulating and enlightening. Thank you and welcome to Boston.

Sincerely,

Dr. Vincent E. Premus
Technical Program Chair
OCEANS '06 MTS/IEEE Boston

Dr. Albert (Sandy) Williams 3rd
Technical Program Co-chair
OCEANS '06 MTS/IEEE Boston

Message from the Tutorial Chair

Dear Participants of Oceans '06 MTS/IEEE Boston:

I am pleased to have been able to recruit top-notch Tutorials speakers who are leading experts in oceanic engineering and allied areas to share with us their knowledge in six topics of full and half-day tutorials that are listed in this Conference Advance Program.

The exciting news is that Oceans '06 Boston will be offering IEEE/Professional Development Hours (PDHs) and Continuing Education Units (CEUs) for participants in the Tutorial Program. This is the first Oceans Conference to offer these credits to the engineering and scientific community. IEEE/CEUs and PDHs are required by many professional engineers to maintain the licences. Evidence of participation in these courses also helps engineers meet company training requirements. There is no extra charge associated with CEUs, and certificates will be issued by the International Association of Continuing Education and Training. Many thanks to Diane DiMassa who took care of the process of approval.

For Awarding please visit:
www.ieee.org/web/education/ceus/award.html

Looking forward to seeing many of you at Oceans '06 Boston

Ferial El-Hawary
Tutorial Program Chair
OCEANS '06 MTS/IEEE Boston

Tutorials

Design of synthetic aperture sonar systems for high-resolution seabed imaging *Marc Pinto*

Monday, September 18, 2006, 8:30 am - 4:30 pm, Room 107

This tutorial will review the key aspects of the design of synthetic aperture sonar (SAS) systems for high resolution seabed imaging. After a quick overview of the expected benefits and main features of SAS, the design of the transmitter and receiver arrays will be discussed, with emphasis on the mitigation of spatial aliasing with multi-element receiver arrays, wideband operation and extension to interferometric SAS for estimating the seabed bathymetry.

Next the most difficult issue in SAS, which is the micronavigation problem, i.e. that of estimating the unwanted platform motions with the required sub-wavelength accuracy, will be addressed in detail. The emphasis will be on methods which have proved their value at sea, which combine inertial navigation systems (INS) with data-driven methods based on the Displaced Phase Centre Antenna (DPCA) technique. The topics covered will include the theory of spatial backscatter coherence, the derivation of ping to ping motion estimates using time delay estimation theory, including the use of bandwidth for phase unwrapping and the appropriate range-dependent near field corrections to arrive at unbiased estimates, the establishment of the Cramer Rao lower bounds for motion estimation which demonstrate the need for fusion with an INS to achieve full performance. The geometrical relationship between the DPCA and INS projection frames, which is necessary for accurate fusion, will be established and shown to depend also on the local seabed slope. The estimation of this slope with interferometric sonar will be discussed.

Furthermore the impact of the environment, and in particular of the multipath structure in large range to water depth ratios will be discussed. Multipath will be shown to degrade the quality of the SAS imagery as well as adversely impact the accuracy of interferometric estimates including DPCA. Means to mitigate multipath operation by management of the vertical transmission and reception beams will be discussed, showing experimental results which point to some of the limitations of existing sonar performance prediction tools.

Finally different design tradeoffs between computational efficiency and robustness for micronavigated SAS imaging algorithms will be discussed and an example of a real-time implementation suited for operation on-board an autonomous underwater vehicle will be described.

Bio Marc Pinto

Marc Pinto was born in Wellington, India in 1960. He graduated from the Ecole Nationale des Ponts et Chaussées, Paris (France) in 1983. From 1985 to 1989 and 1989 to 1993 he worked as a research engineer for Thomson-CSF, specializing in the development of finite element techniques for solving non-linear magnetostatics to support the modeling of the magnetic recording process. In 1991, he received the Ph.D. degree in Solid State Physics from the University of Paris, Orsay. In 1993 he joined Thomson-Sintra ASM (now Thales Underwater Systems) as Head of the Signal Processing Group, specializing in research into advanced MCM and airborne ASW sonar. In 1997 he joined the NATO Saclant Undersea Research Center, La Spezia, Italy as principal scientist. He was appointed Head of the Mine Countermeasures Group, in the Signal and Systems Division in 1998 and held this position until the

Group was dissolved in 2000. From 2000 to 2004 he conducted, as project leader, research into synthetic aperture sonar systems for hunting proud and buried mines. In 2004 he was appointed Head of the Expeditionary MCM and Port Protection Department where he presently oversees the research into AUV-based minehunting, electronic mine countermeasures and harbour defence.

AUV Technology and Application Basics *William J. Kirkwood*

Monday, September 18, 2006, 8:30 am - 12:00 pm, Room 108

AUV Application Basics is a short course that provides an overview of AUV technology and operations. The objective is to provide an overview of what AUV systems can provide and the best practices for their use. The class is targeted at scientists interested in using AUVs for oceanographic applications. The attendee will gain basic understanding of AUV types, technologies, and navigation techniques, including discussion of the comparative strengths of AUVs and alternative methods of data collection. The attendee will also be provided an understanding of trade-offs in AUV operations, including power estimation, endurance considerations, and mission structure to acquire the desired data sets.

Key points are illustrated by applications and results from the Monterey Bay Aquarium Research Institute's (MBARI) Dorado AUV and other AUV operations. Topics include: Basic AUV technology, AUV at-sea Operation, Payload Considerations, Mission Planning, Upper and Mid-Water AUV missions, Benthic and Mapping AUV missions, Data Collection and Reduction, AUV Integration into Sampling Networks, and a look at coming AUV advances.

Intended Participants:
This class is intended for scientists interested in applying AUVs to particular problems, persons interested in AUV applications and the impact of AUV technology, and graduates in oceanographic fields seeking a broader understanding about the application of AUV platforms.

Bio: W.J. Kinkwood
Bill is currently the Associate Director of Engineering at the Monterey Bay Aquarium Research Institute (MBARI) located in Monterey Bay, California. Bill has a BS in Mechanical Engineering and a MS in Computer Science which he has applied to controls and automation of electromechanical systems and robotics since 1978. Bill has been with MBARI for 15 years as a lead mechanical engineer and program manager developing the Tiburon remotely operated vehicle. Bill also performed as program manager and lead engineer developing the Dorado class autonomous underwater vehicles at MBARI. Bill's current efforts are focused on precision and/or automated in situ instrumentation and laser Raman spectroscopy for the deep ocean science.

Matlab Tools for Processing Data from Acoustic Doppler Current Meters Deployed on Deep Water Moorings *J. Bruce Andrews and Bruce A. Magnell*

Monday, September 18, 2006, 8:30 am - 12:00 pm, Room 109

Data collected using deep-sea moored instruments must be processed to engineering units, inspected for quality assurance (QA), and edited to remove unwanted data points before final archival storage. Community-accepted archival formats, such as EPIC netCDF, require fully processed and QA'd data, as well as meta-data. Acoustic Doppler

Current Profilers (ADCPs) produce large amounts of data, making manual methods of data editing and reformatting cumbersome. For ADCPs, the necessary editing tasks include:

- Removal of data collected before completion of mooring deployment and after initialization of mooring retrieval
- Removal of data collected beyond the effective range of the ADCP, beyond the sea surface for upward looking ADCPs, or beyond the bottom for downward looking ADCPs
- Verification of data quality
- Flagging of questionable data due to occasional instrument malfunction or unfavorable environmental conditions
- Depth mapping of data collected by sub-surface moored ADCPs whose depth varies with current drag forces. The ADCP's depth will increase (draw down) as the current increases. The ADCP's measurement cells are defined in terms of distance away from the ADCP and do not represent fixed depths in the water column Mapping the data to fixed depth horizons is necessary for time series analysis.

To streamline these tasks, Woods Hole Group, Inc. (WHG) has developed a set of Matlab-based data processing and QA tools for use with data from R.D. Instruments ADCPs. These tools are based on the ADCPTools package developed by USGS, which was intended for processing data from bottom mounted ADCPs in shallow water. However, unlike the original USGS ADCPTools package, the new processing tools are intended specifically for processing data from deep-sea moored ADCPs. The original ADCPTools software has been available publicly from USGS for several years. WHG intends to makes its new deep-water version of ADCPTools available on the same basis, as a work-in-process, so that other users may join with WHG to use, maintain and improve the software.

The use of the new WHG ADCPTools will be described in detail and demonstrated using data from deep-moored ADCPs. Processing begins with raw binary data in a file as recovered from the ADCP, and ends with quality checked and edited data in a netCDF file following EPIC conventions for Doppler current meter data.

Attendees will be shown how to:

- Enter meta-data not included in the raw file required for the netCDF format
- Make an initial assessment of the data from depth/time color contour plots of raw data and plan the rest of the processing.
- Pick the beginning and end of the good data range (after deployment and before retrieval) from a plot of depth (pressure) over the entire length of the record and confirm (or adjust) the depth mapping range. The new ADCPTools then performs mapping of data from depth cells relative to distance from the ADCP to fixed depth cells using the actual time dependent ADCP depth. ADCP depth can be determined from a pressure sensor if the ADCP is so equipped, from an estimate of the distance to surface based on acoustic data if the ADCP is upward looking, or from another instrument on the same mooring.
- Specify various criteria that will be used to automatically edit the data. These criteria include physical parameters (out-of-range, excessive rate of change, etc.) as well as criteria based on the ADCP's reported QA diagnostic parameters (vertical and error velocity exceedance, echo amplitude, correlation magnitude, and percent good pings).
- Examine the data graphically to determine if the masking is having the proper results, and also manually mark additional data as bad or alternatively mark masked data as good.

- Repeat the editing process with different criteria until a satisfactory result is obtained.
- Specify the number of bins to trim at the end of the data range since an ADCP is usually set up to record more bins than will actually contain good data. Unlike the editing process, which flags data in a particular bin at a particular time as "bad," the trimming process completely removes all data for the specified bins from the record.
- Create a final EPIC netCDF data file that is in a format that is standard within the oceanographic community and can be read by many analysis packages for post-processing.

As time permits, attendees will have the opportunity to use the tools themselves. Attendees wishing to try these tools at the tutorial on their own data (collected with a Teledyne RD Instruments ADCP) should contact Bruce Andrews at bandrews@whgrp.com

Bio:J Bruce Andrews

J Bruce Andrews has more than 30 years' experience at MIT, EG&G, and Woods Hole Group, Inc. in software development, scientific data processing, and numerical modeling for a wide range of commercial and government clients. Mr. Andrews earned his M.S. in Ocean Engineering at MIT in 1969. His fields of expertise include applications programming, system programming, systems integration, instrumentation software design, data analysis, data acquisition, data presentation and display, processing system design and implementation, physical oceanography, signal processing, numerical modeling. He has experience with many different programming languages including FORTRAN, C, and Visual Basic. His most recent work has been with Lab Windows CVI (National Instruments) development environment and Matlab (Mathworks). He has developed software used to collect, analyze, and report on data for numerous deepwater current measurement programs worldwide, including programs in the USA, offshore Brazil, offshore west Africa, offshore Australia, and offshore Indonesia. He is also involved in on going development of software tools for processing and analyzing data from various oceanographic and meteorological instrumentation, with emphasis on interactive quality assessment and data editing as well as archiving in standard (netCDF) formats.

Bio: Bruce A. Magnell Ph.D

Bruce A. Magnell, Ph.D. has more than 30 years' experience at MIT, EG&G, and Woods Hole Group, Inc. in applied science, and ocean engineering for a wide range of commercial and government clients. He is a recognized expert in the field of physical oceanography in industry, government, and academia. His fields of expertise include physical oceanography, electrical engineering, coastal ocean dynamics, oceanographic instrumentation design and evaluation, signal processing, data analysis, data acquisition, real-time telemetry, processing system design and implementation, technology evaluation, business management and business development. He has extensive experience in the analysis of coastal ocean dynamics, especially wind-driven circulation and mixing on the continental shelf. Specifically, he has collected, analyzed, and reported on numerous deepwater current measurement programs worldwide, including some of the first observations of the loop current in the Gulf of Mexico. In the past few years, he has been the Principal Investigator for oceanographic data collection programs in the USA, offshore Brazil, offshore West Africa, offshore Australia, and offshore Indonesia. He also has participated in and directed large-scale oceanographic measurement programs for the MMS, such as the Northern California Coastal Circulation Study and the New England Outer Continental Shelf Physical Oceanography Program.

Airborne Hyperspectral Imaging *Herb Ripley*

Monday, September 18, 2006, 8:30 am - 12:00 pm, Room 110

This half-day workshop will focus on the "do's and don'ts" of preparing for, conducting and then dealing with the data collected during an airborne hyperspectral survey. The session will cover:

- background to the technology
- planning an airborne survey (design and layout of flight lines, things to avoid)
- execution of the survey (type of aircraft to use, when to fly)
- data pre-processing (geocorrection, atmospheric correction)
- overview of data analysis

The session leader has been involved in airborne hyperspectral surveys for seventeen years and has organized and conducted airborne surveys in more than twenty-five countries on four continents. The session will include plenty of real-life examples from many of these projects.

Bio:Herb Ripley
Herb has been trained in geography and remote sensing/geomatics and has spent his entire career with Atlantic Canadian firms. Herb has comprehensive experience in all aspects of aerial photography and airborne remote sensing data collection acquired in over 25 years of project work. This experience includes projects conducted both nationally and internationally. Herb's world recognized casi project experience includes numerous applications but in particular he has considerable experience on coastal projects including mapping invasive species, coral reef surveys, mapping benthic habitats and mapping near-shore vegetation. Herb has been principal author and co-author on numerous technical publications During his career Herb has been very active in industry develop mental activities and has held executive positions with the Nova Scotia Oceans Initiative, the Champlain Institute, the Alliance for Marine Remote Sensing, the Geomatics Industry Association of Canada and the Geomatics Association of Nova Scotia. As a recognition of his professional standing, several years ago Herb was appointed a Fellow of the Remote Sensing Society (U.K.).

Acoustic seabed classification with multibeam and sidescan images *Jon Preston*

Monday, September 18, 2006, 1:00 pm - 4:30 pm, Room 108

Acoustic seabed classification is the organization of the sea floor and shallow subsurface sediment into discrete classes based on information in the echoes. Geoacoustic sediment properties such as grain size and porosity are not available from acoustic backscatter alone, but the survey area can be segmented into regions of similar acoustic character. Systematically exploiting details in backscatter is the basis of acoustic segmentation.

This tutorial presents theory and applications of image-based acoustic classification, from the early papers through to recent applications. The acoustic principles of classifying with echoes from single beams at normal incidence are presented first, since they relate to the principles of image classification. Near nadir, the amplitudes and shapes of sounder echoes are rich in sediment information. Away from vertical incidence, echoes carry sediment information in their amplitudes and their noise characteristics, but not in their shapes. Echoes from imaging sonars, with their wide horizontal beamwidths, become rasters in sonar images, so noise in these echoes

becomes image texture. Macro-roughness such as sand waves and changes in sediment also contribute to texture. Image amplitude and texture are both heavily influenced by sediment type and are exploited for segmentation.

Sonar calibration is not necessary for image-based acoustic classification. Image amplitudes are made consistent throughout a survey, but remain in relative, not absolute, units. Since calibrating imaging sonars is challenging, the ability to use systems that need only be consistent offers cost-effective practical classification for military and civil purposes.

Topics in this tutorial include:

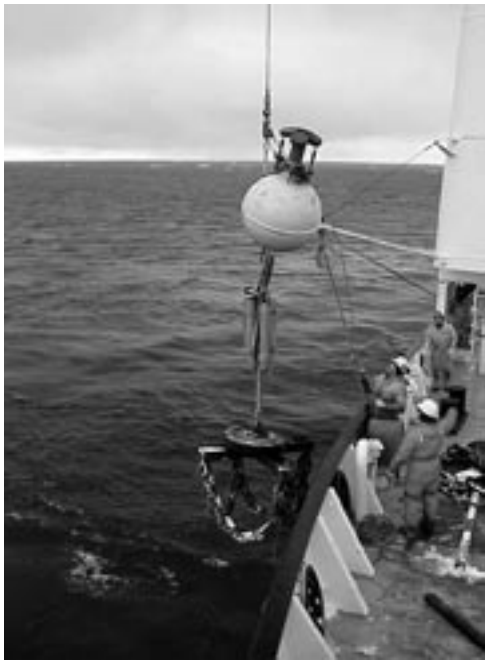
- Quality control, suppressing system artifacts.
- Compensating images for beam patterns and grazing angle effects.
- Features that capture amplitude and texture characteristics.
- Classification with amplitude: backscatter, backscatter vs. grazing angle.
- Classification with texture: Pace, Haralick, fractal, wavelet.
- Differences between classifying multibeam and sidescan images: resolution, using bathymetric data for compensation, benefits of images stitched together from backscatter in beams.
- Supervised classification, training sets.
- Unsupervised classification, PCA, manual and automated clustering.
- Using non-acoustic data to relate acoustic classes to sediment geoacoustic properties.
- Categorical interpolation.
- Maps with acoustic classes in similarity colours.

The techniques presented in this tutorial are wide ranging, and do not concentrate on a selected technical approach. As time allows, hands-on experience with classification software suites will reinforce the tutorial material. Participants are invited to bring their own laptops for this part of the tutorial, and would be able to continue classifying data sets after the session has ended.

Through this combination of theory and experience, participants in this tutorial can expect to gain a thorough understanding of principles and practice of image-based sediment classification.

Bio: Dr. Jon Preston

Dr. Jon Preston (PhD, University of British Columbia) is Senior Scientist at Quester Tangent Corporation, Sidney, BC, and an adjunct professor at the University of Victoria. In his seven years at QTC he has lead the development of software suites for rigorous statistical classification of multibeam and sidescan images, interpolation and visualization of acoustic classes, and automated objective clustering through simulated annealing.



Signal Processing Methods for Underwater Acoustic Communications

Milica Stojanovic and Lee Freitag

Monday, September 18, 2006, 1:00 pm - 4:30 pm, Room 109

Wireless information transmission through the ocean is one of the enabling technologies for the development of future ocean-observation systems, whose applications include gathering of scientific data, pollution control, climate recording, detection of objects on the ocean floor, and transmission of images from remote sites. Implicitly, wireless signal transmission is crucial for control of autonomous underwater vehicles (AUVs) which will serve as mobile nodes in the future information networks of distributed underwater sensors. Wireless communication provides advantages of collecting data without the need to retrieve instruments, and maneuvering underwater vehicles and robots without the burden of cables.

Acoustic wireless communications are governed by three factors: limited bandwidth, time-varying multipath propagation, and low speed of sound in the ocean. Together, these factors result in a communication channel of poor quality and high latency (thus ironically combining the worst of mobile radio and satellite channels). To achieve high information throughput on such channels, coherent modulation/detection techniques, such as PSK and QAM, must be considered because of their bandwidth efficiency. Signal processing methods for underwater acoustic channels are based on the same principles as those for radio communications; yet, they differ substantially due to the amount of time-spreading introduced by the channel, as well as frequency-spreading introduced by the system mobility.

Signal processing methods for high speed underwater communications have been a topic of extensive research over the past decade, resulting in the development of first high speed underwater acoustic modems. In this lecture, we focus on signal processing methods of adaptive equalization, digital synchronization, and multichannel combining for bandwidth-efficient underwater communication systems. We also address methods for multiple-access underwater communications, which form the basis of future underwater wireless communication networks, and discuss the need for scalable network architectures that provide efficient use of channel resources by a large number of AUVs. Finally, we outline the principles used in today's real-time implementation of these techniques. The performance of various techniques is discussed through a series of experimental results, which include transmission over distances ranging from a few kilometers in shallow water to hundreds of kilometers in deep water, at highest bit-rates demonstrated to date.

Bio: Milica Stojanovic

Milica Stojanovic graduated from the University of Belgrade, Serbia, in 1988, and received the M.S. and Ph.D. degrees in electrical engineering from Northeastern University, Boston, Massachusetts, in 1991 and 1993. She is currently a Principal Scientist at the Massachusetts Institute of Technology, and also a Guest Investigator at the Woods Hole Oceanographic Institution. Her research interests include digital communications theory and statistical signal processing, and their applications to mobile radio and underwater acoustic communication systems. Milica is an Associate Editor for Communications with the IEEE Vehicular Technology Society.

Bio: Lee Freitag

Lee Freitag holds BS and MS degrees in Electrical Engineering from the Univ. of Alaska, Fairbanks which he received in 1986 and 1987He is currently a Senior Engineer at the Woods Hole Oceanographic Institution where he has worked on projects related to underwater acoustics for 15 years. His research programs focus on underwater acoustic communication and navigation with a strong focus on UUVs, sensors and submarine systems.

Canadian Tutorial: High-Profile Ocean Science Projects

This session not eligible for IEEE/Professional Development Hours (PDHs) or Continuing Education Units (CEUs) credits

Monday, September 18, 2006, 2:00-4:00pm, Room 111
Chair: Paul Lacroix, Executive Director, Canada's Ocean Science & Technology Partnership (OSTP)

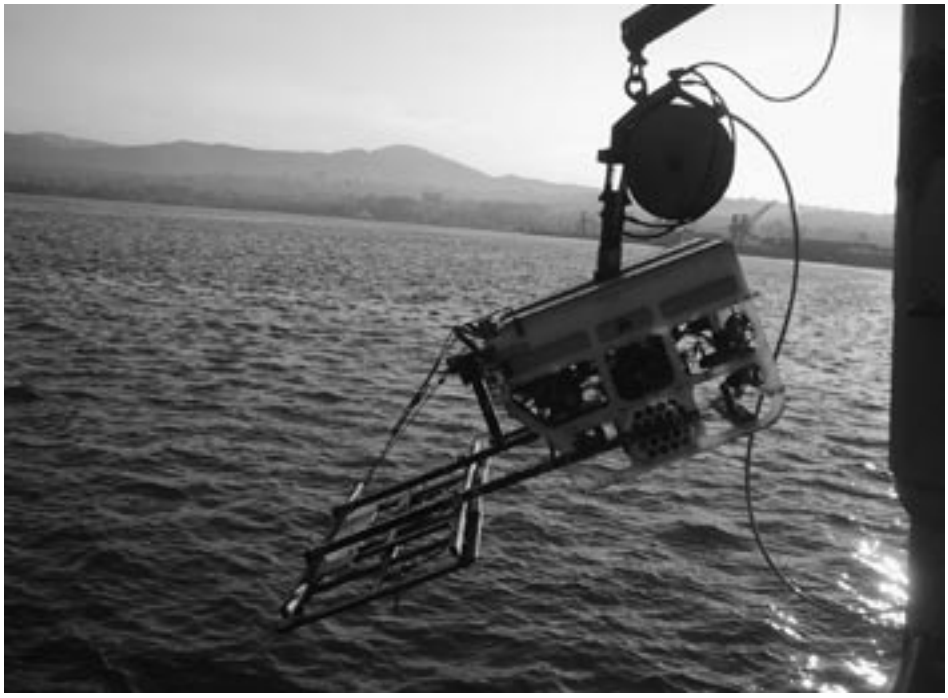
Learn about cutting-edge ocean science projects in Canada. Session focuses on Canada's capabilities in underwater observation, sensors, and data integration and management. High-profile projects affecting Canadian waters will be presented.

Placentia Bay Demonstration Project: Technology Solutions for Integrated Management
Neil Cater, Director, SeaComm; CCMC, St. John's, Newfoundland and Labrador

The St. Lawrence Global Observatory - Collaborators working together to offer the most accurate and complete data for the global ecosystem of the St. Lawrence
Paul Bellemare, Director, Québec Region, Canadian Hydrographic Service,
Institut Maurice Lamontagne, Mont-Joli, Québec

Coastal Ecosystem Research in the Northwest Atlantic
Dr. Albert J. Plueddemann, Associate Scientist, Department of Physical Oceanography,
Woods Hole Oceanographic Institution, Massachusetts

VENUS - The Technology behind Interactive, Real-time Ocean Research
Paul Macoun, Project Instrument Engineer, VENUS Project,
University of Victoria, British Columbia



Plenary Sessions

Ocean Observation Systems

Tuesday, September 19, 2006, 8:00 am - 9:45 am, Ballroom B

Presenters will include Dr. Richard Spinrad, Dr. Margaret Leinen, Dr, Jose Achache.

Revolutionizing Marine Technology

Wednesday, September 20, 2006, 8:00 am - 9:45 am, Ballroom B

Marine Technology - Looking Back, Looking Ahead

Thursday, September 21, 8:00 am - 9:00 am, Ballroom B

RADM J. Bradford Mooney, Jr. USN (Ret.)

RADM Brad Mooney will provide some perspective on marine technology development based on his experience from a rich naval career including tours as Oceanographer of the Navy and culminating with Chief of Naval Research (twenty years ago today) and, since then, from an active role consulting to both government and industry.

Panel Sessions

A Description and Discussion of the Major Earth and Ocean Observing Initiatives: (GEOSS, IEOS, GOOS, IOOS, OOI)

Tuesday September 19, 3:30pm to 5:15pm, Room 112

A number of major earth and ocean observing initiatives are currently underway and the senior leadership representing each will be on hand in this Special Focus Session to describe the initiatives and their inter-relationships. The Global Earth Observation System of Systems (GEOSS) is an international partnership involving 60 countries, intended to build upon existing time-series sites to provide coordinated observations from thousands of instruments worldwide.

The Integrated Earth Observation System (IEOS) is the U.S. national effort to build GEOSS. These nested international and national initiatives will facilitate the sharing and applied use of global, regional and local data from satellites, weather stations and other surface and airborne Earth observing systems. Similarly, the international and U.S. subcomponents for conducting ocean observations to meet high-level societal goals are the GOOS (Global Ocean Observing System) and IOOS (Integrated Ocean Observing System) respectively.

Complementing these operational observing systems is the National Science Foundation's (NSF) Ocean Observatories Initiative (OOI) that will provide research and technology developments needed to ensure that IOOS and GOOS meet their societal goals. The OOI is an outgrowth of several years of scientific planning efforts, both nationally and internationally building upon recent technological advances and underpinned by several successful pilot and test bed projects.

Data from the research-focused observatories enabled by OOI will be interoperable with data from IOOS, IEOS and GEOSS and thus will be an integral part of these systems. After a brief presentation describing each program, the speakers will assemble as a panel to continue the dialog and answer questions from the audience.

Speakers/Panelists:

(GEOSS) **Dr. Jose Achache**, Director, Secretariat of the Group on Earth Observations
(IEOS) **Mr. Ron Birk**, Director of Applied Sciences, NASA
(GOOS) **Dr. Mary Altalo**, Director, Ocean.US and Vice Chair of IGOOS
(IOOS) **Dr. Richard Spinrad**, Assistant Administrator for Ocean and Atmospheric Research, NOAA
(OOI) **Dr. Margaret Leinen**, Assistant Director of Geosciences, NSF

International Developments in GOOS and its Regional initiatives

Wednesday September 20, 3:30pm to 5:15pm, Room 112

This focus panel seeks to examine the Global Ocean Observing System network, (GOOS), the ocean component of the Global Earth Observing System of Systems, (GEOSS).

Presentations will focus on the international regional needs perspectives of the GOOS Regional Alliances (GRAs) around the globe. Each of the 13 GRAs has observing systems in various degrees of development. The challenge is making the system interoperable as well as integrated. In most cases, these efforts have started as grass roots efforts in response to regional needs.

Regions covered will include North and South America, Africa, The European Union, Asia, The Arctic, The Indian Ocean, and The Pacific Islands. The geographic boundaries of the regions correspond roughly to the Large Marine

ecosystem boundaries. These bodies are responsible for the direction and development of operational regional coastal observing systems infrastructure, nested within the global ocean observing system. They also develop the information systems which tailor the data into products and services to serve the user needs.

Representatives of regions will present an assessment of the observing system capabilities in their region and indicate the plans for the development of the full system. They will emphasize the major societal issues in their area and demonstrate how the information from the observing systems can aid in the decision making for policy makers, resource managers and businesses.

The users benefit areas include national security, marine operations, public health, climate/weather predictions, energy, water, disaster response, fisheries, ecosystems and agriculture management.

The session is intended to give an overview of all of the deployed assets in the region (space-based and in-situ), the data and information systems used to assemble information into products and services and the programmatic efforts in capacity building to prepare the societies to use the information optimally.

Case studies, success stories and user scenarios will illustrate how the information from the observing systems is transformed into decision support tools for use by policy makers as well as business. Recent examples, such as the Tsunami warning system being deployed in the Indian Ocean and the Pacific, illustrate this concept along with other programs on sea level, water quality, coastal inundation and sea ice. Transfer of the knowledge gleaned from observing systems is key in optimizing the response of communities to hazards. The session will present some of the cost benefit studies which illustrate the value of the information to the Nations' development.

Speakers/Panelists:

Mary Altalo (Ocean.US) and **Jay Pearlman** (Boeing)

Stimulating Interest in Ocean Engineering and Science-What Can MTS members do?

Thursday September 21, 1:15pm to 3:00pm, Room 112

The MTS leadership is actively engaged in highlighting science and technology education endeavors and encouraging members to participate as a means to stimulate interest in ocean science and engineering careers. Yet many do not know what opportunities exist or how to find the one that is right for their interests and time and schedule constraints.

This Special Focus Session will help MTS members identify the potential opportunities and which are likely to fit a member's interests and constraints. Two MTS members will highlight their experiences with education. How and why they became engaged; why they stay engaged; and the time and effort required to participate. They will also provide advice or guidance to those considering participation in an education endeavor.

In addition, individuals from the National Academy of Sciences' Center for Education, the science curriculum supervisor for the state of Texas, and a science curriculum supervisor for a school district in the northeastern US will highlight the many and diverse ways that practicing scientists and engineers can influence state and local learning standards and engage in education efforts in their communities. Each will highlight examples from their personal experiences and the critical role that scientists and engineers play in the success of their education efforts. Panel members will briefly describe their experiences and then answer questions and address issues posed by the audience.

Speakers/Panelists:

Jay Labov, National Academy of Sciences, Center for Education
Chis Castillo-Comer, Director of Science, Texas Education Agency
Northeastern U.S. school district science curriculum supervisor
Ron Raymond, Spectrum Offshore and a female ocean engineer

Message from the Student Chair

To foster development of the next generation of ocean engineers and scientists, Oceans '06 MTS/IEEE Boston will host a student poster competition for undergraduate and graduate students who are majoring in the sciences and engineering and who are conducting research in the topic areas of the conference. This year's Student Poster Program had over 40 applicants and brings 24 students to Boston. Students from the US, Canada, Venezuela, France, Russia and the UK will be participating in this competition. This year, eight of the participants are women, and five of the participants are undergraduates. Student posters will be judged on their technical content, contribution to the field, their presentation of the data, and the student's ability to relay this information to the panel of judges. Judges are drawn from all sectors of the community including academia, industry, military and research laboratories. These students represent some of the best and brightest studying in ocean related fields.

The program kick-off event will be Tuesday morning at breakfast. The students will be briefed on the schedule for the poster program and get a chance to meet each other and ask questions. During Tuesday and Wednesday students will stand by their posters during the breaks between sessions, so that they can engage with scientists and vendors and answer questions about their research. We hope that everyone will visit the posters and ask many questions!

New this year is the addition of a Poster Précis will allow students a brief opportunity to present a concise overview of their project in 2-3 slides to the judges panel and wider conference audience. We hope that all conference attendees will consider coming to this session to support our students.

We are extremely grateful to our sponsors, especially the continued support from Dr. Frank Herr and the Office of Naval Research, and for the first time this year, support from the National Science Foundation's Dr. Michael Plesniak, CTS Fluid Dynamics Division, and Lisa Rom, Ocean Sciences Division. Their generous financial support has allowed us to pay full registration and housing for all students participating in this program, as well as offer travel awards to offset transportation costs to and from Boston. The program encourages both undergraduate and graduate students to participate.

I am looking forward to meeting all of the student participants and learning about the exciting work they have been doing. See you all in Boston!

Sincerely,

Alexandra H. Techet, Ph.D.
Student Program Chair
OCEANS '06 MTS/IEEE Boston

Technical Sessions at a Glance

Tuesday, September 19, 2006

Time	Room	Topic
8:00am - 9:45am	Ballroom B	Plenary Session: Ocean Observation System
10:15am - 12:00 pm	101	Acoustic Telemetry and Communications: Applications
	102	SAS I: Buried and Proud Objects/Littoral Applications
	103	Cables, Connectors and Power
	104	Aquaculture 1
	107	Sound Propagation, Scattering and Noise
	108	Student Poster Presentations
	109	Ocean Color
	110	Offshore Structures
	111	Exhibitor Product Showcase 1: Canadian Showcase
	112	Regional Initiatives in Ocean Observing Systems
1:15pm - 3:00pm	101	Acoustic Communications: MIMO and Time Reversal
	102	SAS II: AUV Applications
	103	UUV, AUV, ROV I
	104	Aquaculture II
	106	Architecture and Systems Engineering for Ocean Observing Systems
	107	AUV Swarms and Distributed Sensor Processing I
	108	Automatic Control I
	109	Optics I
	110	Marine Life and Ecosystems I
	111	Exhibitor Product Showcase 2: Oceanographic Instrumentation I
	112	Ocean Observing Systems I
3:30pm - 5:15pm	101	Acoustic Communications: Processing Methods
	102	E&M Sensing
	103	UUV, AUV, ROV II
	104	Buoy Technology I
	107	AUV Swarms and Distributed Sensor Processing II
	108	Automatic Control II
	109	Optics II
	110	Marine Life and Ecosystems II
	111	Exhibitor Product Showcase 3: Sonar Systems
	112	Panel Session: A Description and Discussion of the major Earth and Ocean Observing Initiatives (GEOSS, IEOS, GOOS, IOOS, OOI)

Wednesday September 20, 2006

Time	Room	Topic
8:00 am -9:45 am	Ballroom B	Plenary Session: Revolutionizing Marine Technology
8:15am - 10:00am	111	Exhibitor Product Showcase 4: Data Processing Systems
10:15am -12:00pm	101	Seafloor Characterization and Rough Surface Scattering
	102	Data Fusion
	103	Acoustic Measurement and Inversion with AUVs
	104	Buoy Technology II
	106	Standards and Protocols for Ocean Observing Systems
	109	Optics III
	111	Exhibitor Product Showcase 5: Ocean Instrumentation II
	112	Ocean Observing Systems II

1:15pm - 3:00pm	101	Active Sonar I: Clutter Characterization
	104	Ropes and Tension Members
	106	Global Observatories
	107	Sonar Calibration I
	108	Sonar Classification and Pattern Recognition
	109	Airborne and Satellite Radar/Meteorology I
	110	Pollution Monitoring
	111	Exhibitor Product Showcase 6: Underwater and Surface Vehicles
	112	Coastal Observatories I
3:30pm - 5:15pm	101	Active Sonar II: Processing
	102	Underwater Acoustics & Acoustical Oceanography
	103	UUV, AUV, ROV III
	104	Oceanographic Instrumentation
	107	Sonar Calibration II
	108	Acoustic Navigation and Localization
	109	Airborne and Satellite Radar/Meteorology II
	110	Ocean Observation in Education and Outreach
	111	Exhibitor Product Showcase 7: Moorings and Hardware
	112	Panel Session: International Developments in GOOS and its Regional Initiatives (GEOSS)

Thursday, September 21

Time	Room	Topic
8:00 am -9:00 am	Ballroom B	Plenary Session: Marine Technology—Looking Back, Looking Ahead
8:00am - 9:45am	102	Environmentally Adaptive Signal Processing
	103	UUV, AUV, ROV IV
	104	Current Measurement
	106	Transitioning Ocean Observing Systems from Research to Operations
	107	Marine Mammal DCL I
	108	Channel Characterization for Acoustic Communications
	109	Imaging I
	110	Education and Outreach I
	111	Exhibitor Product Showcase 8: Open Topic
	112	Coastal Observatories II
10:15am - 12:00pm	101	Passive Sonar Tracking
	102	Vector Sensor Arrays and Processing I
	103	UUV, AUV, ROV V
	104	Oceanographic Sensors I
	106	Information Processing
	107	Marine Mammals DCL II
	108	Advanced Signal Processing Methods I
	109	Imaging II
	110	Education and Outreach II
	111	Exhibitor Product Showcase 9: MOTN Companies General Meeting
	112	Coastal Observatories III
1:15pm - 3:00pm	101	Active Sonar Tracking
	102	Passive Sonar Array Processing
	103	Structures/Mechanical Engineering
	104	Oceanographic Sensors II
	107	Acoustic Modeling
	108	Advanced Signal Processing Methods II
	109	Imaging III
	110	Education and Outreach III
	111	Exhibitor Product Showcase 10: Open Topic Session
	112	Panel Session: Stimulating Interest in Ocean Engineering and Science—What Can MTS Menbers Do?

Technical Sessions

Tuesday, September 19

TUESDAY 8:00AM – 9:45PM

Plenary Session: Ocean Observation Systems

Ballroom B
Tuesday September 19 (8:00AM - 9:45AM)

Presenters:
Dr. Richard Spinrad
Dr. Margaret Leinen
Dr. Jose Achache

TUESDAY 10:15AM – 12:00PM

Acoustic Telemetry and Communications: Applications

Meeting Room 101
Tuesday, September 19 (10:15AM - 12:00PM)

Co-Chairs: **Keith Davidson**, APL-UW
Geoffrey Edelson, BAE Systems

The PLUSNet Underwater Communications System: Acoustic Telemetry for Undersea Surveillance

Matthew Grund, Woods Hole Oceanographic Institution
Lee Freitag, Woods Hole Oceanographic Institution
James Preisig, Woods Hole Oceanographic Institution
Keenan Ball, Woods Hole Oceanographic Institution

Remote, Aerial, Trans-Layer, Linear and Non-Linear Downlink Underwater Acoustic Communication

Fletcher Blackmon, Naval Undersea Warfare Center, Division Newport
Lynn Antonelli, Naval Undersea Warfare Center, Division Newport

Design and Development of a Software-Defined Underwater Acoustic Modem for Sensor Networks for Environmental and Ecological Research

Tricia Fu, University of California Santa Barbara
Daniel Doonan, University of California Santa Barbara
Christopher Utley, University of California Santa Barbara
Ronald Iltis, University of California Santa Barbara
Ryan Kastner, University of California Santa Barbara
Hua Lee, University of California Santa Barbara

Modeling and Interpretation of beamforming gain and diversity gain for underwater acoustic communications

T.C. Yang, U.S. Naval Research Laboratory

SAS I: Buried and Proud Objects/ Littoral Applications

Meeting Room 102
Tuesday, September 19 (10:15AM - 12:00PM)

Co-Chairs: **Kerry Commander**
Daniel Sternlicht, Applied Signal Technology

Imaging Performance of BOSS Using SAS Processing

Steven Schock, Florida Atlantic University
James Wulf, Florida Atlantic University
Jason Sara, Edgetech

Buried Object Classification using a Sediment Volume Imaging SAS and Electromagnetic Gradiometer

Daniel Sternlicht, Applied Signal Technology
J. Harbaugh, Applied Signal Technology
Anjana Shah, Applied Signal Technology
Michael Webb, Applied Signal Technology
Richard Holtzapple, Naval Surface Warfare Center Panama City

Towards multi-frequency imaging and analysis of sub-surface targets using SAS

Mark Noonchester, University of Canterbury
Peter Gough, University of Canterbury
Michael Hayes, University of Canterbury
Alan Hunter, Acoustics Research Group, Department of Electrical and Computer Engineering, Universtiy of Canterbury

Advances in high-frequency active sonars for countering asymmetric threats in littoral waters

Brian Ferguson, Defence Science and Technology Organisation, Australia
Kam Lo, Defence Science and Technology Organisation, Australia
Ron Wyber, Midspar Systems

Cables, Connectors, and Power

Meeting Room 103
Tuesday, September 19 (10:15AM - 12:00PM)

Co-Chairs: **Liz Creed**, OASIS Inc.
Kenichi Asakawa, Japan Agency for Marine-Earth Science and Technology

Current and Future Wet-Mate Connector Technology Developments for Scientific Seabed Observatory Applications

Howard Painter, Ocean Design, Inc.
John Flynn, Ocean Design, Inc.

Power Storage and Conversion From an Ocean Microbial Energy Source

Lance McBride, Monterey Bay Aquarium Research Institute
Peter Girguis, Harvard University
Claire Reimers, Oregon State University

Advances in Undersea Power Distribution

John Yeago, General Dynamics Advanced Information Systems, Inc.
David Macchiarolo, General Dynamics Advanced Information Systems, Inc.

Power Supply System for Toyohashi Cabled Observatory with Wide Input-range

Kenichi Asakawa, Japan Agency for Marine-Earth Science and Technology
Takashi Yokobiki, Japan Agency for Marine-Earth Science and Technology
Tada-nori Goto, Japan Agency for Marine-Earth Science and Technology
Kazuhiko Furukawa, Intertechno Ltd.
Atsushi Yamaguchi, Scitec Inc.
Koichi Tazaki, Scitec Inc.

Aquaculture I

Meeting Room 104
Tuesday, September 19 (10:15AM - 12:00PM)

Co-Chairs: **James Irish**, Woods Hole Oceanographic Institution
David Fredriksson, United States Naval Academy

Compact Buoy System for Scallop Cultivation Using Sensor Network Technologies

Masaaki Wada, Future University-Hakodate
Katsumori Hatanaka, Hokkaido Tokai University
Masashi Toda, Future University-Hakodate

Aquaculture Feed Buoy Control - Part 1: System Controller

Stanley Boduch, University of New Hampshire
James Irish, Woods Hole Oceanographic Institution

Aquaculture Feed buoy Control - Part 2: Telemetry, Data Handling and Shore-Based Control

James Irish, Woods Hole Oceanographic Institution
Stanley Boduch, University of New Hampshire

Engineering Overview of the University of New Hampshire?s Open Ocean Aquaculture Project

Barbaros Celikkol, University of New Hampshire
Judson DeCew, University of New Hampshire
Kenneth Baldwin, University of New Hampshire
Stanley Boduch, University of New Hampshire
Michael Chambers, University of New Hampshire
David Fredriksson, United States Naval Academy
James Irish, Woods Hole Oceanographic Institution
Oystein Patursson, University of New Hampshire
Glen Rice, University of New Hampshire
M. Swift, University of New Hampshire
Igor Tsukrov, University of New Hampshire
Chad Turmelle, University of New Hampshire

Design of a 20-Ton Capacity Finfish Aquaculture Feeding Buoy

Chad Turmelle, University of New Hampshire
M. Swift, University of New Hampshire
Barbaros Celikkol, University of New Hampshire
Michael Chambers, University of New Hampshire
Judson DeCew, University of New Hampshire
David Fredriksson, United States Naval Academy
Glen Rice, University of New Hampshire
Kurt Swanson, Ocean Spar LLC

Sound Propagation, Scattering, and Noise

Meeting Room 107
Tuesday, September 19 (10:15AM - 12:00PM)

Co-Chairs: **William Carey**, Boston University
Archie Morrison III, Nobska Development, Inc.

Analytical solution for guided waves in a canonical model of shallow water with a thermocline

Allan Pierce, Boston University
William Carey, Boston University
William Siegmann, Rensselaer Polytechnic Institute
Stephen Kaczkowski, Rensselaer Polytechnic Institute
Wendy Saintval, Rensselaer Polytechnic Institute

Sensitivity of modal attenuation coefficients to environmental parameters

Wendy Saintval, Rensselaer Polytechnic Institute
William Carey, Boston University
Jason Holmes, Boston University
Allan Pierce, Boston University
William Siegmann, Rensselaer Polytechnic Institute

Shipping noise and whales: World tallest ocean liner vs largest animal on earth

Yvan Simard, ISMER/Université du Québec
Nathalie Roy, Maurice-Lamontagne Institute
Cédric Gervaise, ENSIETA

Statistical Analysis of Sound Transmission Results Obtained on the New Jersey Continental Slope

Simona Dediu, Rensselaer Polytechnic Institute
William Carey, Boston University
William Siegmann, Rensselaer Polytechnic Institute

Poster Presentation

Meeting Room 108
Tuesday, September 19 (10:15AM - 12:00PM)

Co-Chairs: **Alexandra Techet**, Massachusetts Institute of Technology
Vince Premus, OASIS Inc.

Micro Autonomous Underwater Vehicle Concept for Distributed Data Collection

Daniel Walker, Massachusetts Institute of Technology

Factor Analysis for Ocean Seismic Remote Sensing

Zhenhai Wang, University of Massachusetts Dartmouth, SMAST

Prototype of a Stereoscopic Vision System to Improve Image Quality in Turbid Waters During Underwater Inspections

Rogelio Morales, Universidad Central de Venezuela
Demian Pereira, Universidad Central de Venezuela
High spatial-resolution monitoring of surface CO2 concentrations in Lake Michigan
Joshua Zagorski, University of Wisconsin - Milwaukee Great Lakes WATER Institute
Harvey Bootsma, University of Wisconsin - Milwaukee Great Lakes WATER Institute

The Pipeline Identification Method Basing on AUV's Echo-Sounder Data

Alexander Pavin, Institute of Marine Technology Problems, Russian Academy of Sciences, Far East Branch

Effects of Multiple Scattering on an Underwater Wireless Optical Communications Link

Brandon Cochenour, Naval Air Systems Command / Johns Hopkins University
Linda Mullen, Naval Air Systems Command
Alan Laux, Naval Air Systems Command
Tom Curran, Naval Air Systems Command

Development of An Integrated Acoustical-Optical Platform for Detecting Groundfish

Jiaming Zhang, University of Massachusetts Dartmouth, Electrical and Computer Engineering Department
Zhenhai Wang, University of Massachusetts Dartmouth, Electrical and Computer Engineering Department
Ernest Bernard, University of Massachusetts Dartmouth, SMAST
Christopher Jakubiak, University of Massachusetts Dartmouth, SMAST
Jennifer Miksis-Olds, University of Massachusetts Dartmouth, SMAST

Design of an ROV to Compete in the 5th Annual MATE ROV Competition and Beyond

Heather Brundage, Massachusetts Institute of Technology
Lauren Cooney, Massachusetts Institute of Technology
Edward Huo, Massachusetts Institute of Technology
Harry Lichter, Massachusetts Institute of Technology
Olayemi Oyebode, Massachusetts Institute of Technology
Pranay Sinha, Massachusetts Institute of Technology
Michael Stanway, Massachusetts Institute of Technology
Thaddeus Stefanov-Wagner, Massachusetts Institute of Technology
Kurt Stiehl, Massachusetts Institute of Technology
Daniel Walker, Massachusetts Institute of Technology

A Software Framework for an Integrated Observing System

Jesse Kipp, University of Wisconsin - Milwaukee Great Lakes WATER Institute
Thomas Hansen, University of Wisconsin - Milwaukee Great Lakes WATER Institute

An Inexpensive Underwater Multi-Point Temperature System

Korey Verhein, University of Wisconsin - Milwaukee Great Lakes WATER Institute
Robert Paddock, University of Wisconsin - Milwaukee Great Lakes WATER Institute

Design of an Acoustic-Homing Autonomous Surface Vessel

Lauren Cooney, Massachusetts Institute of Technology
Michael Stanway, Massachusetts Institute of Technology
Peteris Augenbergs, Massachusetts Institute of Technology
Heather Brundage, Massachusetts Institute of Technology
Bridget Downey, Massachusetts Institute of Technology
Timothy Pennington, Massachusetts Institute of Technology
Thaddeus Stefanov-Wagner, Massachusetts Institute of Technology
David Tobias, Massachusetts Institute of Technology

Optimal image blending for underwater mosaics

Fan Gu, University of New Hampshire
Yuri Rzhanov, University of New Hampshire

Passive Acoustic Detection of Divers Under Strong Interference

Xiaoling Chen, Stevens Institute of Technology
Rensheng Wang, Wireless Network Security Center
Uf Tureli, Stevens Institute of Technology

Acoustic Seabed Classification using Fractional Fourier Transform and Time-Frequency Transform Techniques

Madalina Barbu, University of New Orleans
Edit Kaminsky, University of New Orleans
Russell Trahan, Jr., University of New Orleans

Hydrodynamic testing of a Vectored-Thruster Propelled UUV

Lloyd Ackermann, Florida Atlantic University - Seatech
Karl von Ellenrieder, Florida Atlantic University

Size Spectrum of Suspended Particulate Matter in the Bohai Sea

Zhipeng Sun, Harvard University
Wensheng Jiang, Ocean University of China

AUV Propellers: Optimal Design and Improving Existing Propellers for Greater Efficiency

Kathryn D'Epagnier, Woods Hole Oceanographic Institution

Experimental investigation of internal tide generation by two-dimensional topography

Paula Echeverri, Massachusetts Institute of Technology
Thomas Peacock, Massachusetts Institute of Technology

An Automated Morphological Image Processing Based Methodology for Quantifying Coral Cover in Deeper Reef Zones

Jeffrey Kaeli, Virginia Polytechnic Institute and State University
Hanumant Singh, Woods Hole Oceanographic Institution
Roy Armstrong, University of Puerto Rico

Small Diameter Ducted Contrarotating Propulsor for Marine Robots

Michael Stanway, Massachusetts Institute of Technology
Thaddeus Stefanov-Wagner, Massachusetts Institute of Technology

Near shore wireless communication system for sensor buoys

Andy Schneider, University of Wisconsin - Milwaukee Great Lakes WATER Institute

Modeling the Operation and Maintenance Cost of Large Scale Tidal Current Turbine Farm

Ye Li, University of British Columbia
Keith Florig, Carnegie Mellon University

A contribution to the problem of mapping seabed transition zones

Laure Amate, I3S UNSA-CNRS
Maria-João Rendas, I3S UNSA-CNRS

Seismic shape parameters estimation and ground-roll suppression using vector-sensor beamforming

Daniela Donno, Politecnico di Milano
Arye Nehorai, Washington University St. Louis
Umberto Spagnolini, Politecnico di Milano

Ocean Color

Meeting Room 109
Tuesday, September 19 (10:15AM - 12:00PM)

Co-Chairs: **Hui Feng**, Ocean Process Analysis Lab, University of New Hampshire
Alexander Gilerson, City College of the City University of New York

Near-Real-Time Global Sea Ice Concentration from Spaceborne Passive Microwave Sensors

SiriJodha Khalsa, National Snow and Ice Data Center
Walter Meier, National Snow and Ice Data Center

Impact of particulate scattering in coastal waters on reflectance spectra: simulations and Chesapeake Bay measurements

Alexander Gilerson, City College of the City University of New York
Jing Zhou, City College of the City University of New York
Marco Vargas, City College of the City University of New York
Barry Gross, City College of the City University of New York
Samir Ahmed, City College of the City University of New York
Fred Moshary, City College of the City University of New York

Satellite ocean color and aerosol data validation at Martha's Vineyard Coastal Observatory

Hui Feng, Ocean Process Analysis Lab, University of New Hampshire
Ru Morrison, OPAL, University of New Hampshire
Heidi Sosik, Woods Hole Oceanographic Institution
Doug Vandemark, OPAL, University of New Hampshire

Estimation of Ocean Water Chlorophyll-a Concentration Using Computational Intelligence

Habtom Ressom, Georgetown University
Kevin Turner, University of Maine
Mohamad Musavi, University of Maine

Offshore Structures

Meeting Room 110
Tuesday, September 19 (10:15AM - 12:00PM)

Co-Chairs: **Peter Marshall**, MHP Systems Engineering
Thomas Goreau, Global Coral Reef Alliance

Assessing Laboratory and Field Measurements for Design

John Niedzwecki, Texas A&M University

Interdisciplinary Aspects of Cost-Risk Tradeoffs

Peter Marshall, MHP Systems Engineering

Application of Computational Fluid Dynamics to Research Vessel Design

S. Kumar, The Glosten Associates, Inc.

Design of Coastal Research Vessel with Low Radiated Noise Signature

David Bonney, Bay Marine, Inc.
Michael Bahtiarian, Noise Control Engineering

Exhibitor Product Showcase 1: Canada Showcase

Meeting Room 111
Tuesday, September 19 (10:15AM - 12:00PM)

This is an opportunity to witness a dynamic showcase of new technologies and the latest in ocean science projects under development in Canada. Eight presentations by Canadian companies and marine organizations will be presented, including the evolving world of renewable ocean energy.

Chair: **Clayton Burry**, Director, Industry Development, CCMC, St. John's, Newfoundland and Labrador

Discover Multi-electronique

Jacques St. Pierre, Multi-Electronique (MTE) Inc., Rimouski, Québec; custom marine electronic equipment

RBR Ltd: A major presence in the world oceanographic market

Bart Geleynse, RBR Ltd., Ottawa, Ontario; manufacturer of precision instruments for oceanography, limnology, and cryospheric studies

Simulation and real time visualization systems

Stephen Dodd, GRI Simulations Inc., St. John's, Newfoundland and Labrador

Data collection and telemetry products for environmental scientific research requirements

Paul Hill, Xeos Technologies Inc., Bedford, Nova Scotia

Developer of marine and hydrographic software; 'Ping-to-Chart' solutions

Jeremy Nicholson, CARIS, Fredericton, New Brunswick; marine and hydrographic software; 'Ping-to-Chart' solutions

Feet Wet Security Applications

Deron Johnston, Deep Development Corp., Abbotsford, British Columbia; land and submersible high resolution digital video recorders

OPTIDE Software: Using the Tides to Optimize Ship Transit

Anjuna Langevin, Maritime Innovation, Rimouski, Québec

Canada's place in the world of renewable energy

Chris Campbell, Ph D., Ocean Renewable Energy Group, Nanaimo, British Columbia

Regional Initiatives in Ocean Observing Systems

Meeting Room 112
Tuesday, September 19 (10:15AM - 12:00PM)

Chair: **Ann Jochens, Texas A&M University**

Design and Implementation of a Regional Association for the Gulf of Mexico Coastal Ocean Observing System

Ann Jochens, Texas A&M University

COOS to COOPS: On Coastal Ocean Systems and Coupled Architectures, Products and Services: Morphing from Observations to Predictions

Leonard Pietrafesa, North Carolina State University
Margaret Davidson, National Oceanic and Atmospheric Administration
Tom Karl, NCDC
Madilyn Fletcher, Baruch Institute
Dave Dickey, North Carolina State University
Earle Buckley, North Carolina State University
Lian Xie, North Carolina State University
Mauchaun Peng, North Carolina State University
Shauwu Bao, North Carolina State University

Huigin Lui, North Carolina State University
Jeff Kinder, North Carolina State University
John Bichy, North Carolina State University
Ted Dodson, North Carolina State University
Jim Epps, North Carolina State University
Don Stanfield, North Carolina State University
Charles Gabriel, North Carolina State University

Information Management in the Southeast Atlantic Coastal Ocean Observing System: a Regional Approach

Madilyn Fletcher, University of South Carolina
Dwayne Porter, University of South Carolina
Jeremy Cothran, University of South Carolina
Harvey Seim, University of North Carolina

NEPTUNE Canada Instruments Interface Requirements

Benoît Pirenne, NEPTUNE Canada
Paul Hansen, University of Victoria, NEPTUNE project

A Regional HF Radar Pilot Product: Serving IOOS needs in the Mid-Atlantic Bight

Josh Kohut, Rutgers University

TUESDAY 1:15PM – 3:00PM

Acoustic Communications: MIMO and Time Reversal

Meeting Room 101
Tuesday, September 19 (1:15PM - 3:00PM)

Co-Chairs: **Jim Preisig**
Weichang Li, Woods Hole Oceanographic Institution

Error Rate Improvement in Underwater MIMO Communications Using Sparse Partial Response Equalization

Subhadeep Roy, Arizona State University
Tolga Duman, Arizona State University
Vincent McDonald, Space and Naval Warfare Systems Center San Diego

MIMO multi-access passive time reversal communications

Hee-Chun Song, Marine Physical Laboratory, Scripps Institution of Oceanography
William Hodgkiss, Marine Physical Laboratory, Scripps Institution of Oceanography
William Kuperman, Marine Physical Laboratory, Scripps Institution of Oceanography
Tuncay Akal, Marine Physical Laboratory, Scripps Institution of Oceanography
Mark Stevenson, Naval Undersea Systems Center

Iterative reception for acoustic underwater MIMO communications

Magnus Lundberg, Swedish Defence Research Agency
Tommy Öberg, Swedish Defence Research Agency

Underwater Acoustic Communications with Multi-Carrier Modulation

Andrey Morozov, Woods Hole Oceanographic Institution
James Preisig, Woods Hole Oceanographic Institution

Joint Passive Time Reversal and Multichannel Equalization for Underwater Communications

Joao Gomes, ISR - Instituto Superior Tecnico
Sergio Jesus, SiPLAB - Universidade do Algarve
Antonio Silva, SiPLAB - Universidade do Algarve

SAS II: AUV Applications

Meeting Room 102
Tuesday, September 19 (1:15PM - 3:00PM)

Co-Chairs: **Daniel Sternlicht**, Applied Signal Technology
Kerry Commander

Passive synthetic aperture processing with an autonomous underwater vehicle towed hydrophone array

Jason Holmes, Boston University
Edmund Sullivan, EJS Consultants
William Carey, Boston University

Results from a Small Synthetic Aperture Sonar

Daniel Brown, Naval Surface Warfare Center Panama City
Jose Fernandez, Naval Surface Warfare Center Panama City
Daniel Cook, Naval Surface Warfare Center Panama City

Effect of Approximations in Fast Factorised Backprojection in Synthetic Aperture Imaging of Spot Regions

Hayden Callow, Forsvarets forskningsinstitutt
Roy Hansen, Forsvarets forskningsinstitutt
Torstein Saeboe, Forsvarets forskningsinstitutt

12.75" Synthetic Aperture Sonar, High Resolution and Automatic Target Recognition

Anthony Matthews, Naval Surface Warfare Center Panama City
Thomas Montgomery, Applied Research Laboratory/Penn State University
John Oeschger, Naval Surface Warfare Center Panama City
Daniel Cook, Naval Surface Warfare Center Panama City
John Stroud, Naval Surface Warfare Center Panama City

UUV, AUV, ROV I

Meeting Room 103
Tuesday, September 19 (1:15PM - 3:00PM)

Co-Chairs: **Justin Manley**, Battelle/NOAA Office of Ocean Exploration
Barbara Fletcher, Space and Naval Warfare Systems Center San Diego

NOAA's AUV Vision: Status and Opportunities

Justin Manley, Battelle/NOAA Office of Ocean Exploration

Preliminary Sea-trial of Deep-sea Unmanned Underwater Vehicles, HEMIRE and HENUVY

Pan-Mook Lee, MOERI-KORDI
Bong-Huan Jun, MOERI-KORDI
Hyun Choi, MOERI-KORDI
Chong-Moo Lee, MOERI-KORDI
Ji-Hong Li, MOERI-KORDI
Kihun Kim, MOERI-KORDI
Seok-Won Hong, MOERI-KORDI
Yong-Kon Lim, MOERI-KORDI

Development of UUV Standards, an Emerging Trend

John Lambert, Science Applications International Corporation
Pat Picariello, ASTM International
Justin Manley, Battelle/NOAA Office of Ocean Exploration

MMT 3000 - Small AUV of New Series of IMTP FEB RAS

Alexander Scherbatyuk, Institute of Marine Technology Problems, Russian Academy of Sciences, Far East Branch
Vitaly Gornak, Institute of Marine Technology Problems, Russian Academy of Sciences, Far East Branch
Alexander Inzartsev, Institute of Marine Technology Problems, Russian Academy of Sciences, Far East Branch
Oleg Lvov, Institute of Marine Technology Problems, Russian Academy of Sciences, Far East Branch
Yuri Matvienko, Institute of Marine Technology Problems, Russian Academy of Sciences, Far East Branch

Aquaculture II

Meeting Room 104
Tuesday, September 19 (1:15PM - 3:00PM)

Co-Chairs: **James Irish**, Woods Hole Oceanographic Institution
David Fredriksson, United States Naval Academy

A field study to understand the currents and loads of a near shore finfish farm

David Fredriksson, United States Naval Academy
Judson DeCew, University of New Hampshire
James Irish, Woods Hole Oceanographic Institution

Practical Applications of Numerical Modeling using AquaFE: A Case Study

Judson DeCew, University of New Hampshire
Barbaros Celikkol, University of New Hampshire
Glen Rice, University of New Hampshire
Igor Tsukrov, University of New Hampshire

Modeling flow through and around a net panel using computational fluid dynamics software.

Oystein Patursson, University of New Hampshire
M. Swift, University of New Hampshire
Igor Tsukrov, University of New Hampshire
Kenneth Baldwin, University of New Hampshire
Knud Simonsen, University of the Faroe Islands

Tow Test Results of an AquaPod Fish Cage

Judson DeCew, University of New Hampshire
Steve Page, Ocean Farm Technologies Inc.
Chad Turmelle, University of New Hampshire
James Irish, Woods Hole Oceanographic Institution

Are All Floating Structures Vessels?: An Analysis of the U.S. Supreme Court's Holding in Steward v. Dutra Construction Company

Stephanie Showalter, Sea Grant Law Center

Architecture and Systems Engineering for Ocean Observing Systems

Meeting Room 106
Tuesday, September 19 (10:15AM - 12:00PM)

Co-Chairs: **Stuart Williams**, JOI
Caroll Hood, Raytheon

Managing IOOS Development with Today's Systems Engineering Approach

Robert Vorthman, Mitretek Systems, Inc.
John Linn, Mitretek Systems, Inc.
Fred Klein, Mitretek Systems, Inc.

The SCOOP Service-Oriented Architecture for Ocean Observing and Prediction

Philip Bogden, Southeastern Universities Research Association
Helen Conover, University of Alabama Huntsville
Gerald Creager, Texas A&M University

Larry Flournoy, Texas A&M University
Gabrielle Allen, Louisiana State University
Brian Blanton, University of North Carolina Chapel Hill
Hans Graber, University of Miami
Sara Graves, University of Alabama Huntsville
Rick Leuttich, University of North Carolina Chapel Hill
Greg Stone, Louisiana State University
William Perrie, Bedford Institute of Oceanography
Peter Sheng, University of Florida
Harry Wang, Virginia Institute of Marine Science
Wei Zhao, Texas A&M University

Enterprise Architecture as a Tool of Navy METOC Transformation

John Lever, Naval Meteorology and Oceanography Command
Bruce Gritton, Naval Meteorology and Oceanography Command

Ocean Observing Systems: Vision and Details

Eugene Massion, Monterey Bay Aquarium Research Institute

Issues in Data Management in Observing Systems and Lessons Learned

Kevin Gomes, Monterey Bay Aquarium Research Institute
John Graybeal, Monterey Bay Aquarium Research Institute
Thomas O'Reilly, Monterey Bay Aquarium Research Institute

AUV Swarms and Distributed Sensor Processing I

Meeting Room 107
Tuesday, September 19 (1:15PM - 3:00PM)

Co-Chairs: **Jeff Krolik**, Duke University
Claude Brancart, IEEE/Oceanic Engineering Society

Orientation Diversity for an Autonomous Underwater Vehicle Cluster

Samuel Smith, ProSapien LLC
Jeffery Krolik, Duke University

Adaptive Acoustical-Environmental Assessment for the Focused Acoustic Field-05 At-sea Exercise

Ding Wang, Massachusetts Institute of Technology
Pierre Lermusiaux, Harvard University
Patrick Haley, Harvard University
Wayne Leslie, Harvard University
Henrik Schmidt, Massachusetts Institute of Technology

Path Planning Methods for Adaptive Sampling of Environmental and Acoustical Ocean Fields

Namik Yilmaz, Harvard University
Nicholas Patrikalakis, Massachusetts Institute of Technology
Pierre Lermusiaux, Harvard University
Constantinos Evangelinos, Massachusetts Institute of Technology
Henrik Schmidt, Massachusetts Institute of Technology
Patrick Haley, Harvard University
Wayne Leslie, Harvard University
Ding Wang, Massachusetts Institute of Technology
Allan Robinson, Harvard University

An Intentional Framework for Communication Between Multiple AUVs

Kaylani Merrill, Center for Intelligent Systems Research, University of Idaho
Michael O'Rourke, Center for Intelligent Systems Research, University of Idaho
Dean Edwards, Center for Intelligent Systems Research, University of Idaho

Adaptive Collaborative Array Trajectories for Optimum Passive Detection

Granger Hickman, Duke University
Jeffrey Krolik, Duke University

Automatic Control I

Meeting Room 108
Tuesday, September 19 (1:15PM - 3:00PM)

Co-Chairs: **Stephen Martin**, Johns Hopkins University
Charmane Caldwell, FAMU/FSU College of Engineering

Subsumption Architecture for Fluid-Advected Chemical Plume Tracing with Soft Obstacle Avoidance

Wei Li, Department of Computer Science, California State University, Bakersfield
Donald Carter, Department of Computer Science, California State University, Bakersfield

Development of a Guidance System for Autonomous Underwater Vehicle Chemical Plume Tracing

Shuo Pang, Embry-Riddle Aeronautical University

Line of Sight Guidance with Intelligent Obstacle Avoidance for Autonomous Underwater Vehicles

Xiaoping Wu, Shanghai Jiao Tong University
Zhengping Feng, Shanghai Jiao Tong University
Jimao Zhu, Shanghai Jiao Tong University
Robert Allen, University of Southampton

Mission Controller for High Level Control of Autonomous and Semi-Autonomous Vehicle Operation

Stephen Martin, Johns Hopkins University
Louis Whitcomb, Johns Hopkins University
Dana Yoerger, Woods Hole Oceanographic Institution
Hanumant Singh, Woods Hole Oceanographic Institution

Optics I

Meeting Room 109
Tuesday, September 19 (1:15PM - 3:00PM)

Co-Chairs: **Sheri White**, Woods Hole Oceanographic Institution
Philip McGillivary, US Coast Guard Icebreakers

Optical Modem Technology for Seafloor Observatories

Norman Farr, Woods Hole Oceanographic Institution
Alan Chave, Woods Hole Oceanographic Institution
Lee Freitag, Woods Hole Oceanographic Institution
James Preisig, Woods Hole Oceanographic Institution
Sheri White, Woods Hole Oceanographic Institution
Dana Yoerger, Woods Hole Oceanographic Institution
Frederick Sonnichsen, Woods Hole Oceanographic Institution

A Model for Simulation of a Pulsed Laser Line Scan System

Joseph Shirron, Metron, Inc.
Thomas Giddings, Metron, Inc.

Laser Navigational Ranges

Gennady Kaloshin, Institute of Atmospheric Optics, Russian Academy of Sciences

Target-referenced Localization of an Underwater Vehicle using a Laser-based Vision System

George Karras, National Technical University of Athens
Dimitra Panagou, National Technical University of Athens
Kostas Kyriakopoulos, National Technical University of Athens

Marine Life and Ecosystems I

Meeting Room 110
Tuesday, September 19 (1:15PM - 3:00PM)

Co-Chairs: **Richard Thorne**, Prince William Sound Science Center
Gary Thomas, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami

Development of a Towed Survey System for Deployment by the Fishing Industry

Jonathan Howland, Woods Hole Oceanographic Institution
Scott Gallager, Woods Hole Oceanographic Institution
Lane Abrams, Woods Hole Oceanographic Institution
Andrew Girard, Woods Hole Oceanographic Institution
Hanumant Singh, Woods Hole Oceanographic Institution
Richard Taylor, www.seascallop.com
Norman Vine, Independent
Christopher Griner, Woods Hole Oceanographic Institution

Emerging Zoonoses in Marine Mammals and Seabirds in the Northeast US

Andrea Bogomolni, Woods Hole Oceanographic Institution

Using Numerical Modeling and Direct Observation to Investigate Hypoxia in a Shallow Wind-driven Bay

Mohammad Islam, Texas A&M University
James Bonner, Texas A&M University
Temitope Ojo, Texas A&M University
Cheryl Page, Texas Engineering Experiment Station

Computer-Assisted Analysis of Near-Bottom Photos for Benthic Habitat Studies

Vicki Lynn Ferrini, Woods Hole Oceanographic Institution
Hanumant Singh, Woods Hole Oceanographic Institution
M. Clarke, National Oceanic and Atmospheric Administration
Waldo Wakefield, National Oceanic and Atmospheric Administration
Keri York, National Oceanic and Atmospheric Administration

Combining passive and active underwater acoustics with video and laser optics to assess fish stocks

Gary Thomas, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami
Richard Thorne, Prince William Sound Science Center
Thomas Hahn, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami

Exhibitor Product Showcase 2: Oceanographic Instrumentation I

Meeting Room 111
Tuesday, September 19 (1:15PM - 3:00PM)

Chair: **Maggie Merrill, Marine Marketing Services**

New Solid State Submersible Active Flurorometer to Montitor Photosynthetic Parameters and Algal Biomass

Chelsea Donavan, Turner Designs,

Assembly and Testing of the Ice Tethered Profiler

Michael Mathewson, McLane Research Labs.

RealTime Acquisition of Current Profile Data from Two Remote Acoustic Doppler Current Profilers

Adam Lipper, Teledyne Benthos

Ocean Observing Systems I

Meeting Room 112
Tuesday, September 19 (1:15PM - 3:00PM)

Co-Chairs: **Alexandra Isern**, National Science Foundation
Andrew Clark, Ocean.US

The Ocean Observatories Initiative: Wiring the Ocean for Interactive Scientific Discovery

Alexandra Isern, National Science Foundation

The Bermuda Testbed Mooring and HALE-ALOHA Mooring Programs: Innovative Deep-Sea Global Observatories

Tommy Dickey, Ocean Physics Lab / UCSB
Grace Chang, Ocean Physics Lab / UCSB
Casey Moore, WET Labs, Inc.
Al Hanson, SubChem Systems, Inc
Dave Karl, University of Hawaii
Derek Manov, Ocean Physics Lab / UCSB
Frank Spada, Ocean Physics Lab / UCSB
Donald Peters, Woods Hole Oceanographic Institution
John Kemp, Woods Hole Oceanographic Institution
Oscar Schofield, Rutgers University
Scott Glenn, Rutgers University

Design and Construction of a Polar Remote Interactive Marine Observatory (PRIMO)

Vernon Asper, University of Southern Mississippi
Scott Gallager, Woods Hole Oceanographic Institution
Keith von der Heydt, Woods Hole Oceanographic Institution
Andrew Girard, Woods Hole Oceanographic Institution
Steven Lerner, Woods Hole Oceanographic Institution
Kenneth Peal, Woods Hole Oceanographic Institution
Glenn McDonald, Woods Hole Oceanographic Institution
Jay Sisson, Woods Hole Oceanographic Institution
Christopher Griner, Woods Hole Oceanographic Institution
Emily Miller, Woods Hole Oceanographic Institution

SCIMPI: A New Seafloor Observatory System

Kathryn Moran, University of Rhode Island
Charles Paull, Monterey Bay Aquarium Research Institute
Anne Trehu, Oregon State University
William Ussler, Monterey Bay Aquarium Research Institute
Eugene Massion, Monterey Bay Aquarium Research Institute
Stephen Farrington, Applied Research Associates, Inc.
Ralph Stephen, Woods Hole Oceanographic Institution

TUESDAY 3:30PM – 5:15PM

Panel Session: A Description and Discussion of the Major Earth and Ocean Observing Initiatives: (GEOSS, IEOS, GOOS, IOOS, OOI)

Meeting Room TBA
Tuesday September 19 (3:30PM - 5:15PM)

Speakers/Panelists:
(GEOSS) **Dr. Jose Achache**, Director, Secretariat of the Group on Earth Observations
(IEOS) **Mr. Ron Birk**, Director of Applied Sciences, NASA
(GOOS) **Dr. Mary Altalo**, Director, Ocean.US and Vice Chair of IGOOS
(IOOS) **Dr. Richard Spinrad**, Assistant Administrator for Ocean and Atmospheric Research, NOAA
(OOI) **Dr. Margaret Leinen**, Assistant Director of Geosciences, NSF

Acoustic Communications: Processing Methods

Meeting Room 101
Tuesday, September 19 (3:30PM - 5:15PM)

Co-Chairs: **Jim Preisig**
Weichang Li, Woods Hole Oceanographic Institution

Underwater communication link with iterative equalisation

Tommy Öberg, Swedish Defence Research Agency
Bernt Nilsson, Swedish Defence Research Agency
Niten Olofsson, Swedish Defence Research Agency
Magnus Lundberg, Swedish Defence Research Agency
Erland Sangfelt, Swedish Defence Research Agency

Pilot-tone based ZP-OFDM Demodulation for an Underwater Acoustic Channel

Baosheng Li, University of Connecticut
Shengli Zhou, University of Connecticut
Milica Stojanovic, Massachusetts Institute of Technology
Lee Freitag, Woods Hole Oceanographic Institution

Estimation and Equalization of Rapidly Varying Sparse Acoustic Communication Channels

Weichang Li, Woods Hole Oceanographic Institution
James Preisig, Woods Hole Oceanographic Institution

Low Complexity OFDM Detector for Underwater Acoustic Channels

Milica Stojanovic, Massachusetts Institute of Technology

A Sparse Kalman Filter with Application to Acoustic Communications Channel Estimation

Ronald Iltis, University of California Santa Barbara

E&M Sensing

Meeting Room 102
Tuesday, September 19 (3:30PM - 5:15PM)

Co-Chairs: **Paul Carroll**, Naval Surface Warfare Center Panama City
Roy Wiegert, Naval Surface Warfare Center Panama City

Assessment of an Active Electromagnetic Sensor for Hunting Buried Naval Mines, Part Ii

Paul Carroll, Naval Surface Warfare Center Panama City
William Wynn, Naval Surface Warfare Center Panama City
John Purpura, Naval Surface Warfare Center Panama City

Demonstration of the Real-Time Tracking Gradiometer for Buried Minehunting While Operating from a Small Unmanned Underwater Vehicle

Glenn Sulzberger, Naval Surface Warfare Center Panama City
John Bono, Naval Surface Warfare Center Panama City
George Allen, Naval Surface Warfare Center Panama City
Ted Clem, Naval Surface Warfare Center Panama City
Sankaran Kumar, GE Infrastructure Security

Portable Magnetic Gradiometer for Real-Time Localization and Classification of Unexploded Ordnance

Roy Wiegert, Naval Surface Warfare Center Panama City
John Oeschger, Naval Surface Warfare Center Panama City

Initial Buried Minehunting Demonstration of the Laser Scalar Gradiometer Operating Onboard Remus 600

Ted Clem, Naval Surface Warfare Center Panama City
David Overway, Naval Surface Warfare Center Panama City
Philip Davis, Naval Surface Warfare Center Panama City
Leon Vaizer, Naval Surface Warfare Center Panama City
John Bono, Naval Surface Warfare Center Panama City
Don King, Polatomic, Inc.
Andres Torres, Polatomic, Inc.
Thomas Austin, Woods Hole Oceanographic Institution
Roger Stokey, Woods Hole Oceanographic Institution
Gregory Packard, Woods Hole Oceanographic Institution

UUV, AUV, ROV II

Meeting Room 103
Tuesday, September 19 (3:30PM - 5:15PM)

Co-Chairs: **Ben Allen**, Woods Hole Oceanographic Institution
Daniel Stilwell, Virginia Polytechnic Institute and State University

Effects of Hull Length on the Hydrodynamic Loads on a Slender Underwater Vehicle during Manoeuvres

Christopher Williams, National Research Council Canada, Institute for Ocean Technology
Tim Curtis, Phoenix International, Inc.
J. Doucet, Oceanic Consulting Corporation
Manoj Issac, Memorial University of Newfoundland
Farhood Azarsina, Memorial University of Newfoundland

Force/flow measurements on a low-speed, vectored-thruster propelled UUV

Karl von Ellenrieder, Florida Atlantic University
Lloyd Ackermann, Florida Atlantic University

Dynamic Model Development of a Small High-Speed Autonomous Underwater Vehicle

Daniel Stilwell, Virginia Polytechnic Institute and State University
Wayne Neu, Virginia Polytechnic Institute and State University
Haider Arafat, Virginia Polytechnic Institute and State University

Resistance and Static Yaw Experiments on the Underwater Vehicle

Farhood Azarsina, Memorial University of Newfoundland
Christopher Williams, National Research Council Canada, Institute for Ocean Technology
Leonard Lye, Memorial University of Newfoundland

Buoy Technology I

Meeting Room 104
Tuesday, September 19 (3:30PM - 5:15PM)

Co-Chairs: **Jon Wood**, Ocean Data Technologies, Inc.
Walter Paul, WHOI

Technology Refresh of NOAA?s Tropical Atmosphere-Ocean (TAO) Buoy System

Chung-Chu Teng, NOAA National Data Buoy Center
Landry Bernard, NOAA National Data Buoy Center
Peter Lessing, NOAA National Data Buoy Center

Coil-cord Conductors on Compliant Elastic Moorings

James Irish, Woods Hole Oceanographic Institution
Stanley Boduch, University of New Hampshire
Walter Paul, Woods Hole Oceanographic Institution

Self-Positioning Smart Buoys, The ?Un-Buoy? Solution: Logistic Considerations using Autonomous Surface Craft Technology and Improved Communications Infrastructure

Joseph Curcio, Massachusetts Institute of Technology
Phillip McGillivary, US Coast Guard Icebreakers
Kevin Fall, Intel Research Berkeley
Andrew Maffei, Woods Hole Oceanographic Institution
Kurt Schwehr, Center for Coastal and Ocean Mapping, University of New Hampshire
Robert Twiggs, Stanford University
Chris Kitts, Santa Clara University
Phil Ballou, Ocean Systems Inc.

A Mooring Design for Measurement of Deep Water Ocean Waves

Jon Wood, Ocean Data Technologies, Inc.
Eugene Terray, Woods Hole Oceanographic Institution

An Investigation of a Deployed Submerged Grid Mooring System

Glen Rice, University of New Hampshire
Stanley Boduch, University of New Hampshire
Judson DeCew, University of New Hampshire
James Irish, Woods Hole Oceanographic Institution
M. Swift, University of New Hampshire
Chad Turmelle, University of New Hampshire

AUV Swarms and Distributed Sensor Processing II

Meeting Room 107
Tuesday, September 19 (3:30PM - 5:15PM)

Co-Chairs: **Claude Brancart**, IEEE/Oceanic Engineering Society
Jack Ianiello, SAIC

Cooperative Target Tracking in a Distributed Autonomous Sensor Network

Donald Eickstedt, Massachusetts Institute of Technology
Michael Benjamin, Massachusetts Institute of Technology

Assessing performance tradeoffs in undersea distributed sensor networks

Thomas Wettergren, Naval Undersea Warfare Center, Division Newport
Sandie Grage, Naval Undersea Warfare Center, Division Newport
Russell Costa, Naval Undersea Warfare Center, Division Newport
John Baylog, Naval Undersea Warfare Center, Division Newport

Location-Aware Routing Protocol for Underwater Acoustic Networks

Edward Carlson, Florida Atlantic University
Pierre-Philippe Beaujean, Florida Atlantic University
Edgar An, Florida Atlantic University

Power and distance based MAC algorithms for underwater acoustic networks

Hayat Doukkali, ENST Bretagne
Loutfi Nuaymi, ENST Bretagne
Sebastien Houcke, ENST Bretagne

Experimental Evaluation and Modeling of RF Modems for Use in Fleets of Multiple Cooperating Autonomous Undersea Vehicles

Radim Bartos, University of New Hampshire
Venkata Gorla, University of New Hampshire
Leon Cyril, University of New Hampshire
Rick Komerska, Autonomous Undersea Systems Institute
Steven Chappell, Autonomous Undersea Systems Institute
Rohit Sharma, University of New Hampshire

Automatic Control II

Meeting Room 108
Tuesday, September 19 (3:30PM - 5:15PM)

Co-Chairs: **Alfredo Martins**, Autonomous Systems Laboratory - Instituto Superior de Engenharia do Porto
Michael Santora, University of Idaho

Visual Servoing of an ROV for Servicing of Tethered Ocean Moorings

Aaron Plotnik, Stanford University
Stephen Rock, Stanford University

AUV Behavior Algorithm While Inspecting of Partly Visible Pipeline

Alexander Inzartsev, Institute of Marine Technology Problems, Russian Academy of Sciences, Far East Branch
Alexander Pavin, Institute of Marine Technology Problems, Russian Academy of Sciences, Far East Branch

Control of Autonomous Underwater Vehicles Using Neural Networks

Michael Santora, University of Idaho
Joel Alberts, University of Idaho
Dean Edwards, Uiversity of Idaho

Integrated Guidance and Control of AUVs Using Shrinking Horizon Model Predictive Control

Charmane Caldwell, FAMU/FSU College of Engineering
Emmanuel Collins, FAMU/FSU College of Engineering
Srinivas Palanki, FAMU/FSU College of Engineering

Optics II

Meeting Room 109
Tuesday, September 19 (3:30PM - 5:15PM)

Co-Chairs: **Anna Michel**, Woods Hole Oceanographic Institution
Jonathan Howland, Woods Hole Oceanographic Institution

Visible reflectance spectroscopy on a buoy-mounted aerosol sampler: development of a sensor for quantifying the deposition of mineral dust to the oceans

Sheri White, Woods Hole Oceanographic Institution
Edward Sholkovitz, Woods Hole Oceanographic Institution
Norman Farr, Woods Hole Oceanographic Institution

Evaluation of laser induced breakdown spectroscopy (LIBS) as a new in situ chemical sensing technique for the deep ocean

Anna Michel, Woods Hole Oceanographic Institution
Norman Farr, Woods Hole Oceanographic Institution
Alan Chave, Woods Hole Oceanographic Institution

Laser Raman Spectroscopy as a Tool for In Situ Mineralogical Analyses on the Seafloor

Sheri White, Woods Hole Oceanographic Institution

Lessons learned while optimizing instrument sensitivity in deep ocean Raman spectroscopy

Alana Sherman, Monterey Bay Aquarium Research Institute
Rachel Dunk, Monterey Bay Aquarium Research Institute
Edward Peltzer, Monterey Bay Aquarium Research Institute
Peter Brewer, Monterey Bay Aquarium Research Institute
Jim Scholfield, Monterey Bay Aquarium Research Institute
Cheri Everlove, Monterey Bay Aquarium Research Institute
William Kirkwood, Monterey Bay Aquarium Research Institute
Peter Walz, Monterey Bay Aquarium Research Institute

Marine Life and Ecosystems II

Meeting Room 110
Tuesday, September 19 (3:30PM - 5:15PM)

Co-Chairs: **Fredrik Soreide**, Norwegian University of Science and Technology
Warren Colburn, Ocean Technology Foundation, University of Connecticut

Herring and Oil Don't Mix: A Lesson from the Exxon Valdez Oil Spill

Richard Thorne, Prince William Sound Science Center
Gary Thomas, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami

Alternative Seafood Waste Disposal Procedures for Alaskan Waters

Richard Thorne, Prince William Sound Science Center
Gary Thomas, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami
Mary Bishop, Prince William Sound Science Center

An onboard air conveyer oil skimmer

Isamu Fujita, Port and Airport Research Institute
Muneo Yoshie, Port and Airport Research Institute

Shallow-Water Seismic Surveys - How Much Noise Are We Introducing Into the Ocean?

Allen Gontz, University of Massachusetts Boston
Leila Hatch, Gerry E. Studds Stellwagen Bank National Marine Sanctuary
David Wiley, Gerry E. Studds Stellwagen Bank National Marine Sanctuary

Analysis of Intake and Discharge Salinity Regimes for a Desalination Plant

J. Swanson, Applied Science Associates
Christopher Mueller, Applied Science Associates
Stephen Barrett, BlueWave Strategies LLC

Exhibitor Product Showcase 3: Sonar Systems

Meeting Room 111
Tuesday, September 19 (3:15PM - 5:00PM)

Chair: **Mike Mathewson**, McLane Research

Unexploded Ordance Detection in Shallow Water

Chester Bassani, ATEC
Jim McDonald, ATEC
David Wright, ATEC

SHADOWS, A Synthetic Aperature Sonar

Fredrick Jean, Ixsea SAS,

Post Mission Analysis with HUGIN 1000 AUV & High Resolution Interferometric SAS

Espen Hagen, Norwegian Defence Research Est. (FFI)
Kjetil Knutsen, Kongsberg Maritime

Applications and Benefits of Piezocomposite Technology for the Next Generation of Undersea Acoustic Sensors and Arrays

Brian Pazol, Material Systems Inc.
Rick Foster, Material Systems Inc.

Wednesday, September 20

WEDNESDAY 8:00AM – 9:45AM

Plenary Session: Revolutionizing Marine Technology

Ballroom B
Wednesday September 20 (8:00AM - 9:45AM)

WEDNESDAY 8:15AM – 10:00AM

Exhibitor Product Showcase 4: Data Processing Systems

Meeting Room 111
Wednesday, September 20 (8:15AM - 10:00AM)

Chair: **Jim Case**, UNH

Hydrographic Survey Confidence Levels

Daniel Edwin Neuman, NOAA

Distributed Computing with MATLAB and Simulink

Loren Dean, The MathWorks

NOAA Ocean Prediction Center

Joseph Seinkiwicz, NOAA

Naval Oceanography on the Internet, An Update

Theodore J. Bennett Jr., Naval Oceanographic Office
David Malley, Naval Oceanographic Office
Sylvia Seal, Lockheed Martin
Keith Alphonso, Data Systems

WEDNESDAY 10:15AM – 12:00PM

Seafloor Characterization and Rough Surface Scattering

Meeting Room 101
Wednesday, September 20 (10:15AM - 12:00PM)

Co-Chairs: **Raymond Soukup**, NRL
Gaetano Canepa, NATO Undersea Research Centre

Roughness spectra and acoustic response from a diver-manipulated sea floor

Kevin Briggs, U.S. Naval Research Laboratory
Michael Richardson, U.S. Naval Research Laboratory
Kevin Williams, Applied Physics Lab/University of Washington
Anthony Lyons, Applied Research Laboratory/Penn State University

Characterization of seafloor geo-acoustic properties from multibeam data

Gaetano Canepa, NATO Undersea Research Centre
Cecile Berron, ENSIETA

Topography measurement of scale-model representations of the rough ocean bottom by touch-trigger probe and its implications for spectral characterization

Jason Summers, U.S. Naval Research Laboratory
Robert Gragg, U.S. Naval Research Laboratory
Raymond Soukup, U.S. Naval Research Laboratory

Conductivity probe and stereo camera measurements of roughness during SAX04

Brian Hefner, Applied Physics Lab/University of Washington
Dajun Tang, Applied Physics Lab/University of Washington
Chau-Chang Wang, Institute of Undersea Technology

Intertidal sedimentary structures and their formation mechanisms in sandy, muddy, and sand-mud layered flats

Yoichi Watabe, Port and Airport Research Institute
Shinji Sassa, Port and Airport Research Institute

Data Fusion

Meeting Room 102
Wednesday, September 20 (10:15PM - 12:00PM)

Co-Chairs: **David Lindgren**, Swedish Defence Research Agency
Tom Aridgides, Lockheed Martin MS2

Towards Geo-Referenced AUV Navigation Through Fusion of USBL and DVL Measurements

Paul Rigby, ARC Centre of Excellence for Autonomous Systems, University of Sydney
Oscar Pizarro, ARC Centre of Excellence for Autonomous Systems, University of Sydney
Stefan Williams, ARC Centre of Excellence for Autonomous Systems, University of Sydney

Surface Ship Classification in a Littoral Environment using Fusion of Hydroacoustic and Electromagnetic Data

David Lindgren, Swedish Defence Research Agency
Eva Dalberg, Swedish Defence Research Agency
Ron Lennartsson, Swedish Defence Research Agency
Mika Levonen, Swedish Defence Research Agency
Leif Persson, Swedish Defence Research Agency

Data fusion on the Ormen Lange shipwreck project

Martin Ludvigsen, Norwegian University of Science and Technology
Fredrik Søreide, Norwegian University of Science and Technology

Acoustic Measurement and Inversion with AUVs

Meeting Room 103
Wednesday, September 20 (10:15AM - 12:00PM)

Co-Chairs: **James Lynch**, Woods Hole Oceanographic Institution
William Carey, Boston University

Results from the Nantucket Sound autonomous underwater vehicle towed hydrophone array experiment

Jason Holmes, Boston University
William Carey, Boston University
James Lynch, Woods Hole Oceanographic Institution

Detection and classification of buried targets and sub-bottom geoacoustic inversion with an AUV carried low frequency acoustic source and a towed array

James Lynch, Woods Hole Oceanographic Institution
Dezhang Chu, Woods Hole Oceanographic Institution
Thomas Austin, Woods Hole Oceanographic Institution
William Carey, Boston University
Allan Pierce, Boston University
Jason Holmes, Boston University

Mobile Acoustic Source for Underwater Acoustic Measurements

Philip Abbot, OASIS, Inc.
Charles Gedney, OASIS, Inc.
Dave Morton, OASIS, Inc.
Chris Emerson, OASIS Inc.

High-Resolution Multibeam and Subbottom Surveys of Submarine Canyons and Gas Seeps Using the MBARI Mapping AUV

Richard Henthorn, Monterey Bay Aquarium Research Institute
David Caress, Monterey Bay Aquarium Research Institute
Hans Thomas, Monterey Bay Aquarium Research Institute
Rob McEwen, Monterey Bay Aquarium Research Institute
W. Kirkwood, Monterey Bay Aquarium Research Institute
Charles Paull, Monterey Bay Aquarium Research Institute
Rendy Keaten, Monterey Bay Aquarium Research Institute

An efficient method of combining detection and identification of seafloor objects using the Gavia AUV

Hordur Johannsson, Department of Computer Science, University of Iceland
Torfi Thorhallsson, Hafmynd ehf
Hjalmtyr Hafsteinsson, Department of Computer Science, University of Iceland

Buoy Technology II

Meeting Room 104
Wednesday, September 20 (10:15AM - 12:00PM)

Co-Chairs: **Walter Paul**, WHOI
Rick Cole, University of South Florida

The Evolution of Autonomous Untethered Gateway Communications Buoys

Rick Babicz, Falmouth Scientific, Inc.
John Baker, Falmouth Scientific, Inc.

Use of the Automatic Identification System (AIS) on Autonomous Weather Buoys for Maritime Domain Awareness Applications

Peter Lessing, NOAA National Data Buoy Center
Brian Tetreault, United States Coast Guard
Joel Chaffin, Science Applications International Corporation
Landry Bernard, University of Southern Mississippi

Red ACOMAR: Coastal Moored Buoy Network for Real-Time Marine Surveillance, Control and Observation in Canary Islands

Carlos Barrera, Instituto Canario de Ciencias Marinas
Maria Jose Rueda, Instituto Canario de Ciencias Marinas
Octavio Llinas, Instituto Canario de Ciencias Marinas
Juan Carlos Elgue, Instituto Canario de Ciencias Marinas

The remote monitoring system for the buoy to localize the whale by Labview

Chan-Wang Park, Université du Québec à Rimouski
Yvan Simard, ISMER/Université du Québec

Improving the Understanding of Mooring Motion in Current Measurements Using High-resolution Diagnostic Records

Vadim Polonichko, SonTek/YSI
Vitalii Sheremet, University of Rhode Island

Standards and Protocols for Ocean Observing Systems

Meeting Room 106
Wednesday, September 20 (10:15AM - 12:00PM)

Co-Chairs: **Jay Pearlman**, Boeing
Mary Altalo, Ocean.US

Towards a Rational Approach to Standards for IOOS Development

Robert Vorthman, Mitretek Systems, Inc.
Stephen Holt, Mitretek Systems, Inc.

Applying Joint Network Enabled Operations (NEO) Project Lessons to IOOS/GOOS

David Sweet, YourEncore

Esperanto, Klingon, or Other: Metadata Implications for Global Marine Observations

John Graybeal, Monterey Bay Aquarium Research Institute

OCEAN OBSERVATORY Instrument Software Infrastructure

Duane Edgington, Monterey Bay Aquarium Research Institute
Daniel Davis, Monterey Bay Aquarium Research Institute
Thomas O'Reilly, Monterey Bay Aquarium Research Institute

Toward an Ocean Observing System of Systems

Luis Bermudez, Monterey Bay Aquarium Research Institute
Philip Bogden, Southeastern Universities Research Association
Eric Bridger, Gulf of Maine Ocean Observing System
David Forrest, Virginia Institute of Marine Science
John Graybeal, Monterey Bay Aquarium Research Institute
Gerald Creager, Texas A&M University

Optics III

Meeting Room 109
Wednesday, September 20 (10:15AM - 12:00PM)

Co-Chairs: **Kai Schorstein**, TU Darmstadt
Norman Farr, Woods Hole Oceanographic Institution

LAPIS: A new imaging tool for macrozooplankton

Laurence Madin, Woods Hole Oceanographic Institution
Erich Horgan, Woods Hole Oceanographic Institution
Scott Gallager, Woods Hole Oceanographic Institution
Josh Eaton, Woods Hole Oceanographic Institution
Andrew Girard, Woods Hole Oceanographic Institution

Field Tests of a New Camera/LED Strobe System

Jonathan Howland, Woods Hole Oceanographic Institution
Norman Farr, Woods Hole Oceanographic Institution
Hanumant Singh, Woods Hole Oceanographic Institution

Towards a Brillouin-LIDAR for remote sensing of the temperature profile in the ocean

Kai Schorstein, TU Darmstadt
Alexandru Popescu, TU Darmstadt
Thomas Walther, TU Darmstadt
Edward Fry, Texas A&M University

Extended range underwater optical imaging architecture

Fraser Dalgleish, Harbor Branch Oceanographic Institution
Frank Caimi, Harbor Branch Oceanographic Institution
Charles Mazel, Physical Sciences Inc.
James Glynn, Physical Sciences Inc.

Exhibitor Product Showcase 5: Oceanographic Instrumentation II

Meeting Room 111
Wednesday, September 20 (10:15AM - 12:00PM)

Chair: **Margo Newcombe, MLN Marketing**

Innovative Current Profiling Technology for Moored Applications

Jerry Mullison, Teledyne RDI

Improved Long-term Monitoring Systems for Water Quality Parameters

Robert Ellison, Kevin McClurg, YSI

Ocean Observing Systems II

Meeting Room 112
Wednesday, September 20 (10:15AM - 12:00PM)

Chair: **Eric Terrill, Marine Physical Laboratory, Scripps Institution of Oceanography**

The Value of Geostationary Satellite Imagery in IOOS, Now and Future

Andrew Lomax, Itri Corporation
Wes Colburn, Lockheed Martin Civil Space
Maria Galbraith, Itri Corporation

Data Management and Real-time Distribution for HF Radar National Network

Eric Terrill, Marine Physical Laboratory, Scripps Institution of Oceanography
Mark Otero, Marine Physical Laboratory, Scripps Institution of Oceanography
Lisa Hazard, Marine Physical Laboratory, Scripps Institution of Oceanography
Don Conlee, DOC/NOAA/National Weather Service
Jack Harlan, National Oceanic and Atmospheric Administration
Josh Kohut, Rutgers University
Paul Reuter, Marine Physical Laboratory, Scripps Institution of Oceanography
Tom Cook, Marine Physical Laboratory, Scripps Institution of Oceanography
Timothy Harris, Marine Physical Laboratory, Scripps Institution of Oceanography
Kent Lindquist, Lindquist Consulting Incorporated

MBARI technology for self-configuring interoperable ocean observatories

Thomas O'Reilly, Monterey Bay Aquarium Research Institute
Kent Headley, Monterey Bay Aquarium Research Institute
John Graybeal, Monterey Bay Aquarium Research Institute
Kevin Gomes, Monterey Bay Aquarium Research Institute
Duane Edgington, Monterey Bay Aquarium Research Institute
Karen Salamy, Monterey Bay Aquarium Research Institute
Daniel Davis, Monterey Bay Aquarium Research Institute
Andrew Chase, Monterey Bay Aquarium Research Institute

HF Ocean Surface Radar Monitoring for Coral Bleaching in the Great Barrier Reef

Malcolm Heron, James Cook University
Bette Willis, James Cook University
Arnstein Prytz, James Cook University
Paulina Cetina-Heredia, James Cook University
Yadan Mao, James Cook University
Ove Hoegh-Guldberg, University of Queensland
William Skirving, National Oceanic and Atmospheric Administration
Scott Heron, National Oceanic and Atmospheric Administration
Mark Eakin, National Oceanic and Atmospheric Administration
Craig Steinberg, Australian Institute of Marine Science

Establishing a Benthic Cabled Observatory with ROV Based Cable Deployment

Larry Bird, Monterey Bay Aquarium Research Institute
Andrew Hamilton, Monterey Bay Aquarium Research Institute
Dale Graves, Monterey Bay Aquarium Research Institute
Gene Massion, Monterey Bay Aquarium Research Institute
Mark Chaffey, Monterey Bay Aquarium Research Institute
Rendy Keaten, Monterey Bay Aquarium Research Institute

WEDNESDAY 1:15PM – 3:00PM

Active Sonar I: Clutter Characterization

Meeting Room 101
Wednesday, September 20 (1:15PM - 3:00PM)

Co-Chairs: **Mark Prior**, NATO Undersea Research Centre
Douglas Abraham, Penn State University

Mapping Clutter In Situ: Broadband Results from T-MAST 02 and Boundary 2004

Roger Gauss, U.S. Naval Research Laboratory
Joseph Fialkowski, U.S. Naval Research Laboratory

A physical model for the distribution of sonar clutter from a rough interface

Bruce Newhall, Applied Physics Lab/Johns Hopkins University

Statistical behavior of echoes from swimbladder-bearing fish at 2-4 kHz

Timothy Stanton, Woods Hole Oceanographic Institution
Dezhang Chu, Woods Hole Oceanographic Institution
J. Jech, NOAA Northeast Fisheries Science Center
James Irish, Woods Hole Oceanographic Institution

Broad-band time domain modeling of sonar clutter in range dependent waveguides

Kevin LePage, U.S. Naval Research Laboratory
Peter Neumann, Planning Systems Inc.
Charles Holland, Applied Research Laboratory/Penn State University

Non-Rayleigh wideband sonar reverberation modeling including hybrid multipaths

Frans-Peter Lam, TNO Defence, Netherlands
Nurit Konijnendijk, TNO Defence, Netherlands
Hans Groen, TNO Defence, Netherlands
Dick Simons, Delft University of Technology

Ropes and Tension Members

Meeting Room 104
Wednesday, September 20 (1:15PM - 3:00PM)

Co-Chairs: **Bill Fronzaglia**, New England Ropes
Evan Zimmerman, Delmar Systems

Durability of Polyester Rope used as Deepwater Mooring Lines

John Flory, Tension Technology International
Stephen Banfield, Tension Technology International

Predicting the creep lifetime of HMPE Mooring Rope Applications

Martin Vlasblom, DSM Dyneema BV
Rigo Bosman, DSM Dyneema BV

Polyester Mooring Rope: Length Determination and Static Modulus

Mark Huntley, Whitehill Manufacturing Corporation

The Mitigation of Curved by Water Flow Cable Vibrations with a Fairing Element

Moisey Gutman, Retired

Long Term Performance of Mooring Lines Made with Spectra(r) Fiber

Greg Davis, Honeywell
Mark Huntley, Whitehill Manufacturing Corporation
Steven Correale, Honeywell International

Global Observatories

Meeting Room 106
Wednesday, September 20 (1:15PM - 3:00PM)

Co-Chairs: **Uwe Send**, Scripps
Chris Meinig, NOAA/PMEL

Ocean Reference Stations (ORS): An Air-Sea Flux Reference Network

Robert Weller, Woods Hole Oceanographic Institution
Albert Plueddemann, Woods Hole Oceanographic Institution

Acoustic systems for global ocean observatory studies

Timothy Duda, Woods Hole Oceanographic Institution
Bruce Howe, Applied Physics Lab/University of Washington
Bruce Cornuelle, Scripps Institution of Oceanography/ UCSD

Coordination of the global ocean observatories within the international framework: JCOMM and OceanSITES

Boram Lee, Intergovernmental Oceanographic Commission of UNESCO

PMEL Contributions to the OceanSITES Program

H. Freitag, NOAA/PMEL
Michael McPhaden, NOAA/PMEL
Meghan Cronin, NOAA/PMEL
Christopher Sabine, NOAA/PMEL
Dai McClurg, JISAO/University of Washington
Patrick McLain, NOAA/PMEL

Sonar Calibration I

Meeting Room 107
Wednesday, September 20 (1:15PM - 3:00PM)

Co-Chairs: **Kirk Jenne**, ONR
Kenneth Foote, Woods Hole Oceanographic Institution

Optimizing two targets for calibrating a broadband multibeam sonar

Kenneth Foote, Woods Hole Oceanographic Institution

Gauging the Reliability of Acoustic Instruments for Fisheries Surveys

Hans Knudsen, Institute of Marine Research, Bergen

Calibration of a Steered Phased-Array Sonar for use in Fish Detection

Ernest Bernard, UMASS Dartmouth, School for Marine Science and Technology
Christopher Jakubiak, UMASS Dartmouth, School for Marine Science and Technology

Jennifer Miksis-Olds, UMASS Dartmouth, School for Marine Science and Technology
John Penvenne, Penscil, Inc.
D. Holliday, UMASS Dartmouth, School for Marine Science and Technology

Influence of time-varying-gain (TVG) of a multibeam echo sounder on the quantitative applications in fisheries acoustics

Dezhang Chu, Woods Hole Oceanographic Institution
Lawrence Hufnagle, NOAA Northwest Fisheries Science Center

Sonar Classification and Pattern Recognition

Meeting Room 108
Wednesday, September 20 (1:15PM - 3:00PM)

Co-Chairs: **Gerald Dobeck**, Naval Surface Warfare Center Panama City
Paul Baggenstoss, Naval Undersea Warfare Center, Division Newport

Model Based Classification Using Multi-ping Data

Chris Carbone, Naval Undersea Warfare Center, Division Newport
Steven Kay, University of Rhode Island

The K-Nearest Neighbor Attractor-based Neural Network and the Optimal Discriminatory Filter Classifier

Gerald Dobeck, Naval Surface Warfare Center Panama City

Comparison of Volterra and Box-Cox Methodologies for Classification and for the Fusion of Processing Strings, as Applied to Automated Sea Mine Classification in Shallow Water

Tom Aridgides, Lockheed Martin MS2
Manuel Fernández, Lockheed Martin MS2

Classification of Underwater Objects Via Impulse Excitation

James Cobb, Naval Surface Warfare Center Panama City
Rodolfo Arrieta, Naval Surface Warfare Center Panama City
Charles Bernstein, Naval Surface Warfare Center Panama City

Airborne and Satellite Radar/Meteorology I

Meeting Room 109
Wednesday, September 20 (1:15PM - 3:00PM)

Co-Chairs: **William Plant**, Applied Physics Lab/University of Washington
Joan Von Ahn, STG/NOAA/NESDIS/ORA, NOAA Ocean Prediction Center

Characteristics of the Atmospheric Boundary Layer in Nantucket Sound

Leonid Ivanov, Woods Hole Group, Inc.
Bruce Magnell, Woods Hole Group, Inc.
Robert Catalano, Woods Hole Group, Inc.
Leonard Fagan, Cape Wind Associates LLC

Ocean Surface Winds from Space - A Collarborative Education Effort

Joan Von Ahn, STG/NOAA/NESDIS/ORA, NOAA Ocean Prediction Center
Zorana Jelenak, NOAA/NESDIS/Star/UCAR
Joseph Sienkiewicz, NOAA Ocean Prediction Center
Michael Brennan, NOAA/NWS/TPC/UCAR

SeaWinds Scatterometer Wind Vector Retrievals for Hurricane Claudette Using AMSR and NEXRAD to Perform Corrections for Precipitation Effects

David Weissman, Hofstra University
Svetla Hristova-Veleva, NASA Jet Propulsion Laboratory
Phillip Callahan, NASA Jet Propulsion Laboratory

Sea Surface Backscatter Distortions of Scanning Radar Altimeter Ocean Wave Measurements

Edward Walsh, NASA Goddard Space Flight Center
C. Wright, NASA Goddard Space Flight Center

Corrections to Scatterometer Wind Vectors During Hurricane Isabel Using High Resolution NEXRAD Radar Rain Corrections

David Weissman, Hofstra University
Mark Bourassa, Florida State University

Pollution Monitoring

Meeting Room 110
Wednesday, September 20 (1:15PM - 3:00PM)

Co-Chairs: **J. Swanson**, Applied Science Associates
Paul Dragos, Battelle

Boston Harbor Sediment Quality Responds to Cleanup

Carlton Hunt, Battelle
Deirdre Dahlen, Battelle
Stacy Pala, Battelle
Maury Hall, Massachussetts Water Resources Authority
Ken Keay, Massachussetts Water Resources Authority

A New Approach to Simulation of LNG Spills in the Ocean

J. Swanson, Applied Science Associates
Malcolm Spaulding, Department of Ocean Engineering, University of Rhode Island

Cost-Benefit Analysis of Alternative Ocean Observing Platforms for Coastal Water Quality Monitoring

Paul Dragos, Battelle
Michael Mickelson, Massachussetts Water Resources Authority
Carl Albro, Battelle
Matthew Fitzpatrick, Battelle

Transport and Fate of Sediment Suspended from Jetting Operations for Undersea Cable Burial

J. Swanson, Applied Science Associates
Christopher Galagan, Applied Science Associates
Tatsusaburo Isaji, Applied Science Associates

Fish and Shellfish Monitoring in Boston Harbor and Massachusetts Bay - 1992 through 2005

Lisa Lefkovitz, Battelle
Stacy Pala, Battelle
Carlton Hunt, Battelle
Maury Hall, Massachussetts Water Resources Authority
Michael Moore, Woods Hole Oceanographic Institution

Exhibitor Product Showcase 6: Underwater and Surface Vehicles

Meeting Room 111
Wednesday, September 20 (1:15PM - 3:00PM)

Chair: **Bob Lobecker, TMS**

All American Marine, Hydofoil Assisted Hygraphic Survey Vessels

Matt Mullett

Little ROV from SeaBotix does Big Things for Science

Kevin Hardy, Scripps Institute of Oceanography
Sheldon Rubin, Seabotix,

Development of Logistcally Manageable, Low Cost AUVs for Operation in a Swarm for Sensing Experiments

Martin Moroney, SeaSwarm

Coastal Observatories I

Meeting Room 112
Wednesday, September 20 (1:15PM - 3:00PM)

Co-Chairs: **Scott Glenn**, Rutgers University
Grace Chang, UCSB

Applications of the Pacific Ocean Shelf Tracking System (POST): A Permanent Continental-Scale Acoustic Tracking Array for Fisheries Research & Ocean Observation

David Welch, Kintama Research Corp.
Isabelle Gaboury, Kintama Research Corp.
Michael Melnychuk, University of British Columbia
Ron O'Dor, CORE

The Southern California Coastal Ocean Observing System

Eric Terrill, Marine Physical Laboratory, Scripps Institution of Oceanography
Stephanie Peck, Scripps Institution of Oceanography/UCSD
Lisa Hazard, Scripps Institution of Oceanography/UCSD
Russ Davis, Scripps Institution of Oceanography/UCSD
Paul DiGiacomo, Jet Propulsion Laboratory
Burton Jones, University of Southern California
Carolyn Keen, Scripps Institution of Oceanography/UCSD
Mark Moline, California Polytechnic State University
John Orcutt, Scripps Institution of Oceanography/UCSD
Keith Stolzenbach, University of California Los Angeles
Libe Washburn, University of California Santa Barbara
Harry Helling, Ocean Institute
Sue Magdziarz, Ocean Institute
Jennifer Long, Ocean Institute
Melissa Laughlin, Ocean Institute
Jacqueline Kasschau, Ocean Institute

In situ measurement of reflectance and fluorescence spectra to support hyperspectral remote sensing and marine biology research

Charles Mazel, NightSea LLC

The Liverpool Bay Coastal Observatory - towards the goals

Michael Howarth, Proudman Oceanographic Laboratory
Roger Proctor, Proudman Oceanographic Laboratory
Philip Knight, Proudman Oceanographic Laboratory
Michael Smithson, Proudman Oceanographic Laboratory
David Mills, CEFAS

A Collaborative Portal for Ocean Observatories

Michael Godin, Monterey Bay Aquarium Research Institute
James Bellingham, Monterey Bay Aquarium Research Institute

Kanna Rajan, Monterey Bay Aquarium Research Institute
Naomi Leonard, Princeton University
Yi Chao, NASA Jet Propulsion Laboratory

WEDNESDAY 3:30PM – 5:15PM

Panel Session: International Developments in GOOS and its Regional initiatives

Meeting Room TBA
Wednesday September 20 (3:30PM - 5:15PM)

Speakers/Panelists:
Mary Altalo (Ocean.US)
Jay Pearlman (Boeing)

Active Sonar II: Processing

Meeting Room 101
Wednesday, September 20 (3:30PM - 5:15PM)

Co-Chairs: **Douglas Abraham**, Penn State University
Mark Prior, NATO Undersea Research Centre

The physical causes of clutter and its suppression via sub-band processing

Mark Prior, NATO Undersea Research Centre
Alberto Baldacci, NATO Undersea Research Centre

Detecting small slow-moving sonar targets using bottom reverberation coherence

Jinyun Ren, Simon Fraser University
John Bird, Simon Fraser University

Perceptual Feature Identification for Active Sonar Echoes

Scott Philips, University of Washington
James Pitton, Applied Physics Lab/University of Washington
Les Atlas, University of Washington

Bootstrapped K-Distribution Parameter Estimation

Douglas Abraham, Penn State University
Anthony Lyons, Penn State University

Underwater Acoustics & Acoustical Oceanography

Meeting Room 102
Wednesday, September 20 (3:30PM - 5:15PM)

Co-Chairs: **Timothy Duda**, Woods Hole Oceanographic Institution
Philip Abbot, OASIS, Inc.

Autonomous Hydrophones at NOAA/OSU and a New Seafloor Sentry System for Real-time Detection of Acoustic Eventsrr

Haru Matsumoto, NOAA/OSU
Robert Dziak, NOAA/OSU
Dave Mellinger, NOAA/OSU
Chris Meinig, NOAA/PMEL
Jon Bumgardner, NOAA/PMEL
Matt Fowler, NOAA/OSU
Joe Haxel, NOAA/OSU
Walter Hannah, Ithaca College
Andy Lau, NOAA/CIMRS

Seafloor stability monitoring by displacements calculated from acceleration waveforms obtained by a 3-component servo-accelerometer system

Hideki Saito, Oyo Corporation
Tatsuya Yokoyama, Oyo Corporation
Shigekazu Uchiyama, Oyo Corporation

Evaluation of a long-range joint acoustic navigation/thermometry system

Timothy Duda, Woods Hole Oceanographic Institution
Andrey Morozov, Woods Hole Oceanographic Institution
Bruce Howe, Applied Physics Lab/University of Washington
Michael Brown, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami
Kevin Speer, Florida State University
Peter Lazarevich, Florida State University
Peter Worcester, Scripps Institution of Oceanography/UCSD
Bruce Cornuelle, Scripps Institution of Oceanography/UCSD

Passive acoustic quantification of underwater gas seepage

Aneta Nikolovska, RCOM/University of Bremen
Christoph Waldmann, RCOM/University of Bremen

UUV, AUV, ROV III

Meeting Room 103
Wednesday, September 20 (3:30PM - 5:15PM)

Co-Chairs: **Jason Holmes**, Boston University
Philip McGillivary, US Coast Guard Icebreakers

Field Tests of the Hybrid Remotely Operated Vehicle (HROV) Light Fiber Optic Tether

Chris Young, Space and Naval Warfare Systems Center San Diego
Barbara Fletcher, Space and Naval Warfare Systems Center San Diego
Louis Whitcomb, Woods Hole Oceanographic Institution

Dana Yoerger, Woods Hole Oceanographic Institution
Andrew Bowen, Woods Hole Oceanographic Institution
James Buescher, Space and Naval Warfare Systems Center San Diego
Robert McCabe, Woods Hole Oceanographic Institution
Matt Heintz, Woods Hole Oceanographic Institution
Robert Fuhrmann, Woods Hole Oceanographic Institution
Chris Taylor, Woods Hole Oceanographic Institution
Robert Elder, Woods Hole Oceanographic Institution

Small AUV System for Hydrograpic Surveys

Jon Crowell, OceanServer Technology, Inc

Autonomous Docking Demonstrations using Enhanced REMUS Technology

Ben Allen, Woods Hole Oceanographic Institution
Thomas Austin, Woods Hole Oceanographic Institution
Ned Forrester, Woods Hole Oceanographic Institution
Rob Goldsborough, Woods Hole Oceanographic Institution
Amy Kukulya, Woods Hole Oceanographic Institution
Gregory Packard, Woods Hole Oceanographic Institution
Mike Purcell, Woods Hole Oceanographic Institution
Roger Stokey, Woods Hole Oceanographic Institution

Terrain Based Localization Method for Wreck Observation AUV

Tamaki Ura, The University of Tokyo
Takeshi Nakatani, University of Tokyo
Yoshiaki Nose, University of Tokyo

Ship Hull Inspection with the HAUV: US Navy and NATO Demonstrations Results

Jerome Vaganay, Bluefin Robotics Corporation
Michael Elkins, Bluefin Robotics Corporation
David Esposito, Bluefin Robotics Corporation
William O'Halloran, Bluefin Robotics Corporation
Franz Hover, Massachusetts Institute of Technology
Michael Kokko, Massachusetts Institute of Technology

Oceanographic Instrumentation

Meeting Room 104
Wednesday, September 20 (3:30PM - 5:15PM)

Co-Chairs: **Larry Bird**, Monterey Bay Aquarium Research Institute
Marinna Martini, U.S. Geological Survey

Field Tests of Acoustic Telemetry for a Portable Coastal Observatory

Marinna Martini, U.S. Geological Survey
Bradford Butman, U.S. Geological Survey
Jonathan Ware, Woods Hole Oceanographic Institution
Dan Frye, Woods Hole Oceanographic Institution

A Self Contained Acoustic Recorder For Observations from AUV's

Paul Fucile, Woods Hole Oceanographic Institution
Robin Singer, Woods Hole Oceanographic Institution
Mark Baumgartner, Woods Hole Oceanographic Institution
Keenan Ball, Woods Hole Oceanographic Institution

A Low Cost, Long Life Deep Water Acoustic Sensor Assembly

Christopher Taggart, General Dynamics Advanced Information Systems, Inc.
Robert Baker, General Dynamics Advanced Information Systems, Inc.
James Cindric, General Dynamics Advanced Information Systems, Inc.
William Livesay, General Dynamics Advanced Information Systems, Inc.
Terry Wisterman, General Dynamics Advanced Information Systems, Inc.
John Yeago, General Dynamics Advanced Information Systems, Inc.
Kenneth Tysinger, General Dynamics Advanced Information Systems, Inc.

Two Dimensional High-frequency and Mid-Frequency Hydrophone Arrays and Recording Systems

Jeffrey Skinner, Marine Physical Laboratory, Scripps Institution of Oceanography
Gerald D'Spain, Marine Physical Laboratory, Scripps Institution of Oceanography
William Hodgkiss, Marine Physical Laboratory, Scripps Institution of Oceanography

Development of a Self Triggering Submarine Canyon Event Detector

Larry Bird, Monterey Bay Aquarium Research Institute
Brett Hobson, Monterey Bay Aquarium Research Institute
Charles Paull, Monterey Bay Aquarium Research Institute
William Ussler III, Monterey Bay Aquarium Research Institute

Sonar Calibration II

Meeting Room 107
Wednesday, September 20 (3:30PM - 5:15PM)

Co-Chairs: **Kenneth Foote**, Woods Hole Oceanographic Institution
Kirk Jenne, ONR

Method for large sonar calibration and backscattering strength estimation

Pawel Pocwiardowski, RESON, Inc.
Eric Maillard, RESON, Inc.
George Yufit, RESON, Inc.
Peter Eriksen, RESON, Inc.

Experiments for Multibeam Backscatter Adjustments on the NOAA Ship Fairweather

Luciano Fonseca, Center for Coastal and Ocean Mapping, University of New Hampshire
Brian Calder, Center for Coastal and Ocean Mapping, University of New Hampshire
Mark Wetzler, NOAA - MCD

Design and Construction of a Specified Rough Interface for Calibrated Acoustic Measurements

Garfield Mellema, Defence R&D Canada - Atlantic
Terry Ewart, Applied Physics Lab/University of Washington
Kevin Williams, Applied Physics Lab/University of Washington
Brian Hefner, Applied Physics Lab/University of Washington

Acoustic classification of seaweed and sediments with depth-compensated vertical echoes

Jon Preston, Quester Tangent Corporation

Acoustic Navigation and Localization

Meeting Room 108
Wednesday, September 20 (3:30PM - 5:15PM)

Co-Chairs: **Jack Ianiello**, SAIC
Stephen Greineder, NUWC

Underwater Acoustic Navigation with the WHOI Micro-Modem

Sandipa Singh, Woods Hole Oceanographic Institution
Matthew Grund, Woods Hole Oceanographic Institution
Brian Bingham, Franklin W. Olin College of Engineering
Ryan Eustice, Johns Hopkins University
Hanumant Singh, Woods Hole Oceanographic Institution
Lee Freitag, Woods Hole Oceanographic Institution

Recent Advances in Synchronous-Clock One-Way-Travel-Time Acoustic Navigation

Ryan Eustice, University of Michigan
Louis Whitcomb, Johns Hopkins University
Hanumant Singh, Woods Hole Oceanographic Institution
Matthew Grund, Woods Hole Oceanographic Institution

Integration of Range, Bearing and Doppler Measurements from Transponders into Underwater Vehicle Navigation Systems

Are Willumsen, University Graduate Center at Kjeller, Norway
Oddvar Hallingstad, University Graduate Center at Kjeller, Norway
Bjorn Jalving, Norwegian Defence Research Establishment

A Comparison of Outlier Detection Algorithms for Hydro-Acoustic Positioning

Kjell Fauske, University Graduate Center at Kjeller, Norway
Oddvar Hallingstad, University Graduate Center at Kjeller, Norway

Passive scattered array positioning method for underwater acoustic source

Viktoria Zetterberg, Blekinge Institute of Technology / Amlab AB
Mats Pettersson, Blekinge Institute of Technology
Lars Tegborg, Amlab Elektronik AB
Ingvar Claesson, Blekinge Institute of Technology

Airborne and Satellite Radar/Meteorology II

Meeting Room 109
Wednesday, September 20 (3:30PM - 5:15PM)

Co-Chairs: **David Weissman**, Hofstra University
William Plant, Applied Physics Lab/University of Washington

Shipboard Measurements of Coherent Microwave Backscatter

William Plant, Applied Physics Lab/University of Washington
William Keller, Applied Physics Lab/University of Washington
Kenneth Hayes, Applied Physics Lab/University of Washington

The Application Sea Level Pressure and Vorticity Fields derived from the University of Washington Planetary Boundary Layer Model in the NOAA Ocean Prediction Center

Joan Von Ahn, STG/NOAA/NESDIS/ORA, NOAA Ocean Prediction Center
Joseph Sienkiewicz, NOAA Ocean Prediction Center
Gregory McFadden, SAIC/NOAA/NWS/OPC

Status report on predicted current measuring capabilities of the upcoming German satellite TerraSAR-X

Roland Romeiser, University of Hamburg
Hartmut Runge, German Aerospace Center (DLR)

Evaluation of the NOAA Real Time Ocean Forecast System_Atlantic for operational use at the NOAA Ocean Prediction Center

Robert Daniels, I.M. Systems Group @ NOAA National Weather Service

Oil Spill Detection System - Results from field trials

Elisabeth Nost, Miros AS
Cathrine Egset, Miros AS

Ocean Observation in Education and Outreach

Meeting Room 110
Wednesday, September 20 (3:30PM - 5:15PM)

Co-Chairs: **Elizabeth Rom**, National Science Foundation
Blanche Meeson, Ocean.US/NASA

Using real world data in education

Liesl Hotaling, Stevens Institute of Technology
George Matsumoto, Monterey Bay Aquarium Research Institute
Thomas Herrington, Stevens Institute of Technology

More Than One Way to Catch a Fish: Effective Translation of Ocean Science for the Public

Blanche Meeson, Ocean.US/NASA
Janice McDonnell, Rutgers University
Josh Kohut, Rutgers University
Sage Litchenwashler, Rutgers University
Harry Helling, Ocean Institute

Integration of hands-on laboratory modules to enhance the introduction of ocean science and engineering to undergraduates

Alexandra Techet, Massachusetts Institute of Technology
Mary Thompson, Massachusetts Institute of Technology
Tadd Truscott, Massachusetts Institute of Technology

Ocean Observatories and the Education Connection

Elizabeth Rom, National Science Foundation
Gisele Muller-Parker, National Science Foundation
Atziri Ibanez, NOAA National Ocean Service
Marlene Kaplan, National Marine Sanctuary Foundation
Vicki Clark, Virginia Sea Grant

Exhibitor Product Showcase 7: Moorings and Hardware

Meeting Room 111
Wednesday, September 20 (3:15PM - 5:00PM)

Chair: **Mike Stewart, M.J. Stewart Assc.**

Nexus Fiber Optic Plug'n'play System for High Speed Data Transfer

Lars Hansen, McArtney Offshore

Large Ceramic Spheres Provide Robust Buoyancy Alternative

Kevin Hardy, Scripps Institution of Oceanography
Mark Olsson, Weston, Deep Sea Power & Light

Thursday, September 21

THURSDAY 8:00AM – 9:00AM

Plenary Session: Marine Technology - Looking Back, Looking Ahead

Ballroom B
Thursday September 21 (8:00AM - 9:00AM)

Presenters:
RADM J. Bradford Mooney, Jr., USN (Ret.)

THURSDAY 8:00AM – 9:45AM

Environmentally Adaptive Signal Processing

Meeting Room 102
Thursday, September 21 (8:00AM - 9:45AM)

Co-Chairs: **Georgios Haralabus**, NATO Undersea Research Centre
Vince Premus, OASIS Inc.

The Estimated Ocean Detector: Derivation and Predicted Performance under Gaussian Assumptions

Jeffrey Ballard, Penn State University
Colin Jemmott, Penn State University
Leon Sibul, Penn State University
R. Culver, Penn State University
H. Camin, Penn State University

Unambiguous triplet array beamforming and calibration algorithms to facilitate an environmentally adaptive active sonar concept

Georgios Haralabus, NATO Undersea Research Centre
Alberto Baldacci, NATO Undersea Research Centre

Matched-field inversion in the East China Sea with Tabu Search

Zoi-Heleni Michalopoulou, Department of Mathematical Sciences, New Jersey Institute of Technology
James Miller, Department of Ocean Engineering, University of Rhode Island
Gopu Potty, Department of Ocean Engineering, University of Rhode Island

Estimating parameter uncertainties in Geoacoustic inversion by a neighbourhood approximation algorithm

Kunde Yang, Northwestern Polytechnical University
N. Chapman, School of Earth and Ocean Sciences, University of Victoria
Yuanliang Ma, Northwestern Polytechnical University

Received Signal Parameter Statistics in Random/ Uncertain Oceans

H. Camin, Penn State University
R. Culver, Penn State University
Leon Sibul, Penn State University
Jeffrey Ballard, Penn State University
Colin Jemmott, Penn State University
Charles Holland, Penn State University
David Bradley, Penn State University

UUV, AUV, ROV IV

Meeting Room 103
Thursday, September 21 (8:00AM - 9:45AM)

Co-Chairs: **John Higinbotham**, Emergent Space Technologies, Inc.
Denise Crimmins, Naval Undersea Warfare Center, Division Newport

Development of a New Long Duration Solar Powered Autonomous Surface Vehicle

John Higinbotham, Emergent Space Technologies, Inc.
Peter Hitchener, Emergent Space Technologies, Inc.
John Moisan, NASA/GSFC Wallops Flight Facility

A Simulation Environment for Testing and Evaluating Multiple Cooperating Solar-powered AUVs

Rick Komerska, Autonomous Undersea Systems Institute
Steven Chappell, Autonomous Undersea Systems Institute

Long Endurance Test Results of the Solar-powered AUV System

Denise Crimmins, Naval Undersea Warfare Center, Division Newport
Christopher Patty, Naval Undersea Warfare Center, Division Newport
Michel Beliard, Science Applications International Corporation
John Baker, Falmouth Scientific, Inc.
James Jalbert, Falmouth Scientific, Inc.
Rick Komerska, Autonomous Undersea Systems Institute
Steven Chappell, Autonomous Undersea Systems Institute
D. Blidberg, Autonomous Undersea Systems Institute

Development and Experience of a Practical Pressure-Tolerant Lithium Battery for Underwater Use.

Richard Wilson, Bluefin Robotics Corporation
Jim Bales, Massachusetts Institute of Technology

Current Measurement

Meeting Room 104
Thursday, September 21 (8:00AM - 9:45AM)

Co-Chairs: **Albert Williams**, Woods Hole Oceanographic Institution
Kathryn Bosley, NOAA National Ocean Service

Cross-Spectral Phase Method for Distinguishing Waves from Turbulence in Single-Point Boundary Layer Flow Measurements

Weichang Li, Woods Hole Oceanographic Institution
Albert Williams 3rd, Woods Hole Oceanographic Institution

Validation of National Data Buoy Center (NDBC) directional wave measurements using swell waves from distant storms

Theodore Mettlach, SAIC/NDBC
Chung-Chu Teng, NOAA National Data Buoy Center

Enhancements to the NOAA Current Measurement System On US Coast Guard Navigation Buoys

Kathryn Bosley, NOAA National Ocean Service
Chris McGrath, NOAA National Ocean Service
Tammy Graff, NOAA National Ocean Service
John Stepnowski, NOAA National Ocean Service

The Development of New & Existing Cabling Techniques to Obtain Realtime Full Water Column Current Measurements.

Jan van Smirren, Fugro GEOS Inc
Caroline Nicholas, Fugro GEOS Inc

Quality Control of Mineral Management Service - Oil Company ADCP Data at NDBC: A Successful Partnership Implementation

Richard Crout, NOAA National Data Buoy Center
Don Conlee, NOAA National Data Buoy Center

Transitioning Ocean Observing Systems from Research to Operations

Meeting Room 106
Thursday, September 21 (8:00AM - 9:45AM)

Co-Chairs: **Alexandra Isern**, National Science Foundation
Andrew Clark, Ocean.US

Research to Operations and Back

Thomas Malone, Ocean.US

Transitioning NOAA Moored Buoy Systems to Operations

David Green, NOAA Tsunami Program
Paul Moersdorf, National Data Buoy Center

An Integrated Coastal Observation and Flood Warning System: Rapid Prototype Development

Barry Stamey, Mitretek Systems, Inc.
Kenneth Carey, Mitretek Systems, Inc.
Harry Wang, Virginia Institute of Marine Science
Wade Smith, Mitretek Systems, Inc.
Brant Smith, Mitretek Systems, Inc.
David Forrest, Virginia Institute of Marine Science
Kyoung-Ho Cho, Virginia Institute of Marine Science
John Billet, NOAA National Weather Service
Andrew Stern, Mitretek Systems, Inc.
Gary Mineart, Mitretek Systems, Inc.
Scot Lynn, Mitretek Systems, Inc.

Real-Time Information Management for a Coastal Ocean Observing System

Janet Fredericks, Woods Hole Oceanographic Institution
Edward Hobart, Woods Hole Oceanographic Institution
Robert Groman, Woods Hole Oceanographic Institution
John Krauspe, Woods Hole Oceanographic Institution
Julie Allen, Woods Hole Oceanographic Institution

Speeding through the "Valley of Death": More rapid and efficient transition of instruments and platforms from research to operations

Alexandra Isern, National Science Foundation
Andrew Clark, Ocean.US

Marine Mammal DCL I

Meeting Room 107
Thursday, September 21 (8:00AM - 9:45AM)

Co-Chairs: **Francine Desharnais**, Defence R&D Canada - Atlantic
David Moretti, Naval Undersea Warfare Center, Division Newport

Estimating the density of Blainville's beaked whale (Mesoplodon densirostris) in the Tongue of the Ocean (TOTO) using passive acoustics

David Moretti, Naval Undersea Warfare Center, Division Newport
Nancy DiMarzio, Naval Undersea Warfare Center, Division Newport
Jessica Ward, Naval Undersea Warfare Center, Division Newport
Ronald Morrissey, Naval Undersea Warfare Center, Division Newport
Susan Jarvis, Naval Undersea Warfare Center, Division Newport

Acoustic behavior of beaked whales, with implications for acoustic monitoring

Peter Tyack, Woods Hole Oceanographic Institution
Mark Johnson, Woods Hole Oceanographic Institution
Walter Zimmer, NATO Undersea Research Centre
Natacha Soto, University of La Laguna
Peter Madsen, University of Aarhus

Automated Classification of Beaked Whales and Other Small Odontocetes in the Tongue of the Ocean, Bahamas

Susan Jarvis, Worcester Polytechnic institute
Nancy Dimarzio, Naval Undersea Warfare Center, Division Newport
Ronald Morrissey, Naval Undersea Warfare Center, Division Newport
David Moretti, Naval Undersea Warfare Center, Division Newport

Detecting, Tracking and Classifying Animals in Underwater Video

Duane Edgington, Monterey Bay Aquarium Research Institute
Danelle Cline, Monterey Bay Aquarium Research Institute
Daniel Davis, Monterey Bay Aquarium Research Institute
Ishbel Kerkez, Monterey Bay Aquarium Research Institute
Jerome Mariette, Monterey Bay Aquarium Research Institute

Channel Characterization for Acoustic Communications

Meeting Room 108
Thursday, September 21 (8:00AM - 9:45AM)

Co-Chairs: **Lee Freitag**, Woods Hole Oceanographic Institution
Milica Stojanovic, Massachusetts Institute of Technology

Characterization and Modeling of Underwater Acoustic Communications Channels for Frequency-Shift-Keying Signals

Wen-Bin Yang, U.S. Naval Research Laboratory
T.C. Yang, U.S. Naval Research Laboratory

Statistical Characterization of Very Low Frequency Communication Channels at Ocean Basin-Scales

John Spiesberger, University of Pennsylvania
Dale Green, Benthos Inc.

Incorporating Realistic Acoustic Propagation Models in Simulation of Underwater Acoustic Networks: A Statistical Approach

Geoffrey Xie, Naval Postgraduate School
John Gibson, Naval Postgraduate School
Leopoldo Díaz-González, Mexican Navy

Channel Coding for Underwater Acoustic Communication System

Andre Goalic, ENST Bretagne
Joël Trubuil, ENST Bretagne
Nicolas Beuzelin, GESMA
Joël Labat, ENST Bretagne

Exploring Random Access and Handshaking Techniques in Large-Scale Underwater Wireless Acoustic Sensor Networks

Peng Xie, University of Connecticut
Jun-Hong Cui, University of Connecticut

Imaging I

Meeting Room 109
Thursday, September 21 (8:00AM - 9:45AM)

Co-Chairs: **Christian Barat**, I3S UNSA-CNRS
Kristof Richmond, Aerospace Robotics Laboratory/Stanford University

A fully automated approach for underwater mosaicking

Alessandro Leone, IMM-CNR
Cosimo Distante, IMM-CNR
Angela Mastrolia, IMM-CNR
Giovanni Indiveri, Università di Lecce

Deep-sea geo-referenced video mosaics

Yuri Rzhanov, University of New Hampshire
Larry Mayer, University of New Hampshire
Stace Beaulieu, Woods Hole Oceanographic Institution
Timothy Shank, Woods Hole Oceanographic Institution
Samuel Soule, Woods Hole Oceanographic Institution
Daniel Fornari, Woods Hole Oceanographic Institution

Construction of video mosaics using the Minimum Description Length

Maria-João Rendas, I3S UNSA-CNRS

An Operational Real-Time Large-Scale Visual Mosaicking and Navigation System

Kristof Richmond, Aerospace Robotics Laboratory/Stanford University
Stephen Rock, Aerospace Robotics Laboratory/Stanford University

Education and Outreach I

Meeting Room 110
Thursday, September 21 (8:00AM - 9:45AM)

Co-Chairs: **Paula Keener-Chavis**, NOAA
Liesl Hotaling, Stevens Institute of Technology

The Educational Benefits of the Human-Powered International Submarine Races

Claude Brancart, IEEE/Oceanic Engineering Society
Nancy Hussey, FURE

A simple ROV project for the engineering classroom.

Rustam Stolkin, Stevens Institute of Technology
Liesl Hotaling, Stevens Institute of Technology
Richard Sheryll, Stevens Institute of Technology

New and innovative programs linking scientists to educators, their students, and the general public

Scott Glenn, Rutgers University
Oscar Schofield, Rutgers University
Janice McDonnell, Rutgers University
Josh Kohut, Rutgers University
Robert Chant, Rutgers University

Tools for Tomorrow's Science and Technology Workforce: MATE's 2006 ROV Competition Sets Students' Sights on Ocean Observing Systems

Jill Zande, Marine Advanced Technology Education Center
Susan Cook, Consortium for Oceanographic Research and Education
George Matsumoto, Monterey Bay Aquarium Research Institute
Blanche Meeson, Ocean.US

Exhibitor Product Showcase 8: Open Topic Session

Meeting Room 111
Thursday, September 21 (8:15AM - 10:00AM)

Contact show management, or Bob Lobecker or Maggie Merrill to schedule this room

Coastal Observatories II

Meeting Room 112
Thursday, September 21 (8:00AM - 9:45AM)

Co-Chairs: **Grace Chang**, UCSB
Oscar Schofield, Rutgers University

CORIE: the first decade of a coastal-margin collaborative observatory

Antonio Baptista, Oregon Health & Science University

Adaptive Integration of Sub-regional Coastal Ocean Observing Systems: A Case Study of the Coastal Ocean Research and Monitoring Program (CORMP) and the Carolinas Coastal Ocean Observing and Prediction System (Caro-COOPS)

Madilyn Fletcher, University of South Carolina
Dwayne Porter, University of South Carolina
Lynn Leonard, University of North Carolina Wilmington
Marvin Moss, University of North Carolina Wilmington
Michael Durako, University of North Carolina Wilmington
Jennifer Dorton, University of North Carolina Wilmington
Leonard Pietrafesa, North Carolina State University
Earle Buckley, North Carolina State University
Lian Xie, North Carolina State University

Comparison of Real Time Plume Tracking Methods in Coastal Waters

Carl Albro, Battelle
Alex Mansfield, Battelle

Observed Response of the Hudson River Plume in an Operational Research Observatory

Oscar Schofield, Rutgers University
Scott Glenn, Rutgers University
Josh Kohut, Rutgers University
Robert Chant, Rutgers University

Coastal Ocean Observatories Enable Biological Investigations in a Buoyant Plume

Thomas Frazer, University of Florida
Oscar Schofield, Rutgers University
Mark Moline, California Polytechnic State University
Scott Glenn, Rutgers University
Josh Kohut, Rutgers University
Robert Chant, Rutgers University
S. Keller, University of Florida
M. Oliver, Rutgers University
J Reinfelder, Rutgers University
M. Zhou, University of Massachusetts Boston
R. Chen, University of Massachusetts Boston

THURSDAY 10:15AM – 12:00PM

Passive Sonar Tracking

Meeting Room 101
Thursday, September 21 (10:15AM - 12:00PM)

Co-Chairs: **Christian Hempel**, Naval Undersea Warfare Center, Division Newport
Roy Streit, Metron

An Overview of the Probability Density Function (PDF) Tracker

Benjamin Shapo, GD-AIS
Roy Bethel, Mitre

Narrowband Tracking Using a Markov Random Field Algorithm

Paul Baggenstoss, Naval Undersea Warfare Center, Division Newport

Bearing Stabilization and Tracking for an AUV with an Acoustic Line Array

Andrew Poulsen, Massachusetts Institute of Technology
Donald Eickstedt, Massachusetts Institute of Technology
John Ianniello, Science Applications International Corporation

A Chorus of Whales: Evaluation of Sequential and Batch Approaches to Time-Series Tracking

Odile Gerard, NATO Undersea Research Centre
Stefano Coraluppi, NATO Undersea Research Centre
Walter Zimmer, NATO Undersea Research Centre
Peter Willett, University of Connecticut

Vector Sensor Arrays and Processing I

Meeting Room 102
Thursday, September 21 (10:15AM - 12:00PM)

Co-Chairs: **Bruce Abraham**, Applied Physical Sciences Corporation
James McConnell, Acoustech Corporation

Localization of Radiating Sources along the Hull of a Submarine Using a Vector Sensor Array

Joseph Clark, Naval Surface Warfare Center Panama City
Gerald Tarasek, Naval Surface Warfare Center Panama City

Forming First- and Second-Order Cardioids with Multimode Hydrophones

James McConnell, Acoustech Corporation
Jason Rudzinsky, Applied Physical Sciences Corporation
Scott Jensen, Acoustech Corporation

ARAP - Deep Ocean Acoustic Vector Sensor Research Array

James McEachern, NAVMAR Applied Sciences Corp.
James McConnell, Acoustech Corporation
John Jamieson, 3 Phoenix, Inc.
David Trivett, Georgia Institute of Technology

Ambient Noise Measurements with Vector Acoustic Hydrophones

Bruce Abraham, Applied Physical Sciences Corporation

UUV, AUV, ROV V

Meeting Room 103
Thursday, September 21 (10:15AM - 12:00PM)

Co-Chairs: **Markus Bergenthal**, Marum / University of Bremen
Karl von Ellenrieder, Florida Atlantic University

Characteristics of an autonomous underwater vehicle with a towed hydrophone array

Jason Holmes, Boston University
Amy Kukulya, Woods Hole Oceanographic Institution

Signal Processing Algorithms for High-precision Three-dimensional Navigation and Guidance of Unmanned Undersea Vehicles (UUV)

Christopher Utley, University of California Santa Barbara
Hua Lee, University of California Santa Barbara

Unmanned Surface Vehicles for Environmental Assessment and Monitoring

Eric Steimle, University of South Florida
Micheal Hall, University of South Florida

MOVE! - An instrument carrier system for spatial oberservation and time series measurements.

Markus Bergenthal, Marum / University of Bremen
Christoph Waldmann, Marum / University of Bremen
Jens Renken, Marum / University of Bremen
Ralf Duessmann, Marum / University of Bremen

First Results of A Novel and Low Power Forward Looking Sonar Technology for Small AUVs

Wen Xu, Teledyne RD Instruments
Paul Kraeutner, Teledyne RD Instruments
Hongkai Guo, Teledyne RD Instruments
Harry Maxfield, Teledyne RD Instruments

Oceanographic Sensors I

Meeting Room 104
Thursday, September 21 (10:15AM - 12:00PM)

Co-Chairs: **Chris Scholin**, Monterey Bay Aquarium Research Institute
Matt Mowlem, National Oceanography Centre, Southampton

Solid State Attitude sensor for Low Cost Marine Application

Jon Crowell, OceanServer Technology, Inc

Micro System Technology for Marine Measurement

Matt Mowlem, National Oceanography Centre, Southampton
Giuseppe Benazzi, University of Southampton
David Holmes, University of Southampton
Hywel Morgan, University of Southampton
Christoph Haas, University of Southampton
Michael Kraft, University of Southampton
Alan Taberham, University of Southampton
Valerie Chavagnac, National Oceanography Centre, Southampton
Peter Statham, National Oceanography Centre, Southampton
Peter Burkill, National Oceanography Centre, Southampton

A fast response, stable CTD for gliders and AUVs

Raymond Schmitt, Woods Hole Oceanographic Institution
Robert Petitt, Woods Hole Oceanographic Institution

Measurement of Net Ocean Surface Heat Flux, Solar Irradiance, near-Surface Temperature and Sea State using a Novel Surface Contact Lagrangian Buoy

James Boyle, Western Connecituct State University
Michael Herman, Embedded Signal and Image Processing
J. DePasqua, Western Connecticut State University

Information Processing

Meeting Room 106
Thursday, September 21 (10:15AM - 12:00PM)

Co-Chairs: **Dean Edwards**, University of Idaho
Anna Fiolek, NOAA Central Library

AUVish: An Application-Based Language for Cooperating AUVs

Andrew Rajala, University of Idaho
Michael O'Rourke, University of Idaho
Dean Edwards, University of Idaho

MBARI's Video Annotation and Reference System

Brian Schlining, Monterey Bay Aquarium Research Institute
Nancy Jacobsen Stout, Monterey Bay Aquarium Research Institute

TerrLab - a generic simulation and post-processing tool for terrain referenced navigation

Ove Hagen, Norwegian Defence Research Establishment

NOAA Ocean Exploration Digital Video and Image Data: Archiving, Preserving, and Accessing Online Oceanographic Information

Anna Fiolek, NOAA Central Library
Donald Collins, NOAA National Oceanographic Data Center
Janice Beattie, NOAA Central Library
Dorothy Anderson, NOAA Central Library

Marine Mammal DCL II

Meeting Room 107
Thursday, September 21 (10:15AM - 12:00PM)

Co-Chairs: **Francine Desharnais**, Defence R&D Canada - Atlantic
David Moretti, Naval Undersea Warfare Center, Division Newport

Development and experimentation of a satellite buoy network for real-time acoustic localisation of whales in the St. Lawrence

Yvan Simard, ISMER/Université du Québec
Chan-Wang Park, DIMG/Université du Québec à Rimouski
Mohammed Bahoura, DIMG/Université du Québec à Rimouski
Jean Rouat, IMSI
Martin Sirois, IDS Micronet
Xavier Mouy, ISMER/Université du Québec
Diya Seebaruth, IMSI
Nathalie Roy, Maurice-Lamontagne Institute
Richard Lepage, ISMER/Université du Québec

Real-time Detection and localization of North Atlantic Right Whale (Eubalaena glacialis) vocalizations using widely-space, bottom-mounted hydrophones in the Bay of Fundy

Ronald Morrissey, Naval Undersea Warfare Center, Division Newport
Nancy DiMarzio, Naval Undersea Warfare Center, Division Newport
Susan Jarvis, Naval Undersea Warfare Center, Division Newport
David Moretti, Naval Undersea Warfare Center, Division Newport
Jessica Ward, Naval Undersea Warfare Center, Division Newport

Integrated Marine Mammal Monitoring and Protection System (IMAPS): Gray Whale Target Strength Measurements and the Analysis of the Back-Scattered Response

Irena Lucifredi, Scientific Solutions Inc.
Peter Stein, Scientific Solutions Inc.

Advanced Signal Processing Methods I

Meeting Room 108
Thursday, September 21 (10:15AM - 12:00PM)

Chair: **Gerald Dobeck, Naval Surface Warfare Center Panama City**

A new wavelet thresholding approach for SAS images de-noising

Julien Mallet, ISEN-Toulon
Philippe Courmontagne, ISEN-Toulon

Gabor Transform for Subband SAS Imaging

JoEllen Wilbur, Naval Surface Warfare Center Panama City
Robert McDonald, Naval Surface Warfare Center Panama City
Daniel Brown, Naval Surface Warfare Center Panama City

A Kernel Machine Framework for Feature Optimization in Multi-frequency Sonar Imagery

Jason Stack, Naval Surface Warfare Center Panama City
Rodolfo Arrieta, Naval Surface Warfare Center Panama City
Xuejun Liao, Duke University
Larry Carin, Duke University

A Group Filter Algorithm for Sea Mine Detection

Richard Tolimieri, Prometheus, Inc.
Myoung An, Prometheus, Inc.
James Cobb, Naval Surface Warfare Center Panama City
Benjamin Shenefelt, Prometheus, Inc

Imaging II

Meeting Room 109
Thursday, September 21 (10:15AM - 12:00PM)

Co-Chairs: **Maria-João Rendas**, I3S UNSA-CNRS
Matthew Johnson-Roberson, Australian Centre for Field Robotics, University of Sydney

MBARI's Midwater Ecology Low-Light Imaging System Development

Lance McBride, Monterey Bay Aquarium Research Institute

Kim Reisenbichler, Monterey Bay Aquarium Research Institute
Barbara Johnson, Monterey Bay Aquarium Research Institute

Shoreline Mapping using an Omni-directional Camera for Autonomous Surface Vehicle Applications

Daniel Stilwell, Virginia Polytechnic Institute and State University
Christopher Wyatt, Virginia Polytechnic Institute and State University
Anbumani Subramanian, Virginia Polytechnic Institute and State University
Xiaojin Gong, Virginia Polytechnic Institute and State University
Jamie Riggins, Virginia Polytechnic Institute and State University

Photogrammetric models for marine archaeology

Martin Ludvigsen, Norwegian University of Science and Technology
Ryan Eustice, Johns Hopkins University
Hanumant Singh, Woods Hole Oceanographic Institution

Photo Mosaicing of Tagiri Shallow Vent Area by the AUV

Toshihiro Maki, Institute of Industrial Science, The University of Tokyo
Hayato Kondo, Tokyo University of Marine Science and Technology
Tamaki Ura, Institute of Industrial Science, The University of Tokyo
Takashi Sakamaki, Institute of Industrial Science, The University of Tokyo

Education and Outreach II

Meeting Room 110
Thursday, September 21 (10:15AM - 12:00PM)

Co-Chairs: **Jill Zande**, Marine Advanced Technology Education Center
Paula Keener-Chavis, NOAA

OurOcean - An Integrated Solution to Ocean Monitoring and Forecasting

Peggy Li, NASA Jet Propulsion Laboratory
Yi Chao, NASA Jet Propulsion Laboratory
Quoc Vu, NASA Jet Propulsion Laboratory
Zhijin Li, NASA Jet Propulsion Laboratory
John Fararra, NASA Jet Propulsion Laboratory
Hongchun Zhang, NASA Jet Propulsion Laboratory
Xiaochun Wang, Jet Propulsion Laboratory

The MATE Technical Internship Program: Providing students with hands-on, real-world workplace experiences and employers with future employees

Lani Clough, Marine Advanced Technology Education Center
Tami Lunsford, Marine Advanced Technology Education Center

Telling Your Story: Helping Ocean Scientists to Participate in Outreach and Education that Focuses on the Importance of Ocean Research and Technology

Harold McWilliams, TERC
John Anderson, New England Aquarium
Nick Haddad, TERC
Catherine Cramer, COSEE-NE
Carol Baldassari, Lesley University

The National Ocean Sciences Bowl: More than just a Competition

Susan Cook, Consortium for Oceanographic Research and Education
Susan Haynes, Consortium for Oceanographic Research and Education
Genevieve Healy, CORE

Exhibitor Product Showcase 9: Marine and Oceanographic Technology Network Member General Meeting

Meeting Room 111
Thursday, September 21 (10:15AM - 12:00PM)

Chair: **MOTN TBD**

Coastal Observatories III

Meeting Room 112
Thursday, September 21 (10:15AM - 12:00PM)

Co-Chairs: **Scott Glenn**, Rutgers University
Grace Chang, UCSB

Significant Events Reported by the NDBC Stations during Hurricane Katrina

Richard Bouchard, NOAA National Data Buoy Center
Chung-Chu Teng, NOAA National Data Buoy Center
Rex Hervey, NOAA National Data Buoy Center

Coastal Observing Systems: Addressing Science while Fulfilling the Needs of Regulators, Managers and Stakeholders

James Bonner, Texas A&M University
Cheryl Page, Texas A&M University
Temitope Ojo, Texas A&M University
Deidre Williams, Texas A&M University, Corpus Christi
Nick Kraus, US Army Corp of Engineers

National Data Buoy Center (NDBC) National Backbone Contributions to the Integrated Ocean Observation System (IOOS)

Richard Crout, NOAA National Data Buoy Center
Don Conlee, NOAA National Data Buoy Center
Landry Bernard, NOAA National Data Buoy Center

The Goodwin / York Research Observatory (GYRO): A Cabled Coastal Observing System

Neil Rondorf, Science Applications International Corporation
Charles Fralick, Science Applications International Corporation

GLUCOS: The Great Lakes Urban Coastal Observing System

Thomas Consi, University of Wisconsin - Milwaukee Great Lakes WATER Institute
G. Barske, University of Wisconsin - Milwaukee Great Lakes WATER Institute
Harvey Bootsma, University of Wisconsin - Milwaukee Great Lakes WATER Institute
Thomas Hansen, University of Wisconsin - Milwaukee Great Lakes WATER Institute
John Janssen, University of Wisconsin - Milwaukee Great Lakes WATER Institute
Val Klump, University of Wisconsin - Milwaukee Great Lakes WATER Institute
Robert Paddock, University of Wisconsin - Milwaukee Great Lakes WATER Institute
James Waples, University of Wisconsin - Milwaukee Great Lakes WATER Institute

THURSDAY 1:15PM – 3:00PM

Panel Session: Stimulating Interest in Ocean Engineering and Science-What Can MTS members do?

Meeting Room TBA
Thursday September 21 (1:15PM - 3:00PM)

Speakers/Panelists:
Jay Labov, National Academy of Sciences, Center for Education
Chis Castillo-Comer, Director of Science, Texas Education Agency
Northeastern U.S. school district science curriculum supervisor
Ron Raymond, Spectrum Offshore and a female ocean engineer

Active Sonar Tracking

Meeting Room 101
Thursday, September 21 (1:15PM - 3:00PM)

Co-Chairs: **Peter Willett**, UConn
Christian Hempel, Naval Undersea Warfare Center, Division Newport

Use of the invariance principle for target tracking in active sonar geometries

Jorge Quijano, Portland State University
Lisa Zurk, Portland State University

Multi-Static Sonar Tracking Incorporating Environmentally-Adaptive SNR Estimates

David Krout, Department of Electrical Engineering, University of Washington
James Pitton, Applied Physics Lab/University of Washington
Warren Fox, Applied Physics Lab/University of Washington

Adaptive Track Detection for Multi-Static Active Sonar Systems

Christian Hempel, Naval Undersea Warfare Center, Division Newport

Off-Line and Real-Time ML-PDA Track Validation

Wayne Blanding, University of Connecticut
Peter Willett, University of Connecticut
Yaakov Bar-Shalom, University of Connecticut

Passive Sonar Array Processing

Meeting Room 102
Thursday, September 21 (1:15PM - 3:00PM)

Chair: **Bruce Newhall, Applied Physics Lab/Johns Hopkins University**

A generalized beamformer for tracking tonal sources

Francine Desharnais, Defence R&D Canada - Atlantic
Marie-Noël Matthews, Defence R&D Canada - Atlantic
Gordon Ebbeson, Defence R&D Canada - Atlantic
Garry Heard, Defence R&D Canada - Atlantic
Gary Brooke, General Dynamics Canada
David Thomson,

Robust Broadband Adaptive Beamforming via Polynomial Eigenvalues

Soydan Redif, QinetiQ Ltd
John McWhirter, QinetiQ Ltd
Paul Baxter, QinetiQ Ltd
Thomas Cooper, QinetiQ Ltd

A Multi-hypothesis Filter for Passive Surface and Sub-surface Target Localization

JoEllen Wilbur, Naval Surface Warfare Center Panama City
John Hyland, Naval Surface Warfare Center Panama City
Gerald Dobeck, Naval Surface Warfare Center Panama City
Chris Sermarini, Naval Surface Warfare Center Panama City

Tripwire system for fixed line array processing

Sunil Mathews, Naval Undersea Warfare Center, Division Newport
Mary Johnson, Naval Undersea Warfare Center, Division Newport
Robert LaTourette, Naval Undersea Warfare Center, Division Newport
Sami Deeb, Naval Undersea Warfare Center
Elizabeth Kocab, Naval Undersea Warfare Center

Structures/Mechanical Engineering

Meeting Room 103
Thursday, September 21 (1:15PM - 3:00PM)

Co-Chairs: **Jerry Stachiw**, Stachiw Associates
Jan Hatleskog, Heriot-Watt University

External Pressure Housings

Jerry Stachiw, Stachiw Associates
Donald Peters, Woods Hole Oceanographic Institution
Glenn McDonald, Woods Hole Oceanographic Institution

Passive Compensator Load Variation for Deep Water Contact Operations

Jan Hatleskog, Heriot-Watt University
Matthew Dunnigan, Heriot-Watt University

Underwater Observatories with Panoramic Visibility

Joan Stachiw, Hydroports.com
Jerry Stachiw, Stachiw Associates

Heave Compensation Simulation for Non-Contact Operations in Deep Water

Jan Hatleskog, Heriot-Watt University
Matthew Dunnigan, Heriot-Watt University

Oceanographic Sensors II

Meeting Room 104
Thursday, September 21 (1:15PM - 3:00PM)

Co-Chairs: **Sheri White**, Woods Hole Oceanographic Institution
Rich Camilli, WHOI

Boundary Tracking and Rapid Mapping of A Thermal Plume Using an Autonomous Vehicle

Christopher Cannell, Virginia Polytechnic Institute and State University
Aditya Gadre, Virginia Polytechnic Institute and State University
Daniel Stilwell, Virginia Polytechnic Institute and State University

Integrated in-situ chemical sensor system for submersible deployment at deep-sea hydrothermal vents

Kang Ding, University of Minnesota
Zhong Zhang, University of Minnesota
William Seyfried, University of Minnesota
Albert Bradley, Woods Hole Oceanographic Institution
Yong Zhou, Zhejiang University
Can Yang, Zhejiang University
Ying Chen, Zhejiang University

The Environmental Sample Processor (ESP) - An Autonomous Robotic Device for Detecting Microorganisms Remotely using Molecular Probe Technology

Chris Scholin, Monterey Bay Aquarium Research Institute
Scott Jensen, Monterey Bay Aquarium Research Institute
Brent Roman, Monterey Bay Aquarium Research Institute
Roman Marin III, Monterey Bay Aquarium Research Institute
Eugene Massion, Monterey Bay Aquarium Research Institute
Christina Preston, Monterey Bay Aquarium Research Institute
Dianne Greenfield, Monterey Bay Aquarium Research Institute
William Jones, Monterey Bay Aquarium Research Institute
Kevin Wheeler, Monterey Bay Aquarium Research Institute

Investigation of the Limits of a Fibre Optic Sensor System for Measurement of Temperature Distribution.

Robert Brehm, Rbr Ltd.
Frank Johnson, RBR Ltd.

Dissolved Methane Sensor for Methane Leakage Monitoring in Methane Hydrate Production

Tsuyoshi Fukasawa, Ishikawajima Inspection & Instrumentation, LTD
Seisuke Hozumi, Ishikawajima Inspection & Instrumentation, LTD

Miki Morita, Ishikawajima Inspection & Instrumentation, LTD
Takashi Oketani, Ishikawajima Inspection & Instrumentation, LTD
Michel Masson, CAPSUM Technologie GmbH

Acoustic Modeling

Meeting Room 107
Thursday, September 21 (1:15PM - 3:00PM)

Chair: **Kevin LePage, U.S. Naval Research Laboratory**

Model-Based Calculations in Support of Inverse-Acoustic Sensing of the Ocean

Paul Etter, Northrop Grumman Corporation

Numerical prediction of coherent integration time at 75 Hz, 0.03 temporal resolution at 3250 km

John Spiesberger, University of Pennsylvania

High-Fidelity Model for Sonar Interrogation of Bottom and Surface Targets in Shallow Water

Thomas Giddings, Metron, Inc.
Joseph Shirron, Metron, Inc.

Modeling the underwater sound field excited by a rapidly moving source in air with wavenumber integration

Yipeng Zhang, College of Ocean Engineering, Northwestern Polytechnical University
Yuanliang Ma, College of Ocean Engineering, Northwestern Polytechnical University
Kunde Yang, Northwestern Polytechnical University

Advanced Signal Processing Methods II

Meeting Room 108
Thursday, September 21 (1:15PM - 3:00PM)

Chair: **Rene Garello, GET - ENST Bretagne**

Interferometric signal denoised by wavelets

Rene Garello, GET - ENST Bretagne
Christophe Sintes, GET - ENST Bretagne
Didier Guériot, ENST Bretagne

On the use of the stochastic matched filter for ship wake detection in SAR images

Fabien Chaillan, ISEN-Toulon
Philippe Courmontagne, ISEN-Toulon

Multi-scale MAP Denoising of SAR Images

Dorina ISAR, University of Timisoara
Alexandru ISAR, University of Timisoara
André Quinquis, ENSIETA

The adaptive stochastic matched filter for SAS images de-noising

Philippe Courmontagne, ISEN-Toulon
Fabien Chaillan, ISEN-Toulon

Imaging III

Meeting Room 109
Thursday, September 21 (1:15PM - 3:00PM)

Co-Chairs: **Toshihiro Maki**, Institute of Industrial Science, The University of Tokyo
Lance McBride, Monterey Bay Aquarium Research Institute

Development of High-Resolution Acoustic Camera based Real-Time Object Recognition System by using Autonomous Underwater Vehicles

Son-Cheol Yu, University of Hawaii
Tae-Won Kim, University of Hawaii
Akira Asada, Mase Inc.
Scott Weatherwax, University of Hawaii
Ben Collins, University of Hawaii
Junku Yuh, National Science Foundation

A robust visual attention system for detecting manufactured object in underwater video

Christian Barat, I3S UNSA-CNRS
Maria-João Rendas, I3S UNSA-CNRS

Stereoscopic Imaging for Coral Segmentation and Classification

Matthew Johnson-Roberson, Australian Centre for Field Robotics, University of Sydney
Stefan Williams, Australian Centre for Field Robotics, University of Sydney
Suresh Kumar, Australian Centre for Field Robotics, University of Sydney
Oscar Pizarro, Australian Centre for Field Robotics, University of Sydney

Detection of Trawling Patterns in Seabed Images

Xinsheng Yu, Ocean University of China
Dejun Gong, Institute of Oceanology
Ying Tang, Ocean University of China
Ni Wang, Ocean University of China

Education and Outreach III

Meeting Room 110
Thursday, September 21 (1:15PM - 3:00PM)

Co-Chairs: **Liesl Hotaling**, Stevens Institute of Technology
Jill Zande, Marine Advanced Technology Education Center

Multimedia Learning Materials for Marine Applications

Sherwood Wang, UCAR/COMET
Patrick Dills, UCAR/COMET
Thomas Lee, U.S. Naval Research Laboratory
Patrick Parrish, UCAR/COMET

Ocean Surface Currents in the classroom

M. Tweedie, NASA
Henry Snyder, Gallaudet University

Data Visualization on the OceanMotion Surface Currents Website

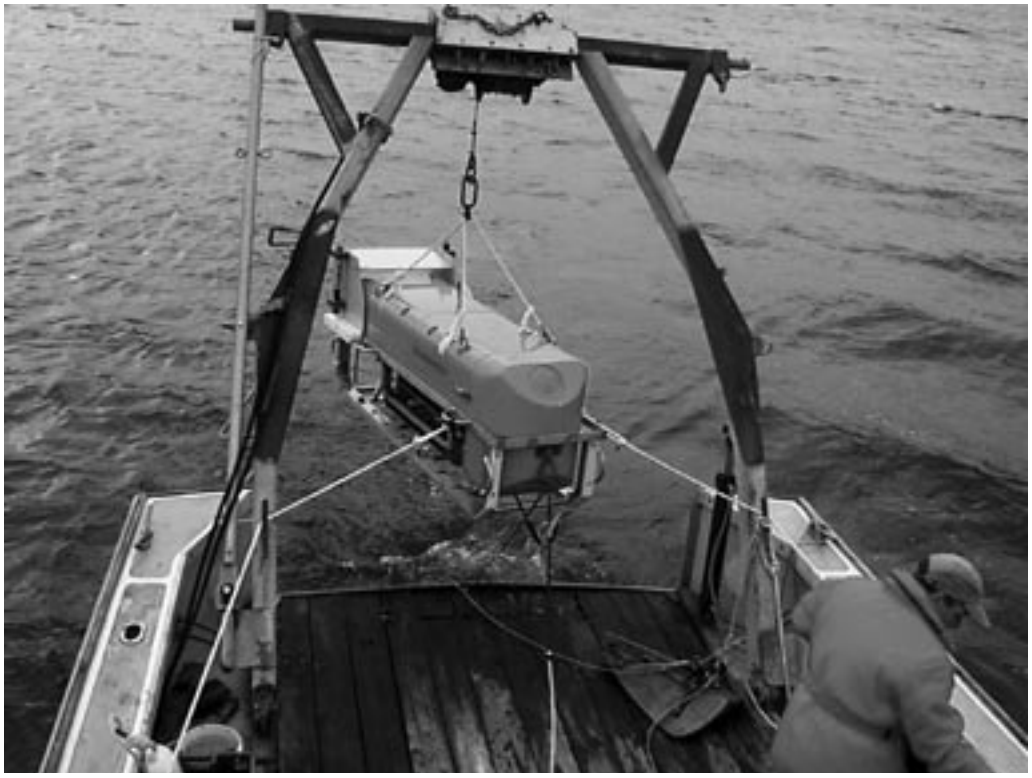
Henry Snyder, Gallaudet University

NOAA Ship Okeanos Explorer: Telepresence in the Service of Science, Education and Outreach

Catalina Martinez, National Oceanic and Atmospheric Administration
Paula Keener-Chavis, National Oceanic and Atmospheric Administration

Exhibitor Product Showcase 10: Open Topic Session

Meeting Room 111
Thursday, September 21 (1:15PM - 3:00PM)
Contact Bob Lobecker or Maggie Merrill at Conference Registration to reserve the room for meetings.



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CANADA—PLATINUM SPONSOR

Canadians are going to have a gigantic presence at OCEANS '06 in Boston, in advance of OCEANS '07 in Vancouver, and OCEANS '08 in Quebec City. More than fifty exhibit hall spaces have been reserved including Pavilions for Canada, and the provinces of Quebec, British Columbia, Newfoundland and Labrador, and Nova Scotia, along with booths for more than twenty companies. Numerous events are being organized, designed to stress the technical excellence and business importance of Canadian Marine Technology, and to showcase Canadian companies to potential customers, partners, and investors. Events being planned include the pre-gala reception at the Museum of Science, special matchmaking sessions focusing on partnering opportunities, an investment forum, a Canadian Product Showcase, and a business-to-business breakfast.

LOCKHEED MARTIN SIPPICAN—GOLD SPONSOR

In 2004, Lockheed Martin acquired Marion, Massachusetts-based Sippican, Inc., adding the company's expertise in the design and manufacture of expendable oceanographic and meteorological instrumentation, submarine communication systems, countermeasure systems, and underwater vehicles to its MS2 portfolio.

Visit our exhibit to learn more about some of the products we provide for our customers around the world. On display will be oceanographic instrumentation and data acquisition systems used by oceanographers involved in various global climate challenges to obtain accurate measurements of temperature and salinity. Also on display will be our autonomous underwater vehicles used for scientific data collection, detection of various undersea threats, and anti-submarine warfare training.

In addition to the company's oceanographic and undersea systems displays, information will be available on the integrated space and ground system Lockheed Martin is now developing for NOAA. This new GOES-R series of satellites will dramatically improve severe storm tracking, weather prediction, climate forecasting, and coastal imaging.

Headquartered in Bethesda, Md., Lockheed Martin employs about 135,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration, and sustainment of advanced technology systems, products and services. The corporation reported 2005 sales of $37.2 billion.

RAYTHEON—SILVER SPONSOR

Raytheon, headquartered in Massachusetts, is a strong supporter of the marine industry, and continues this year as a sponsor of various events at OCEANS '06 including student posters and internet café.

MARINE & OCEANOGRAPHIC TECHNOLOGY NETWORK (MOTN)—SILVER SPONSOR

MOTN is a network of manufacturers of marine and oceanographic products and related supply chain vendors, educators, and government agencies. Network members are primarily located in New England along the sea corridor from Maine to Connecticut. MOTN activities include the biannual Ocean Technology Workshop (OTW) featuring in-water customer demonstrations, conducting industry economic impact studies, and offering briefings on issues that affect the bottom line, such as non-lead soldering rules, and Export regulations. Nineteen MOTN companies have reserved twenty-one booth spaces. A special Product Showcase is scheduled for MOTN companies to make product presentations. Our thanks too, to the MOTN company personnel who have volunteered many hundreds of hours to make OCEANS '06 a success.

ONR—SILVER SPONSOR

The US Navy is well represented at OCEANS this year. ONR (Office of Naval Research) is supporting travel and lodging expenses for the Students participating in the Poster Presentations. ONR has provided funds for this event for several years, enabling students to attend the conference. In most cases these students could not normally afford to come. Some are coming from overseas. In addition, SPAWAR Systems Command of San Diego, and the Navy Meteorological and Oceanographic Office from Stennis will have booth space.

NATIONAL SCIENCE FOUNDATION (NSF)—SILVER SPONSOR

For the first time this year National Science Foundation's Dr. Michael Plesniak, CTS Fluid Dynamics Division, and Lisa Rom, Ocean Sciences Division. have provided support to the Student Poster Presentations. Their generous financial support has allowed us to pay full registration and housing for all students participating in this program, as well as offer travel awards to offset transportation costs to and from Boston.

MATERIAL SYSTEMS INC.—TITANIUM SPONSOR

Materials Systems Inc. (MSI) designs and manufactures custom sonar transducers and arrays for a wide range of applications, including side-scan, obstacle avoidance, sub-bottom profiling, swath bathymetry, mine hunting, swimmer detection, and acoustic communications. MSI's piezocomposite technology offers extremely broad bandwidth, high receive sensitivity, high source levels, and conformability for curved arrays. MSI personnel participated in the earliest work on piezocomposites in the

late 1970s, when the performance benefits were first demonstrated under ONR and DARPA funding. Since then, MSI has developed innovative injection molding techniques for mass-producing these transducers at the lowest possible cost. MSI's pioneering development of low cost injection molding for manufacturing piezocomposite opened the way for application of this powerful acoustic transducer material in sonar and ultrasound. During the past 15 years, MSI has become the recognized leader in providing high performance piezocomposite transducers for the US Navy and a variety of other defense and commercial applications. This is a mature technology that has been demonstrated on a wide range of applications. MSI is now in full scale production for a variety of commercial and industrial customers.

Teledyne Marine Instruments Group

TELEDYNE MARINE INSTRUMENTS GROUP—TITANIUM SPONSOR

Teledyne Marine Instruments Group is a new and growing coalition of Teledyne Technologies companies that provide instrumentation and services to the marine, offshore and oceanographic communities. The Teledyne Marine Instruments Group is now comprised of Teledyne RD Instruments, Teledyne Benthos, Teledyne Geophysical, and most recently, Ocean Design, Inc. (a Teledyne majority owned company.) Independently, each company remains an undeniable expert in its respective field. As a group, these organizations now merge their strengths, talents, and technology to provide customers with a new era of cooperative product innovation, service, and performance.

Marine Technology Society New England Section

IEEE OES

MTS NEW ENGLAND & IEEE/OES BOSTON

The sponsoring hosts for OCEANS '06 welcome all attendees, exhibitors and technical paper presenters to this year's conference. A grateful thanks to the volunteers from the two organizations who have worked so hard to bring this event to the marine technology community.

Lionheart GRAPHICS + ILLUSTRATION

LIONHEART GRAPHICS

Based just northwest of Vancouver, Canada, on British Columbia's Sunshine Coast, Lionheart Graphics has been involved with Oceans '06 from the outset, working with Margo Newcombe of MLN Marketing on the design and production of all the event media. Martin Nichols, Lionheart's owner, wishes all the organizers and participants of Oceans '06 all the very best for a successful event.

THANKS ALSO...

to our sponsors for their support in making this a special OCEANS, in particular to the Canadian Consulate, Boston for their successful efforts in bringing many companies and provincial pavilions to Boston, as well as full support for the pre-gala reception. Our best wishes to our Northern partner for OCEANS '07 Vancouver, and OCEANS '08 Quebec City.

Media Partners

Every year the professional societies of IEEE and MTS organize various events and conferences. These events would never be as successful without the unending assistance from our promotional partners in the marine trade magazines. We salute our media partners for running many full and half page four color ads, running various press releases updating folks on the happenings with all the Oceans programs and in particular with the conference and exhibition being held September 18-21, 2006 in Boston, Massachusetts.

We rely on the efforts of these publications to get the word out to the individuals in the marine science and technology industry. We applaud them for reporting each and every day, week, month and quarter on all the very interesting and important developments in science and industry.

Please read these publications on line and in print. Contribute stories and news items regularly and as always support them through advertising your products and services.

Our special thanks go to:

H2O Ops: Ben Sharples, Editor and Publisher

Hydro International: Joost Boers, Editorial Manager

International Ocean Systems: Astrid Powell, Publisher; Daniel Johnson, Editor

Marine Technology Reporter: Rob Howard, VP Marketing and Greg Trauthwein, Associate Publisher and Editor

MTS Currents: Judith Krauthamer, Executive Director

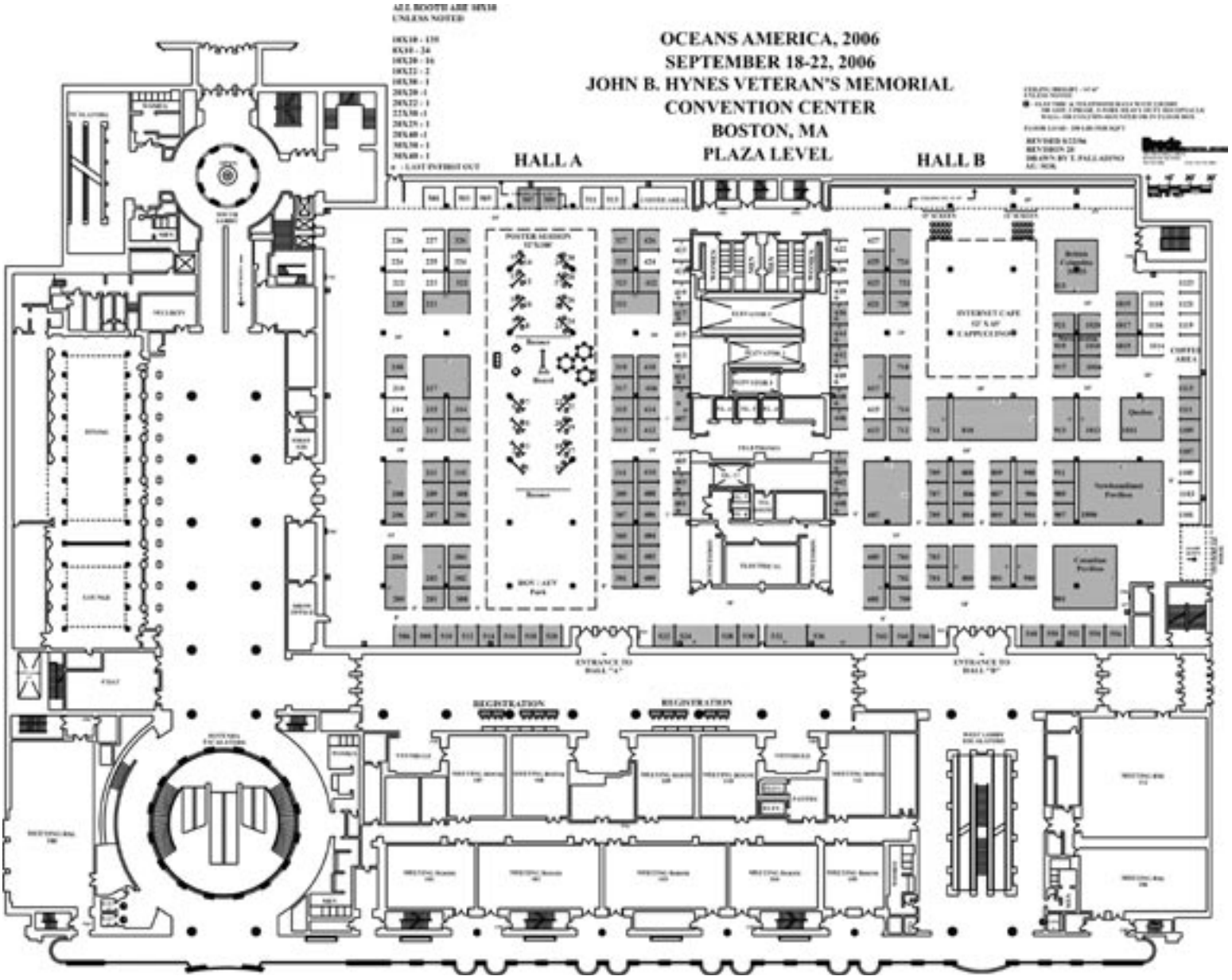
Ocean News and Technology: Lisa Chilik, Advertising and Sales; Dan White, Publisher

Offshore Source: Mary Nass, Advertising & Sales; Dan White, Publisher

Sea Technology: Amos Bussman, Publisher; Travis Trent, Assistant Editor; Sue Owen, VP Advertising Production

Underwater: Howie Doyle III, Publisher Editor; Darren Jones, Managing Editor

Exhibit Hall Floorplan



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Exhibitor Product Showcase

This year the highly successful Exhibitor Product Showcase that attracted standing room only audiences at Oceans 2000 in Providence has returned. All exhibitors are invited to submit abstracts and then full papers to the Exhibitor Product Showcase track. This track will provide exhibitors with a scheduled time to give talks or demonstrations on their new technology, applications, or programs. Refer to the Technical Program Schedule to locate the specific Exhibitor Product Showcase topics, speakers and times.

These sessions are scheduled to take place in Room 111 located steps away from the exhibit halls, making attendance convenient and trouble-free. There is a sponsored session on Tuesday September 19 from 10:15am - 12pm highlighting Canadian Companies.

The second will take place on Thursday morning from 10:15am - 12pm as an open time for a general meeting for existing and future members of the Marine and Oceanographic Technology Network (MOTN).

Room 111 will be available for other exhibitors to use for special sessions as time allows. Contact Maggie Merrill or Bob Lobecker at the Conference Registration area to schedule time to use the room.

Admission to these sessions is open to all conference registrants at no charge. Please refer to Technical Session Schedule for times and the web site and Final Program for updates.

Exhibitor Product Showcase Technical Committee:

Robert Lobecker, President, Technical Marketing Services
Stephane Loeul, Managing Director, IXSEA, Inc.
Maggie Merrill, President, Marine Marketing Services Editorial Director, Marine Technology Reporter

Exhibitor Profiles

All exhibitors were given an opportunity to submit short write-ups. Some may not have received emails regarding this added benefit due to aggressive spam filters. We apologize for omissions due to technical and time limitations.

Aanderaa Data Instruments (Norway)

Booth # 711/713
Web: www.aadi.no; Tel. 508-369-5269

Aanderaa Data Instruments - 40th Anniversary - announces a Breakthrough in commercial availability of Remote Underwater Observing Systems. Our Seaguard Host and expanding line of distributed Sensors mark a turning point in instrumentation for Hydro Acoustic, Optical, Electro-Chemical, Pressure, Temperature and Meteorological observing systems and self-contained instrumentation. Known for reliable robust products Aadi is a trusted source to Oceanographic Institutes, Universities, Geophysical Surveyors, Navies, Offshore Oil & Gas, Harbours, Government Agencies, Water Authorities, Electric Utilities.

Aerospace & Defence Industries Association of Nova Scotia (Nova Scotia)

Booth #901/1018
Web: www.adians.ca; Tel: 902-425-0070

ADIANS' Ocean Technology Council represents a cluster of advanced Ocean Technology Companies that collaborate to increase awareness, support advocacy, and increase business development in collaboration with the Federal Government's Oceans Action Plan's fourth pillar - the Ocean Science Technology Partnership.

ALEC Electronics Co. Ltd. (Japan)

Booth # 913/915
Web: www.alec-electronics.co.jp; Tel. 81-78-997-8686

ALEC presents the next generation its marine oceanographic instruments and our line-up features substantial improvements to our well-proven equipment. The wide range of our products are current speed/direction, compass/tilt, chlorophyll, DO, water temperature, depth, conductivity, salinity, turbidity, light intensity, pH & ORP.

All American Marine, Inc. (USA)

Booth # 600
Web: www.allamericanmarine.com; Tel. 360-647-7602 ext. 3003

All American Marine is a custom builder of high-speed, hydrofoil-assisted, aluminum catamarans with over 19 years of experience. AAM is committed to building high quality research catamarans at a reasonable price. All American Marine is the exclusive builder of Teknicraft Design hulls in North America.

Alliance for Coastal Technologies (USA)

Booth # 805
Web: http://www.act-us.info; Tel. 410-326-7385

The Alliance for Coastal Technologies (ACT) is a NOAA-funded partnership of research institutions, resource managers, and private sector companies dedicated to fostering the development and adoption of effective and reliable sensors and platforms. ACT is committed to providing the information required to select the most appropriate tools for studying and monitoring coastal environments. Priorities include effectively transitioning emerging technologies to operational use; maintaining a dialogue among technology users, developers, and providers; identifying technology needs and novel technologies; documenting technology performance and potential; and providing the Integrated Ocean Observing System (IOOS) with information required for the deployment of reliable networks.

APM Hexseal (USA)

Booth # 804
Web: www.apmhexseal.com; Tel. 201-569-5700

The world's most hostile environments are our proving ground ...has been the APM HEXSEAL mission and motto since 1947 when we first developed our line of switch & circuit breaker sealing boots for U.S. Naval equipment. Our highly IP Rated seals are designed to meet MIL-B-5423 and are UL recognized, and

are used extensively in a wide range of underwater & marinesurface applications. A full line of complimentary high-pressure, reusable self-sealing fasteners are also used extensively in marine and other related industrial applications.

Applied Acoustic Engineering

Booth # 532/534
Web: Tel.

Applied Signal Technology (USA)

Booth # 1012/1014
Web: Tel.

Applanix (Ontario)

Booth #212
Web: www.applanix.com; 905-709-4600

Applanix, a wholly owned subsidiary of Trimble, develops, manufactures, sells and supports precision products that accurately and robustly measure the position and orientation of vehicles operating in dynamic environments. Applanix strives to support customers around the world with exceptional service, anywhere at anytime.

Applied Microsystems Ltd.

Booth #1015
Web: www.appliedmicrosystems.com; Tel. 250- 656-0771

Oceanographic research, environmental protection or marine survey - detailed knowledge of the properties of water is critical. For 30+ years, Applied Microsystems has manufactured SV and CTD instrumentation. Through innovative research and miniaturization, the Company has developed single and multi-function devices to measure, monitor and record; sound velocity, fresh and seawater conductivity, salinity, temperature, depth, tides, waves, dissolved oxygen, pH, Redox, turbidity, ocean floor sediment temperature gradients and other specialized parameters. Instrument types include; CTD's, Sound Velocimeters, loggers, profilers, real-time probes, multi-sensor chains and in-situ mass spectrometer for chemical detection.

ArcticNet

Booth #901
Web: www.arcticnet-ulaval.ca; Tel.418-656-5830

The ArcticNet Network of Centres of Excellence of Canada brings together over 100 research teams from 27 Canadian universities and 5 Federal departments with their partners in Inuit organizations, government, industry and foreign research laboratories to study the impacts of climate change in the coastal Canadian Arctic.

ASL Environmental Sciences Inc. (British Columbia)

Booth # 927
Web: www.aslenv.com; Tel. 250-656-0177

ASL has specialized in the physical measurement of oceans and sea ice since 1977 and provides a broad range of oceanographic measurement, modeling and data processing and analysis services. ASL offers a range of upward looking sonar products including the Ice Profiling sonar for accurate long term measurements of ice keels and the Acoustic Water Column Profiler for monitoring the abundance and movements of zooplankton.

AXYS Technologies Inc.(British Columbia)

Booth #552
Web: www.axystechnologies.com; Tel.250-655-5850

AXYS Technologies Inc. (AXYS) is a leader in environmental data acquisition systems. AXYS delivers complete monitoring solutions for measuring parameters in air and water by providing turnkey integrated hardware, software, and field services. Our systems provide real-time data with a wide range of data telemetry options including radio, cellular phone, and satellite.

Battelle (USA)

Booth # 200/202
Web: Tel.

Bedford Insitute of Oceanography (Canada)

Booth # 901
Web: http://iot-ito.nrc-cnrc.gc.ca; Tel. (709) 772-4939
Bedford Institute of Oceanography (BIO) is a modern oceanographic research facility, established in 1962 by the Federal Government of Canada and is located on the shores of the Bedford Basin in Dartmouth, Nova Scotia. The Institute performs targeted research, mandated by the Canadian government, to provide advice and support to government decision making on a broad range of ocean issues, including sovereignty, defence, environmental protection, health and safety, fisheries and natural resources and undertakes environmental and oceans management and planning.

Birns Aquamate, LLC (Israel)

Booth # 524/526
Web: www.birnsaquamate.com; Tel: 972-4-676-3863 Intl:+1-805-487-5393
Birns Aquamate is a member of the Birns Group which, supplies quality underwater electrical connectors, cable assemblies, and cable terminations. Produce a wide range of standard industry connectors such as the 5500 Series, SC, MC, LP, FAWL/FAWM, RM, etc. fully compatible with other manufacturers. The firm also specializes in fast turn-around for custom design of special connector solutions.

BIRNS, Inc. (USA)

Booth # 525/526
Web: www.birns.com; Tel: (888)BIRNS-88 (USA toll-free)
BIRNS is in its sixth decade of manufacturing high-performance lighting systems; MPI equipment; and electrical, electromechanical and electro-optical connectors and cable systems for deep-submergence use. On display are full ranges of BIRNS diving and ROV lights, and BIRNS Millennium, Aquamate, Elastomeric, Polymeric, and Metal Shell connectors. New for Oceans'06: optical connectors, electro-optical hybrid connectors, miniature helmet lights, and penetrators for PVHO's.

Bluefin Robotics (USA)

Booth # 200/202
Web: www.bluefinrobotics.com; Tel. 617-715-7000
Bluefin Robotics is a world-class provider of AUVs, Gliders, and Subsea Batteries.

Boston Harbor Islands (USA)

Booth # 4002
Web: www.islandalliance.org; Tel. 617-223-8636

British Columbia Innovation Council (British Columbia)

Booth #923
Web: www.bcinnovationcouncil.com; Tel.604-438-2752
BC Innovation Council is the province's lead organization supporting applied research and commercialization of science and technology to foster province-wide economic development. A Crown Agency of the Province of British Columbia, BC Innovation Council serves as a one-stop point of access and support to companies, educational institutions, technology industry awareness groups, federal science and technology agencies and university research labs.

British Columbia Pavilion, (British Columbia)

Booth # 923,925,927,1020,1022
Web: Tel.

BOT-USA

Booth #507
Web: www.brooke-oceanusa.com; Tel. 508-990-4575
Brooke Ocean Technology supplies handling systems for towed bodies, ROVs, AUVs and other payloads. These systems typically incorporate a capture mechanism to control the motion of the payload as it is transferred between the sea and the vessel.

Brooke Ocean Technology Ltd. (Nova Scotia)

Booth # 507
Web: www.brooke-ocean.com; Tel. 902-468-2928
Brooke Ocean Technology Ltd. (BOT) manufactures advanced data collection platforms, instrumentation,

cable handling hardware and launch/recovery systems. Products include the Moving Vessel Profiler (MVP), an automated, free-fall data collection system which can collect CTD, sound velocity and other data from vessels underway at speeds up to 18 knots. Our SeaHorse moored profiling system harnesses wave power as an energy source to move up and down a mooring wire. The SeaCycler is an energy efficient subsurface winch and profiling system which can collect data profiles for up to 12 months.

Canadian Centre for Marine Communication (Newfoundland)

Booth #1006
Web: www.ccmc.nf.ca; Tel. 709-579-4872

CCMC, founded in 1989, facilitates the expansion of the industrial base and enhances the competitiveness of the Canadian marine ICT industry. CCMC focuses on the strategic partnerships between industry, research centres, universities, government agencies, and finance institutions. As both an investor and a partner, CCMC demonstrates a positive impact on both the technical and commercial success of industry in this sector

Canadian Space Agency (Canada)

Booth #901
Web: http://www.space.gc.ca; Tel.450-926-4800

Day and night, in all weather conditions, RADARSAT can cover vast areas for vessel tracking and oil-spill surveillance, ice monitoring, and search and rescue operations to help ground, air, and sea-based maritime resource units. Canadian satellite technology provides the cost-effective, timely, accurate information delivery that's critical to decision makers and stakeholders.

Canadian Technology Pavilion (Canada)

Booth#901, 903, 905,1000,1002,1004
Web: www.boston.gc.ca; Tel.617-262-3760 x3259

The Canadian Pavilion is showcasing innovative ocean technologies including space born radar for marine surveillance, autonomous underwater vehicles, offshore oil & gas environmental research, hydrographic surveying, maritime security, ocean energy, and ocean observing systems including "Smart Bay" and "VENUS." Also showcased is ArcticNet's collaborative research on climate change in the Canadian Arctic.

Cape Cod Stranding Network (USA)

Booth # 610
Web: cduren@dsne.com; Tel. 508-833-4440

The Cape Cod Stranding Network (CCSN) is a Cape Cod based non-profit group that provides rapid response, assessment and humane care for stranded marine mammals; as well as research and education in order to reduce suffering and prevent avoidable deaths. CCSN responds to hundreds of calls every year regarding stranded animals around Cape Cod.

CARIS (New Brunswick)

Booth #416
Web: www.caris.com; Tel. 506-458-8533

Established in 1979, CARIS develops marine and hydrographic software. Continually selected number one by esteemed military agencies, survey contractors, ports and harbours and academia, the CARIS product line provides a complete 'Ping-to-Chart' solution from post-processing of bathymetric data to paper, raster and electronic chart production, to spatial database management and production, through to Internet distribution.

CDL

Booth # 415
Gil Tosh, gt@cdtid.net; Tel. +44 (0) 1224 706655

CDL is a progressive, dynamic Aberdeen-based company specialising in the design and manufacture of equipment and sensors for use primarily in the offshore survey, inspection, and ROV markets.
Our expertise lies in sophisticated ring-laser gyro-compasses and inertial navigation systems. Our product range has grown to include attitude sensors, cameras, bathymetry sensors and video and data telemetry products

Center of Excellence for Research in Ocean Sciences (Hawaii)

Booth # 810
Web: www.ceros.org; Tel. (808) 327-4310

The National Defense Center of Excellence for Research in Ocean Sciences (CEROS) seeks to advance innovative concepts and new approaches to technology while fully leveraging existing facilities and infrastructure in Hawaii and demonstrating beneficial commercial utility for the Department of Defense (DoD). CEROS solicits proposals through annual competitive Solicitations. All proposals are evaluated by an expert panel for technical merit, innovation, and value according to criteria published in the solicitations. The CEROS Research Advisory Board determines the best proposals based on critical evaluations. Since 1993, the CEROS Research Programs have funded a total of 189 projects at a value of over $74 million.

CIDCO (Interdisciplinary Centre for the Development of Ocean Mapping) (Quebec)

Booth #1011
Web: www.cidco.ca; Tel. 418-725-1732

CIDCO's aim is to promote marine geomatics sciences and technologies to industrial, governmental and academic partners in North America. With surveying facilities CIDCO can experiment new technologies and provide support on operational marine data acquisition methods and technologies as well as databasing, visualisation, interpretation and dissemination.

Centre for Offshore Oil and Gas Environmental Research (COOGER) (Canada)

Booth #901
Web: www.dfo-mpo.gc.ca/science/cooger-crepge/main_e.htm; Tel. 902-426-7344

The Centre for Offshore Oil and Gas Environmental Research (COOGER) was established in 2002 to assess impacts associated with offshore oil and gas activities. Our group identifies priority research and coordinates collaborative programs that have included the development of instrumentation and techniques for environmental effects monitoring and contaminated site mitigation.

CLS America, Inc. (USA)

Booth # 522
Web: www.clsamerica.com; Tel. 301-925-4411

CLS America, Inc. operates the Argos System, which is an extremely robust satellite data collection and location system especially designed for harsh environments. Drifting buoys, profiling floats and other oceanographic platforms are monitored worldwide. Low power transmissions enable long-term autonomous operation. New features for the future include two-way communication, increased data transmission rate and fully customized access to data and results. Designed for and with its scientific users, Argos is the only satellite-based system dedicated to monitoring and protecting the environment.

Consortium for Oceanographic Research and Education (USA)

Booth # 621, 623,625
Web: . Tel: 202-332-0063

The Consortium for Oceanographic Research and Education (CORE) is the Washington, DC-based non-profit organization representing leading public and private ocean research and education institutions, aquaria and industry. Since 1994, CORE has established a leadership role on oceanographic issues and the development of marine science policy. CORE is respected as the voice of the ocean community and is dedicated to promoting awareness and appreciation of the oceans among government agencies, non-governmental organizations and the general public.

CODAR Ocean Sensors (USA)

Booth # 707
Web: www.codar.com; Tel. 408-773-8240

CODAR Ocean Sensors, Ltd. offers the SeaSonde HF radar system for real-time, continuous ocean surface current mapping and wave monitoring. Convenient operation from shore or platform, with no equipment in water. CODAR staff are the leaders in HF radar technology development for various ocean monitoring applications.

D.G. O'Brien Inc. (USA)

Booth # 724/726
Web: www.dgo.com; Tel. 603-474-5571

Man-rated systems demand fail-safe reliability. That's D.G. O'Brien's specialty. Since our founding in 1962, we've developed thousands of connection system solutions to perform in the ocean depths. DGO connection products for the sub-sea market include deep submergence connectors, hull penetrators for submarines, towed array connection systems and more. In addition, we offer extensive cable termination, splicing, molding and testing to integrate our connectors onto your cable.

Deep Development Corp.(British Columbia)

Booth #925
Web:www.deepdevelopmentcorp.com; Tel. 1.604.877.9671

Deep Development Corp (DDC) is a division of Gatekeeper Systems Inc. (GSI) a Canadian company with head office in Abbotsford, British Columbia, Canada. GSI has been a CCTV systems provider for the transportation industry for over ten years. DDC was created to combat global threats in Feet Wet Security Applications and its product suite includes the UDU Underwater Detection Unit™, a portable imaging sonar package for port security application, and the Viperfish™ range of ruggedized digital video recorders.

Deep Sea Power and Light, Inc. (USA)

Booth # 403
Web; www.deepsea.com; Tel. 858-576-1261 x303

DeepSea Power & Light was founded in 1983 with the goal of providing high quality innovative products to the oceanographic community. Initially manufacturing deep water power systems, the company's expertise and product line has grown to include underwater video and lighting systems, pressure relief valves and high performance ceramic floatation. All of DeepSea Power & Light's products are designed and tested to withstand the rigors of the harshest marine environments. From wet/dry surface applications to full ocean depth deployments, DeepSea can provide the perfect product for your application.

Deep Sea Systems, Inc.(USA)

Booth # 207
Web: www.deepseasystems.com; Tel. 508 564 4200

Deep Sea Systems International, Inc., located in Cataumet, Massachusetts, brings decades of deep ocean engineering experience to the design and manufacture of underwater remotely operated vehicles (ROVs), thrusters, HDTV camera systems and HID gas arc lamps. DSSI's team specializes in developing custom engineered solutions for unique and challenging undersea projects.

EPC Labs, Inc. (USA)

Booth # 546
Tel. 978-777-1996

EdgeTech Marine (USA)

Booth # 516
Web: www.edgetech.com; Tel: 508-291-0057

EdgeTech manufactures a variety of marine products for commercial, government and research customers including side scan sonar systems, sub-bottom profiling systems, combined side scan/sub-bottom systems, and modular imaging systems for deep towed, AUV, ROV and other applications utilizing Full Spectrum, MultiPing or synthetic aperture acquisition and processing techniques.

EDO Electro-Ceramic Division (USA)

Booth # 321/420
Web: www.edocorp.com; Tel: 801-486-7481 x. 447

Look to EDO Electro-Ceramic Products for your ceramic components, value added components or system requirements. For over 50 years EDO has been proud to supply the best piezoelectric ceramic available to industry leaders in underwater detection and surveillance, ultrasonic, medical, oil and gas and others.

Electrochem Commercial Power (USA)

Booth # 700
Web: www.electrochempower.com; Tel:716-759-5800

Electrochem Commercial Power is a leading manufacturer of lithium battery packs and cells for extreme environments. Electrochem's primary spiral-

wound lithium cells are engineered to optimize performance and provide safe, dependable power with low self-discharge that lasts many years. Applications include buoys, towed arrays, UVs, seismometers, sonar devices and more.

Electronic Sales of New England (USA)

Booth #714/716
Web: www.esalesne.com; Tel.860-388-1196
ESNE was founded in 1967 by Bob Warren. Mark Warren joined him in Feb. of 1977 and Tom Reynolds worked for ESNE from 1983 until 1997. Paul Igo joined ESNE in June of 1997 and continues to cover ME, NH, eastern MA and RI for ESNE while Mark covers CT, Western MA, VT, NY,NJ and PA. ESNE represents 19 manufacturers of oceanographic instrumentation and harsh environment products and is the oldest rep firm in the Northeast in these fields.

Enterprise Honolulu (USA)

Booth # 810
Web: www.enterprisehonolulu.com; Tel. 808-521-3611
Enterprise Honolulu is a non-profit economic development organization funded by Oahu's private sector that is focused on attracting, retaining and growing businesses within the island of Oahu. Enterprise Honolulu works to improve Hawaii's business climate and global competitiveness, in collaboration with government agencies and other business associations.

Falmat, Inc. (USA)

Booth # 201
Web: www.falmat.com; Tel/Fax: 704-528-5922
Falmat is a leading manufacturer of custom electro-mechanical, electro-optical and instrumentation cables for all sub sea and oceanographic applications. Product line includes: single and multilayered steel armored cables and braided haired fairing. Falmat XtremeGreen video inspection cables are tested and proven worldwide as the premier choice in harshenvironments. Please let me know if you need more information.

Focal Technologies Incorporated (Nova Scotia)

Booth #1016
Web: www.moogpowerdata.com; Tel. 902-468-2263
Focal Technologies has delivered trusted technology products and services to the offshore petroleum, oceanographic, seismic and maritime defense industries for over 20 years. A member of Moog Components Group, Focal specializes in providing custom electrical slip rings, fiber optic rotary joints, swivels and multiplexer solutions for the harshest offshore environments.

Fugro GEOS

Booth #325
Web: www.usa@geos.com; Tel. ++ 1 713 346 3623
Fugro GEOS is the world's largest commercial provider of metocean consultancy, measurement, monitoring and forecasting services. These include the Seawatch Buoy system, an integrated, real-time ocean observing system that can be provided as a turnkey system for coastal and offshore monitoring, or as modules to enhance existing infrastructure. Fugro Pelagos is a leading provider of high-resolution hydrographic survey and seabed mapping services. These include integrated solutions involving advanced technologies, such as multibeam bathymetry, multibeam backscatter "snippets" imagery, airborne hydrographic LIDAR, and GIS. Fugro Pelagos provides innovative technical approaches that raise the quality and productivity of seafloor mapping.

General Dynamics/AIS (USA)

Booth # 618
Web: www.gd-ais.com; Tel. 805-497-5139

General Oceanics (USA)

Booth # 550
Web: www.generaloceanics.com

Geometrics (USA)

Booth # 606
Web: www.geometrics.com; Tel. 408-954-0522

Gilman Corporation (USA)
Booth # 608
Web: www.gilmancorp.com; Tel. 860-887-7080

Globe Composite Solutions (USA)
Booth # 219
Tel. 781-871-3700 x 202
Globe Composite Solutions (GCS), designs and manufactures non-metallic components for the Marine and Oceanographic industries. We also have a large experience base in military, industrial, and materials handling. We use cost-effective, high-performance composite alloys and urethanes that outperform traditional metallic parts. GCS has produced large and small parts such as Mooring systems, RF/SONAR transparent Hull Windows, Buoys, Waterproof equipment enclosures, and Hydrodynamic stabilizers and rudders.

GOMOOS (USA)
Booth # 614
Web: www.gomoos.com; Tel. 207-773-0423
Gulf of Maine Ocean Observation System is a network of ten fully instrumented oceanographic and meteorological bouys set out on the Gulf of Maine, which transmit data on an hourly basis. All data can be seen on line via web site.

GRI Simulations Inc. (Newfoundland)
Booth#1006
Web: www.grisim.com; Tel. 709-747-5599
Developers of VROV (Virtual Remotely Operated Vehicle) the world's most powerful simulator for UUV pilot training, mission planning and rehearsal, prototype design and testing, and real-time visualization. The exhibit features the VROV Benthos Stingray simulator and real-time visualization system available for trial flight by visitors.

H2Ops Magazine
Booth # 209
web: www.dsmedialtd.com; Tel. +44 (0)1962 760 601
H2Ops is the only truly international magazine for commercial divers and the subsea industry as a whole published on a bi-monthly basis. H2Ops magazine covers areas such as ROVs, AUVs, sonar, positioning systems, subsea communications, submersibles, all areas of commercial diving and related equipment as well as bringing you all of the latest news from the industry.

Harvey Lynch (USA)
Booth # 218
Tel. 281-240-5441

Hawaii Ocean Science and Technology (USA)
Booth # 810
Web:www.HawaiiOceanScience.org; Tel. 808-587-2690
Hawaii Ocean Science & Technology industry offers outstanding advantages for those looking for cutting-edge research, products and services. Hawaii is a leader in a wide variety of areas including ocean engineering, software development for cable laying and design, deep ocean water applications, remote sensing, ship design and ocean bottom surveying. Visit our on-line magazine at www.HawaiiOceanScience.org to access our Meet the Companies directory with links to almost 200 Hawaii companies doing business in a growing industry worth $176 million in direct revenues in 2004. Learn about Hawaii's high tech tax incentives, the most generous in the U.S.

Hydro International Magazine
Booth # 314
Web:www.pat.wartell@gd-ais.com; Tel. 31-514-56-1854

Hydrogroup USA
Booth # 213
Web: www.sales@hazardouslocation.com; Tel. 562-492-1394
Hydrogroup was formed in 1982. Hydrogroup is focused on developing electrical, coax, optical connectors, penetrators and custom molded breakout assemblies. Hydrogroup is involved in military & defense projects and is a preferred supplier to the United States NAVY and various defense contractors.

Hydroid, Inc. (USA)
Booth # 300
Web: www.hydroidinc.com; Tel. 508-563-6565
Hydroid was founded in November 2001, following the execution of a technology transfer license with WHOI. Hydroid is delivering REMUS systems to a worldwide clientele. The REMUS family of AUVs has operational capabilities suitable for operations in very shallow water down to water depths as great as 6,000 meters.

Hydro Technologies Inc. (USA)
Booth # 204
Tel. 970-674-8094

IEEE Oceanic Engineering Society (USA)
Booth # 512
Web; www.ieee.org; Tel. 732-562-3971

IEEE National (USA)
Booth # 808
Web: www.ieee.org; Tel. 732) 981-0060
IEEE, a leading authority in electrical engineering and computing technologies, offers on-line resources vital to researchers worldwide. IEEE is the world's largest technical professional society and publishes the leading journals in the field, sponsors more than 300 conferences, and has developed over 900 industry standards. Additional information is available at www.ieee.org.

Imagenex Technology Corp (Canada)
Booth #404
Web: www.imagenex.com; Tel. 604-944-8248
Imagenex Technology Corp. was founded in 1988 by pioneers in the development of high resolution sonar. On an international level, Imagenex is an innovative company that designs and manufactures sonar systems and continues to move forward through ground-breaking advances, with continual support for the customer's needs and demands.

Impulse Enterprises (USA)
Booth # 712
Web: www.impulse-ent.com; Tel. 858-565-7050

Innovatum International, Ltd. (United Kingdom)
Booth # 426
Web: saraclarissa@aol.com; Tel. 011-44-1284-729-123

Institute of Marine Engineering, Science and Technology (United Kingdom)
Booth # 327
Web: www.imarest.org; Tel: +44 (0)20 7382 2689
The IMarEST is the international professional membership body and learned society with over 15,000 members worldwide, and for marine professionals in industry, academia, and research. Activities include: Professional Membership - Chartered Engineer, Chartered Marine Scientist, Chartered Marine Technologist; Marine Partners - company membership; Trade Journals - Shipping World & Shipbuilder, JOT, MER, Maritime IT & Electronics, The Marine Scientist* Books and Technical Proceedings: Part A: Journal of Marine Engineering & Technology; Part B: Journal of Marine Design & Operations, Part C: Journal of Marine Science & Environment; Marine Information Centre Recruitment Site.

Institut des sciences de la mer de Rimouski (Quebec)
Booth #1109
Web: www.pqm.net/ismer; Tel. 418-723-1986
Located on the campus of the Université du Québec à Rimouski and composed of researchers and specialists whose expertise covers the main areas of coastal oceanography; ISMER offers a diverse and integrated research programme. Therefore students have access to a variety of expertise.

Institut maritime du Québec (Quebec)
Booth #1107-1113
Web: www.imq.qc.ca; Tel. 418-724-2822
Founded in 1994, the Institut maritime du Québec (IMQ) is the most important maritime teaching establishment in Canada. The IMQ trains a skilled workforce in five specialties: naval architecture, navigation, marine engineering, professional diving and transport logistics. The institute supports research and development. Training is in accordance with the STCW Convention and Transport Canada.

Institute for Ocean Technology (Canada)

Booth #901
Web: http://iot-ito.nrc-cnrc.gc.ca; Tel. (709) 772-4939

Institute for Ocean Technology (IOT) conducts ocean engineering research through modeling of ocean environments, predicting and improving the performance of marine systems, and developing innovative technologies that bring benefits to the Canadian marine industry. IOT has established a world-wide reputation for the excellence of its work, building an impressive record of collaborative and contractual research and a history of solid scientific achievement. It has helped to commercialize vessel prototypes, offshore technologies, underwater systems and more.

International Industries, Inc. (USA)

Booth # 414
Web: www.internationalindustries.net; Tel: 410-349-4080

International Industries is a Manufacturer's Representative and Distributor headquartered in the Washington, D.C. metropolitan area in Annapolis, Maryland. We provide products of leading domestic and international Hydrographic and Oceanographic firms in the marine technology industry.

International Ocean Systems (United Kingdom)

Booth #613
Web: www.intoceansys.co.uk; Tel. +44 20 8943 4288

International Ocean Systems is a European based Diver Group magazine with a bi-monthly circulation in excess of 10,000 worldwide. It serves the commercial oceanography market covering the fields of ocean data gathering, underwater surveying, and instrumentation. Readers are predominantly upper management, designers/engineers and scientists.

InterOcean Systems (USA)

Booth # 806
Web: www.interoceansystems.com; Tel. 858-565-8400

International Submarine Engineering (British Columbia)

Booth # 1020
Web: www.ise.bc.ca; Tel. 1.604.942.5223

International Submarine Engineering (ISE) Ltd is a privately held company based in Port Coquitlam, BC Canada and has been in operation since 1974. ISE and its subsidiary, ISE Research (ISER) Ltd are high technology engineering companies engaged in the development and manufacture of undersea vehicles, computer control systems, and robotics. Since 1975, ISE and ISER have build over 200 undersea vehicles and over 400 manipulators. Of these vehicles, most have been tethered Remotely Operated Vehicles (ROVs) for salvage, offshore petroleum, telecommunications cables, military and scientific use, and the Trailblazer series for mine countermeasures.

International Transducer Corporation

Booth # 206
Web: www. ctarter-itc@channeltech.com; Tel. (805) 683-2575, Ext. 525

International Transducer Corporation is a leading manufacturer of acoustic transducers for: seismic exploration; ship and submarine sonar; oceanographic survey; marine life research; medical devices and industrial proximity sensing. For forty years ITC has provided design, development and manufacturing of acoustic and ultrasonic transducers for the widest range of applications.

IVS - 3D, Inc. (USA)

Booth #315
Web: www.ivs3d.com; Tel. 603- 431-1773

IVS 3D's Fledermaus software suite provides users with powerful interactive 3D visualizations tools for data processing efficiency, quality control accuracy, data analysis completeness, and project integration, promoting clear communication and insight. Fledermaus has a comprehensive Area Based Editing capability, real-time vessel tracking module, and a pipeline and route planning tool. Fledermaus is used across many industries by a variety of disciplines such as geoscientist, oceanographers and hydrographers. Data such as backscatter, side scan, geo-referenced

aerial photographs or images (still images from an ROV) can be draped over topographic or bathymetric data sets.

IXSEA INC. (USA)

Booth # 217,219,316,318
Web: www.ixsea.com; Tel. +1 781 937 8800

At IXSEA we combine smart technology and experience with marine know-how to provide our customers with navigation, positioning and imagery systems and solutions. We strive to exceed our customers' expectations from conception to installation and beyond with our high-performance technology, our international sales network and round-the-clock customer support. To sail. To sound. To analyze.

J. Teague Enterprises, LLC (USA)

Booth # 220
Web: www www.jteagueenterprises; Tel. 508-528-5740

J Teague Enterprises, LLC is a manufacturer's agent representing Sub Sea Salvage, Mereco Resins, Polynova, Engineered Syntactic Systems, Lee Tool and Deepsea Power and Light. Our experiences and product lines are used in applications from the Aerospace and Electronics communities to the Hydrospace community. With over 36 years of experience we stand ready to serve.

JASCO Research (Nova Scotia)

Booth #919
Web: www.jasco.com; Tel. 902-405-3336

JASCO provides government and corporate clients with engineering, technical, operational and environmental planning/compliance support services. Our areas of expertise include: underwater and airborne acoustics; acoustic modeling; acoustic research; marine environmental compliance; vibration and blast physics; passive acoustic monitoring; sonar systems and oceanographic instrumentation.

Knudsen Engineering, Ltd. (Canada)

Booth #306
Web: www.knudsenengineering.com;
Tel. 613-267-1165

Recognized for innovation, high performance products and dedicated customer support, Knudsen Engineering Limited (KEL) manufactures single beam echosounders for a wide range of applications including survey, navigation, dredging and scientific research. Stop by Booth 306 to see the Knudsen product showcase including their new, next generation Sounder and Chirp Series.

Kongsberg Maritime, Inc. (USA)

Booth # 800/802
Web: www.kongsberg.com; Tel.713-934-8884 x146

Laurentian University

Booth # 401
Tel. 705-929-0419

Linkquest, Inc. (USA)

Booth # 702
Web: www.link-quest.com; Tel. (858) 623-9900

Manufactures high-speed, power efficient and highly robust underwater acoustic modems and TrackLink USBL acoustic tracking systems. Manufactures FlowQuest acoustic current profilers and NavQuest Doppler Velocity Logs. Also manufactures PinPoint LBL acoustic positioning systems and Precision Marine Geodetic Systems used for Tsunami and earthquake monitoring and prediction.

L-3 Communications Klein Associates, Inc. (USA)

Booth #412
www.L-3Klein.com. Tel. 603-893-6131

L-3 Communications Klein Associates, Inc. is the leading provider of high resolution Side Scan and Multi-bean sonar systems, fully Integrated Bridge and Communications equipment, and Waterside Security and Surveillance Systems. L-3 Klein's products are used by governments, navies, surveyors, oil companies, and universities worldwide. L-3 Klein has developed a worldwide reputation of excellence in the industry

by providing high quality products with first class customer service. To learn more about our products and services log onto our web site at

Lockheed Martin (USA)

Booth # 536, 538, 540
Web: www.lockheedmartin.com; Tel. 508- 748-1160
Headquartered in Bethesda, Md., Lockheed Martin employs about 135,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. The corporation reported 2005 sales of $37.2 billion.

MacArtney Offshore (USA)

Booth # 310
Web: www.macartney.com; Tel. 713-266-7575

Marine Advanced Technology Education (USA)

Booth # 418
Web: www.marinetech.org; Tel: 831-645-1393
The Marine Advanced Technology Education (MATE) Center is a national partnership of organizations and individuals working to improve marine technical education and, in this way, prepare the future workforce for marine science and technology occupations. Funded by the National Science Foundation, the MATE Center is headquartered at Monterey Peninsula College.

Marine Magnetics Corp. (Canada)

Booth #807
Web: www.marinemagnetics.com; Tel. 905-709-3135
Marine Magnetics designs and manufactures high-sensitivity magnetometers and gradiometers. Products include the industry standard SeaSPY, and the SeaQuest cutting edge in multi-sensor Gradiometers arrays. Our Explorer's compact size makes it ideal for shallow water surveys. Our products are used by navies, research institutes, universities, archaeologists, geophysicists and survey companies worldwide.

Marine Technology Reporter (USA)

Booth # 518
Web: www.Seadiscovery.com; Tel. 561-732-4368
With the largest BPA audited circulation in the marine technology Industry, MARINE TECHNOLOGY REPORTER magazine is the definitive international information source for the marine, oceanography and marine engineering industries; serving innovators in commerce, government, and education. In this expanding marine technology market, New Wave Media has created OceanTech Expo to provide marine technology business and professionals dealing with undersea defense, sub-sea exploration, drilling and mining, oceanography and marine sciences an annual trade event in North America that focuses on the most current technology and equipment.

Marine Technology Society (USA)

Booth # 510
Web: www.mtsociety.org; 410-884-5330
The Marine Technology Society is an international, not for profit professional Society serving the diverse technical and engineering interests of the ocean community. Founded in 1963, the Society believes that the advancement of marine technology and the productive, sustainable use of the oceans depend upon the active exchange of ideas among members of government, industry, the military and academia. The Society is the "go-to" association that fosters education, networking and information-sharing through three annual conferences, numerous technical workshops, local section meetings and online information. The Society publishes a bimonthly newsletter, a monthly electronic newsletter and a quarterly, peer reviewed Journal.

Marine Technology Society/New England (USA)

Booth # 506
Web:

Martec Metocean (Nova Scotia)

Booth #701
Web: www.metocean.com; Tel. 902-468-2505 x. 247

METOCEAN Data Systems Limited is a manufacturing and development company of meteorological data acquisition platforms, asset management products, oil tracking buoys and water monitoring systems. Since 1985, METOCEAN has been the world leader in the design and manufacture of air-deployed drifting buoys, remote weather forecasting stations and VMS systems.

Maritime Communications Services, Inc. (USA)

Booth # 722
Web: www.harris.com; Tel. 321-674-4771

Maritime Innovation (Quebec)

Booth #1011
Web: www.imar.ca; Tel. 418-725-3525

Maritime Innovation, an applied research center, identifies and develops solutions for the marine industry to enhance the competitiveness and efficiency of shipping companies, ports and marine suppliers and stakeholders through innovation. Our research areas are marine security, electronic navigation, underwater interventions, pollution prevention and ships and ports management.

Marine and Oceanographic Technology Network (USA)

Booth # 208/210
Web: www.motn.org

Business association devoted to assisting marine and oceanographic organizations to collaborate in order to thrive in the world market.

Massachusetts Maritime Academy (USA)

Booth # 322
Web: www.maritime.edu; Tel. 508-830-5000 x6441

Massachusetts Maritime Academy Located on Cape Cod, Massachusetts Maritime Academy is the nation's oldest and finest co-ed maritime college. MMA students balance a unique regimented lifestyle with a typical four-year college environment, where they can earn an accredited Bachelor of Science Degree in Marine Engineering, Facilities and Environmental Engineering, Marine Safety and Environmental Protection, Emergency Management, International Maritime Business, or Marine Transportation. Cadets can also earn a Merchant Marine Officer's License and a Naval Officer's Commission. Because of the learn-do-learn approach to education, where all students participate in sea terms or complete co-op assignments, MMA cadets are prepared for success both at sea and ashore.

MBARI (USA)

Booth # 703
Web: www.mbari.org; Tel. 831-775-1900

MIT Center for Ocean Engineering, Dept. of Mechanical Engineering, Massachusetts Institute of Technology

Booth #
Web: http://oe.mit.edu; Tel. 617-253-4330

The Department of Mechanical Engineering at MIT offers an undergraduate degree in Mechanical and Ocean Engineering, as well as graduate degrees in Ocean Engineering, Naval Architecture and Marine Engineering, Naval Engineering, and Oceanographic Engineering through the MIT/WHOI Joint Program. MIT is at the forefront of ocean engineering developments, such as autonomous underwater vehicles, smart sensors, and advanced hydrodynamic codes, while for nearly a century MIT has been a leading center of ship research and design. MIT is widely recognized for its contributions in hydrodynamics, ship structural mechanics and dynamics, propeller design, and overall ship design.

Massachusetts Technology Transfer Center (USA)

Booth # 514
Web: mattcenter@umassp.edu; Tel. 617-287-7105

MTTC facilitates technology transfer from research institutions to companies and supports technology startups in Massachusetts. In collaboration with Technology Transfer Offices, MTTC launched the Massachusetts Technology Portal - a unified search engine serving as a one-stop shop for technologies available for license from multiple Massachusetts research institutions.

Marport Canada Inc. (Newfoundland)

Booth #1006
Web: www.marport.com; Tel. 709-757-5757

Marport Canada Inc. is a world leader in underwater sensing, processing and communication products We develop and manufacture next generation acoustic products, including sensors, echo-sounders and sonars for the global commercial workboat fleet.

Material Systems, Inc. (USA)

Booth # 317
Web: www.matsysinc.com; Tel. 978-486-0404 x203

Materials Systems Inc. (MSI) designs and manufactures custom sonar transducers and arrays for a wide range of applications, including side-scan, obstacle avoidance, sub-bottom profiling, swath bathymetry, mine hunting, and acoustic communications. MSI's piezocomposite technology offers extremely broad bandwidth, high receive sensitivity, high source levels, and conformability for curved arrays. MSI's piezocomposite arrays can be curved and shaded to achieve a specific beampattern or to provide a desired hydrodynamic profile. The technology has enabled several of the most advanced sonar systems available today.

Maurice Lamontagne Institute (Canada)

Booth # 901/1102
Web:www.dfo-mpo.gc.ca; Tel. (418) 775-0502

The Maurice Lamontagne Institute, located in Mont-Joli, Québec, Canada, is part of Fisheries and Oceans Canada's network of research centres. It provides scientific research, monitoring activities, advice and scientific products, services and data management in support of: sustainable fisheries and aquaculture, healthy and productive aquatic ecosystems, and safe and accessible waterways.

McLane Research Laboratories, Inc. (USA)

Booth #304
Web: www.mclanelabs.com; Tel: +1 508 495 4000

McLane Research Laboratories, Inc. designs, manufactures and sells reliable, autonomous, time-series sampling instruments for physical and biogeochemical ocean research and environmental monitoring. Our samplers collect water in EPA approved bags, filtered samples for harmful algal bloom studies, and large volume water samples for chemical analyses. McLane also manufactures moored profilers for the collection of high-resolution CTD, acoustic currents, dissolved oxygen, turbidity, and fluorometer measurements. We also maintain a product line of glass and steel flotation.

Measurement Technology NW (USA)

Booth # 705
Web: www.mtnw-usa.com; Tel. 206-634-1308

Measurement Technology NW's popular LCI displays are used to control and monitor speed, payout, and tension (both cable and chain) in single/multi winch systems used for equipment deployment, barge positioning, fixed-place mooring, towing and ship assist activities, dredging, and wherever accurate and reliable line control is required.

MIROS AS (Norway)

Booth #604
Web: www.miros.no; Tel.+ 47 66 98 75 00

Miros is one of the leading suppliers of Met-Ocean Systems and microwave based Remote Ocean Sensors which includes the Miros SM-050 MkIII Wave and Current Radar, the Miros WAVEX System using a standard marine radar as sensor for directional wave monitoring from vessels and shore sites, the Miros Altimeter and Range Finders used for tide, water level, wave monitoring and air-gap measurements for Bridge Sailing Clearance and input to vessel ride control systems. Miros Oil Spill Detection System - based on above WAVEX System - is used for Oil Spill Surveillance and Tracking during Spill Response and Restoration operations.

Mooring Systems, Inc. (USA)

Booth # 305
Web: www.mooringsystems.com; Tel: 508-564-4770

Mooring Systems provides oceanographic scientists and engineers with design services, fabrication, and supply of ocean moorings and instrumentation platforms. Our extensive experience in the analysis of

moored systems along with our computer modeling tools provide the necessary components for designing moorings and instrumentation platforms that survive difficult environmental conditions. Our materials science knowledge and specialized fabrication techniques result in mooring configurations that successfully resist fatigue, corrosion, and pelagic predators. Considerations for deployment and recovery at sea come from our extensive "hands-on" technical field experience. Mooring Systems also manufactures sediment sampling devices including; gravity and piston corers, and inventories replacement parts for the original Benthos coring products.

Multi-Électronique (MTE) Inc. (Quebec)

Booth #1011
Web: www.totalsat.qc.ca/mte/; Tel. 418-724-5835
Multi-Électronique is doing business in the design and assemblage of electronic equipment in many fields including marine science. Our products are designed to match our customer request, and include; an underwater sound recording device (AURAL-M2), a winch cable length counter, a laboratory sample counter, and an instrumental buoy.

National Oceanic and Atmospheric Administration (USA)

Booth # 607,609,611,706,708,710
Web: www.NOAA.gov; Tel. 301-713-3060 x186
NOAA, an agency of the U.S. Department of Commerce, is dedicated to enhancing economic security and national safety through the prediction and research of weather and climate-related events and providing environmental stewardship of the nation's coastal and marine resources.

National Oceanographic Partnership Program (USA)

Booth #623
www. Tel:
The National Oceanographic Partnership Program (NOPP) is a collaboration of 15 federal agencies that provide leadership and coordination of national oceanographic research and education programs. An innovative program established by Congress in 1996, NOPP facilitates new interactions among federal agencies, academia and industry; increases visibility for ocean issues on the national agenda; and achieves a higher level of coordinated effort and synergy across the broad oceanographic community.

Naval Research Laboratory (USA)

Booth # 612
Web: www.nrlssc.navy.mil; www. Tel: (301) 713-3060 x 186
The Naval Research Laboratory, Stennis Space Center houses the Oceanography Division, the Marine Geosciences Division, and the Acoustic Simulation, Measurements, and Tactics Branch. NRL conducts a broadly based multidisciplinary program of scientific and advanced technological development directed toward maritime applications of new and improved materials, techniques, equipment, systems, and ocean/atmospheric/space sciences and related technology.

Naval Meteorology and Oceanography Command

Booth# 617/619
Web: https://pao.cnmoc.navy.mil; Tel. 228.688.4384
The Naval Meteorology and Oceanography Command uses high performance computing, advanced sensing technology, comprehensive data collection and analysis, modeling, on-scene and reach back support and training to "get the oceans right" for the following warfare and warfare support areas: Antisubmarine Warfare, Naval Special Warfare, Naval Mine Warfare, ISR, Precise Time and Astrometry, Fleet Operations (Strike and Expeditionary), Navigation, Aviation and Maritime.

Naval Undersea Warfare Center (USA) Division Newport

Booth # 417
Web: www.npt.nuwc.navy.mil; Tel. 401-832-3371

NavSim (Newfoundland)

Booth # 1007
Web: www.navsim.com; Tel. 709-726-7779
NavSim Technology Inc., manufacturer of electronic

navigation software, offers advanced vessel control and management systems. Specializing in mission planning for underwater vehicle surveillance, unmanned ship control and AIS tracking, NavSim's in-house fast-speed desktop simulator is used in waterway and port design projects and in ship performance prediction studies.

Newfoundland Pavilion (Canada) Dept. of Innovation and Rural Development

Booth # 1006,1008,1010,1005,1007,1009,1104,1106, 1108,1000
Web: www.mail.gov.nf.ca; Tel.709-729-0680

Newfoundland Department of Innovation, Trade & Rural Development (Newfoundland)

Booth #1006
http://www.gov.nl.ca/intrd; http://www.nlbusiness.ca; Tel. 709-729-7000
Department of Innovation, Trade & Rural Development in partnership with individuals, communities, businesses and other levels of government is responsible for creating and maintaining a competitive economic environment that encourages and supports private sector business growth and new long-term sustainable employment opportunities for Newfoundlanders and Labradorians.

NOBSKA/General Oceanics (USA)

Booth # 542
Web: NOBSKA@compuserve.com; 941-766-0706, 508-289-2725
Maunfacturer of Acoustic Current Meters, ultra-high accuracy, 3-D measurement. Applications include: bottom boundary layer, surf zone, tidal and estuary, fresh and salt water, low flow environments, tow tanks and flumes, coral reef studies and moored profilers. Moored or Tethered, logging or Real Time. Optional pressure, temperature, conductivity, turbidity and Directional Waves Spectra.

Nova Scotia Business Inc. (Nova Scotia)

Booth #917
Web: www.novascotiabusiness.com; Tel. 902-424-6650
Nova Scotia Business Inc. (NSBI) is the business development agency for the province of Nova Scotia, Canada; focusing on export promotion, investment attraction, business retention and expansion, and financing. We are the first point of contact for businesses and organizations, providing services that help Nova Scotia companies grow and stay competitive in the global marketplace.

Ocean Advance (Canada)

Booth #901
Web: www.oceansadvance.net; Tel. (709) 738-7069
OceansAdvance is a multi-stakeholder, regional technology cluster initiative aimed at making St. John's, Newfoundland and Labrador the International Centre of Ocean Excellence. The cluster is comprised of industry, government(s), academia and NGOs. It represents the community integration aspects of the cluster and is governed by a Board of Directors.

Oceans '07 IEEE Aberdeen

Booth # 508

Oceans '07 MTS/IEEE Vancouver

Booth # 1017

Oceans '08 MTS/IEEE Quebec

Booth # 505
Web: http://www.oceans08mtsieeequebec.org/
Contact: Dr. Ferial El-Hawary Co-chair: f.elhawary@ieee.org. OCEANS' 2008 Conference, September 15-18, 2008; "Oceans, Poles and Climate: Technological Challenges." MTS/IEEE OCEANS '2008 takes place in the historic UNESCO heritage city of Quebec in 2008 that will celebrates its 400th anniversary. This Conference is an annual event and co-sponsored by the Marine Technology Society (MTS) and the Oceanic Engineering Society (OES) of the Institute of Electrical and Electronic Engineers (IEEE) and held annually in the Fall, Oceans has become a focal point for the ocean and marine community to meet, learn, and exhibit products and services. The conference program consists

of technical paper sessions and exhibits, complemented by tutorials, Workshops, Short Courses, Student Paper and/or Poster Sessions, Panel Discussions, Awards Ceremonies, Tours, Receptions, and other Professional and Social Activities.

Ocean Business 2007

Booth # 542
Web: www.oceanbusiness2007.com; Tel,011-44-1453-839228

A new biennial hands-on ocean technology exhibition incorporating in-classroom and on-water demonstrations and training sessions, organised in partnership with the Association of Marine Scientific Industries and hosted by the National Oceanography Centre, Southampton, UK. Exhibit space selling fast - already 70% booked.

Ocean Design Inc. (USA)

Booth #605
Web:T@WrightMarketingWorks.com; Tel: 386-236-0780 Ext. 1367

ODI (Ocean Design, Inc.) is a technology focused world leader in subsea interconnect networking systems. ODI's high reliability solutions for Power and Data System interconnectivity include underwater mateable electrical and fiber optic connectors, harnesses, terminations and distribution systems used worldwide for offshore oil and gas, defense, oceanographic and research applications.

Oceanic Imaging Consultants, Inc. (USA)

Booth # 801
Web: www.oicinc.com; tel. (808) 539-3706

Oceanic Imaging Consultants, Inc. develops software for hydrographic survey acquisition, processing, visualization and interpretation, as well as real-time 3-D navigation tools. OIC develops software and systems that acquire and process sidescan, interferometric and multi-beam bathymetry, sub-bottom, and associated data. In addition, OIC provides consulting and data processing services.

Ocean Marine Inc. (USA)

Booth # 900,902, 548
Web: www.oceanmarineinc.com; Tel. 757-382-7616

Ocean News and Technology (USA)

Booth # 411
Web: www.ocean-news.com; Tel. 722-221-7720

A world class publication with distribution to thousands of marine, scientific and business individuals world wide.

Oceanology International, Inc. (United Kingdom)

Booth # 520
Web: www.reedexpo.co.uk; Tel. 44-20 8439-8900

Trade show and exhibition taking place in London every other year in March.

Ocean Science and Technology Partnership (Canada)

Booth # 901
Web: www.ostp-psto.ca/

The Oceans Science and Technology Partnership (OSTP) is a network of networks. It is an independent, federally incorporated, non-profit corporation developed with the support of Canada's Oceans Action Plan (OAP). The mission of the OSTP is: to capture the links between ocean science researchers and technology innovators; to encourage linkages between regional and national networks, information sharing and awareness building; to encourage and support collaboration to build and commercialize technology; and to present a national voice for the ocean technology community.

Oceanserver Technology Inc. (USA)

Booth # 911
Web: www.ocean-server.com; Tel. 508-678-0550 x107

Developers of the new Iver 2 Autonomous Underwater Vehicle, a small modern AUV system based on proven commercial components, and suitable for many routine missions in the near coastal environment down to 100 feet. Initial applications include environmental and bathymetric hydrographic surveying, inspection of ship hulls or harbor facilities and selected military operations. Vehicle power is provided by the OceanServer Intelligent Battery and Power System, a pre-engineered power sub-system for electronic or electro-mechanical OEM applications, based on high-performance rechargeable Lithium-Ion battery Smart Packs.

Ocean US (USA)
Booth # 602
Web: www.ocean.us; Tel. 703-588-0844
The National Office for Integrated and Sustained Ocean Observations was established by the Congressionally-created National Oceanographic Partnership Program (NOPP) in 2000. Since being established, Ocean.US has catalyzed the coordinated development of the IOOS, the U.S. contribution to a Global Ocean Observing System.

OceanWorks International Corp. (British Columbia)
Booth # 923
Web: www.oceanworks.cc; Tel. 1.604.986.560
OceanWorks is an independent company specializing in subsea systems. Services include design, manufacturing, test and integration, project management, training, and technical support for science, industry and military clients worldwide. We are recognized leaders in the fields of submarine rescue, atmospheric diving, cabled networks, subsea engineering, and remote tooling systems.

Optech Incorporated (Canada)
Booth # 704
Web: www.optech.ca; Tel: +1-905-660-0808
Optech is the world leader in advanced laser-based (lidar) survey instruments, with an extensive global client base. Optech's SHOALS (Scanning Hydrographic Operational Airborne Lidar Survey) system is the world's smallest, fastest and most accurate airborne laser bathymeter. SHOALS is a complete littoral zone mapping solution, providing area coverage rates as high as 70 km2 per hour.

ORE Offshore (USA)
Booth #516
Web: www.ore.com; Tel. 1-508-291-0960
ORE Offshore manufactures products and systems to locate, position, communicate and activate/control devices underwater including acoustic releases, acoustic transponders, USBL positioning systems, and acoustic telemetry products.

ORION (USA)
Booth #625
Web: www.COREocean.org; Tel: (202) 332-0063 Ext. 1231
The Ocean Research Interactive Observatory Networks (ORION) is a program that coordinates the science, technology, education and outreach of an emerging network of science-driven ocean observatories. The ORION initiative is managed through the 1201 Group LLC, an entity jointly owned by Joint Oceanographic Institutions (JOI) and the Consortium for Oceanographic Research and Education (CORE).

OSIL (United Kingdom)
Booth # 530
Web: www.seawatersolutions.com; http://www.osil.co.uk; Tel: +44 (0) 1730 265 015
OSIL/ Guildline Instruments will be exhibiting the industry standard Autosal and Portasal salinometers plus a range of sample/ data handling products designed to make life in the lab that much easier. Additionally the full range of IAPSO Standard Seawater will be on display including additional standards for Oxygen, Nutrients, performance evaluation.

Pacific Ocean Shelf Tracking Project (British Columbia)
Booth # 923
Web: www.postcoml.org; Tel. 1.604.659.3448
POST is a not-for-profit organization that uses acoustic technology to track the movement of individual aquatic animals. Tags implanted in the animals' abdomens send out unique signals, which are detected by receivers placed on the ocean floor. POST results provide much needed insight into the mysteries of migration

Paroscientific, Inc. (USA)
Booth # 907
Web: www.paroscientific.com; Tel. 425-883-8700

Phoenix International Inc. (USA)
Booth # 801
Web: www.phnx-international.com; Tel. 301-341-7800
Phoenix provides multi-disciplinary ocean operations and underwater engineering services worldwide

in underwater welding; waterborne ship repair; subsea inspection, maintenance, and repair; remotely operated vehicles; search & recovery; subsea construction support, and submarine rescue. Turnkey design engineering emphasizes rapid prototyping of underwater systems and tools, application of pressure tolerant electronics, and development of high energy density battery systems.

PMI (USA)

Booth # 718
Web: www.pmiind.com; Tel. 216-881-4914

Polymer Corp. (USA)

Booth # 709
Tel. 781-871-4606

PREVCO Subsea Housings LLC

Booth # 312
Web: www.prevco.com; Tel:772-223-5085
PREVCO Subsea Housings is a subsea engineering consultancy and manufacturer specializing in submersible pressure vessels, instrumentation housings, junction boxes, vent plugs, pressure relief valves, vacuum test and dry nitrogen backfill kits and other accessories to meet your underwater equipment needs. We have developed over 130 off-the-shelf subsea housing designs that can be easily configured to match your specifications. Our designs are fully tested and ready to fabricate. Some designs are available from stock.

PRIZM

Booth # 410
Web: Tel.

Québec Ministère du Développement Économique, de l'Innovation et de l'Exportation (Quebec)

Booth #1011, 1013, 1110, 1112
Web: www.mdeie.gouv.qc.ca; Tel. 418-691-5650
The Ministère du Développement Économique, de l'Innovation et de l'Exportation, a Quebec government department, has initiated a project to help regions to develop clusters based on their specific competencies and adopt shared innovation-led strategies and actions plans. A "Marine resources, sciences and technologies" cluster has been selected for Quebec's maritime regions.

Raytheon Company (USA) Corporate Sponsor

Web: www.raytheon.com; Tel.781-522-3000
Raytheon Company, with 2005 net sales of $21.9 billion, is an industry leader in defense and government electronics, space, information technology, technical services, and business aviation and special mission aircraft, providing integrated mission systems to meet the critical defense and non-defense needs of its customers. With global headquarters in Waltham, Massachusetts, Raytheon employs 80,000 people worldwide.

RBR Ltd. (Canada)

Booth #313
Web: www.rbr-global.com; Tel. 613-233-1621
For over 30 years, RBR has been manufacturing precision instruments for oceanography, limnology and cryospheric studies. Current products include CTDs, thermistor chains and wave/tide gauges. Recent introductions include a flexible data buoy controller, vented tide gauge, and large removable flash memory (<2GB) with USB support.

Remote Ocean Systems, Inc. (USA)

Booth # 809
Web: www.rosys.com; Tel. 858-565-8500
Remote Ocean Systems (ROS) has been an industry leader in the design and manufacturing of reliable, high-tech equipment and systems for the most severe oceanographic, industrial, commercial, and military environments since 1975. Our customers require products which must be infinitely reliable. Our standard product line includes underwater video cameras, underwater lights, rugged pan and tilt units, and video inspection systems which are manufactured primarily for the oceanographic, nuclear utility, and defense industries.

RESON Inc. (USA)
Booth # 319
Web: www.reson.com; Tel. 805-964-6260

ROMOR Atlantic Ltd. (Nova Scotia)
Booth #921
Web: www.romor.ca Tel: (902) 466-7000
ROMOR is Canada's ocean solutions provider. With 23 years of experience, ROMOR exclusively represents and distributes oceanographic, offshore oil and gas, geophysical and defense instrumentation and supplies. We can fulfill your equipment, field service, training, systems integration and new product development needs. Equipment can be customized to your specifications. Visit us at Oceans '06 to discuss how we can fulfill your technical requirements.

Roper Resources Ltd.(British Columbia)
Booth #1019
Web: www.roperresources.com; Tel.805-798-0277
Manufacturers Representative selling ocean robotics. ROVS, AUVS, Sonars, Cameras, Manipulators and Custom Tools. We also represent the following companies: Gavia AUV Corp., Imagenex Technology Corporation, Inuktun Services Ltd., MacArtney Underwater Technology, Marine Oil Technology, Seabotix Inc., Seaeye Marine, Sidus Solutions, Subconn, TEK Engineering, WSM Inc.

Scientific Solutions (USA)
Booth # 909
Web: www.scisol.com; Tel. 603-880-3784

Sea-Bird Electronics, Inc. (USA)
Booth # 221, 320
Web: www.seabird.com; Tel. 425-643-9866

Sea Education Association (USA)
Booth # 309
Web: www.sea.edu; Tel. 508-540 3954 x 30
Sea Education Association located in Woods Hole, Massachusetts offers interdisciplinary programs that combine oceanography, sailing and navigation, and the social sciences and humanities related to the ocean. All students gain hand-on research experience while sailing aboard one of our two 134-foot Brigantines the SSV Corwith Cramer and the SSV Robert C. Seamans. Both vessels are equipped with modern oceanographic equipment for investigating biological, chemical, physical, and geological oceanography.

Seacon Brantner and Associates (USA)
Booth # 211
Web: www.seaconbrantner.com; Tel. 401-348-0155

SEA CON(r) Phoenix, Inc. (USA)
Booth # 616
Web: www.seaconphoenix.com; Tel. 401-596-6658
SEA CON(r) Phoenix, Inc is the world leader in underwater cable and connector solutions for a variety of commercial and military programs. Products include glass to metal seals, underwater mateable power and fiber optic designs, Level 1 Subsafe hull penetrators, MIL-C-24231, MIL-C-24217 connectors, towed array inserts, VLS weapon control cables, ADCAP torpedo control assemblies, magnetic switches, and torpedo countermeasure cable systems. SEA CON(r) Phoenix, Inc. has it's headquarters in Westerly, Rhode Island with a facility in Barrow-In-Furness, UK which serves the European market with its products and services.

Sea Sciences, Inc. (USA)
Booth # 408
Web: www.seasciences.com

Sea Swarm (Australia)
Booth # 720
Web: www.atsu.com.au; Tel. 61-2-4964-3502

SeaBotix Inc. (USA)
Booth # 307
Web: www.seabotix.com; Tel.619.239.5959 x113
SeaBotix Inc. manufactures the Little Benthic Vehicle (LBV), a mini-class ROV. The LBV is the perfect balance between compact size, ideal mass, very powerful thrusters, and a small diameter umbilical. With 4-axis control including a lateral thruster, the LBV flies like a helicopter, making it the ultimate in portable inspection and sensor platforms. Standard features include auto-heading, depth, and trim, as well as our 24-month limited warranty. A variety of modular

options are available including multi-function grabber, sonar, tracking, and scaling lasers. Most systems include a 15 inch monitor and umbilical reel with slip ring. Over 350 vehicles sold worldwide.

Seaeye Marine Ltd. (United Kingdom)

Booth # 400
Web: www.seaeyemarine.uk Tel. +44 (0)1329 289 000
The successful Seaeye Falcon ROV is on show. Worldwide over 80 have been sold, and a new 1000m model has been introduced. This portable open frame vehicle comes with brushless DC thrusters and distributed intelligence. Seaeye is the world's leading manufacturer of electric ROVs for marine science, defence and the Oil & Gas industry.

Sea Technology (USA)

Booth # 323
Web: www.sea-technology.com; Tel. (703) 524-3136.
Published monthly for more than 42 years and circulated in 110+ countries, Sea Technology magazine is the worldwide information leader for marine business, science, and engineering for commercial and military applications.

Seimac Limited (Nova Scotia)

Booth #917
Web: www.seimac.com; Tel. 902-468-8234
For over 25 years, Seimac has been designing, manufacturing, and marketing mission critical radios used in remote deployments for search & rescue and telemetry & tracking applications. Our global clients operate in diverse sectors such as search and rescue, military, wildlife and asset tracking, oceanography, oil and gas, and research.

Smart Bay Technology (Newfoundland)

Booth #901
Web: www.smartbay.ca; Tel. 709-758-8356
SmartBay: An operational showcase of Canadian ocean expertise in action; demonstrating the benefits of improved access to information in support of integrated management of the sensitive coastal and ocean environment of Placentia Bay, Newfoundland. SmartBay: Better information - better decisions.

School of Marine Science and Technology SMAST Univ. of Massachusetts Dartmouth (USA)

Booth # 326
Web: www.umassd.edu; Tel. 508-999-8193

Sonardyne (USA)

Booth # 311
Web: www.sonardyne.com; Tel. 281-890-2120

South Bay Cable (USA)

Booth # 302
Web: www.southbaycable.com; Tel. 951-659-2183
Manufacture of Electrical, Optical and Mechanical Cables. South Bay Cable is entering our 50th year of manufacturing leadership. Our products have been put to the test in the most demanding applications; including, Geophysical, Undersea Exploration to Naval Defense - Towed Arrays, Video Pipe Inspection, Coastal Engineering and Remotely Operated Vehicles.

South Coast Development Partnership (USA)

Booth # 203, 205
Web: www.umass.edu; Tel. 508-999-8412

Sound Ocean Systems. Inc. (USA)

Booth # 904
Web: www.southbaycable.com; Tel. (425) 869-1834
SOSI established in 1978 to provide quality marine and undersea systems at realistic costs through innovative engineering. We have developed an excellent national and international reputation for producing ocean observation stations and other challenging data platforms. We approach each job with a team concept whether working alone or with a large consortium.

SPAWAR Systems Center (USA)

Booth # 407,409
Web:www.navy.mil; Tel. 619-553-2114
Marine Navigation Division of the Space and Naval Warfare Systems Center San Diego, develops, tests and evaluates navigation and sonar systems to provide an integrated navigation solution of precise time and position to naval combatants for battlegroup coordination and pinpoint accuracy that is critical in maintaining the U.S. warfighting edge.

SOPER - Rimouski Economic Development Corporation (Canada)

Booth #1011
Web: www.promotion-rimouski.org; Tel. 418-722-4718
SOPER is the economic development corporation of the city of Rimouski, an urban area of 50 000 people on the south shore of the St. Lawrence River. The mission of SOPER is to support all new applied technology projects and initiatives such as marine technology, communications, biotechnology, biological resources and environmental survey.

Subsea Technologies (USA)

Booth # 532, 534
Web: www.subseatechnologies.com; Tel. 281-347-0001

SubChem Systems, Inc. (USA)

Booth # 324
Web:http://www.subchem.com; Tel. 401 783 4744
SubChem Systems, Inc. is a RI small business contractor for the NAVY, EPA and NOAA, that offers submersible chemical analyzers for in situ sensing of nutrients and other chemical and biological agents in marine waters. The SubChem Analyzers are adaptable for deployment on a variety of stationary and mobile ocean observation platforms.

Subconn Inc. (USA)

Booth #308
Web: www.subconn.com; Tel.781- 934- 0790
Subconn is a leading designer and supplier of wet mateable underwater connector and cable assemblies. Featuring the original multi "O" ring design series of underwater connectors, the Subconn line includes 1 to 16 pin connectors with neoprene and polyurethane jacketed cable. A full range of specialty assemblies including high power, Ethernet, coax and shielded assemblies are available. The Subconn connectors have been the innovative leaders for over 25 years in the underwater market.

SyQwest, Inc. (USA)

Booth # 424
Web: www.syqwestinc.com; Tel. 401-921-5170

Tenix LADS, Inc. (USA)

Booth # 528
Web: www.tenixladsusa.com; Tel. 228-594-6800
Tenix LADS, Inc owns and operates the latest generation LADS MkII lidar survey system mounted in a deHavilland Dash 8-202 aircraft which is certified for international operations. Our qualified, experienced survey team use LADS Mk II to provide contract survey services in a broad range of environmental conditions to governments and industrial customers throughout the world. Tenix LADS' accurate, high density, digital bathymetric data is used to: produce nautical charts which meet the standards of the International Hydrographic Organization (IHO); accurately delimit and map exclusive economic zones; support safe, cost-effective, offshore oil and gas exploration and field development; manage fragile coastal zones, beaches and coral reefs; support marine engineering.

Technopole maritime du Québec (Quebec)

Booth #1011
Web: www.tmq.ca; Tel. 418-724-9616
Our mission is to create a stimulating environment for the sustainable development of marine sciences and technologies, the cornerstone for a knowledge-based sea and ocean economy for Quebec's coastal regions, and to ensure these regions become key players at the national and international level.

Teledyne Benthos (USA)

Booth # 303
Web: www.benthos.com; Tel. 508-563-1000
Teledyne Benthos designs, manufactures, and sells a variety of oceanographic and underwater products for use in marine environments including: acoustic releases, modems; hydrophones; geophysical survey equipment equipment; ROVs; glass flotation spheres and instrument housings; and locating devices.

Teledyne RDI Instruments (USA)

Booth # 301
Web: www.rdinstruments.com; Tel. 858-842-2600
Teledyne RD Instruments is the industry's leading manufacturer of Acoustic Doppler Current Profilers (ADCPs) and Doppler Velocity Logs (DVLs). Teledyne RDI's Workhorse ADCPs offer ease of use, reduced

cost, and patented BroadBand technology, providing fast, accurate high-resolution water current profiling in every environment - from the shallowest stream to the deepest ocean. Teledyne RDI's revolutionary Navigator Doppler Velocity Log (DVL) provides precision navigation to a wide array of underwater vehicles and surface vessels. Visit Teledyne RDI's booth to discover the many new products available in 2006!

The MathWorks (USA)

Booth #622
Web: www.mathworks.com; Tel.1-508-647-7605
The MathWorks is the leading global provider of software for technical computing and Model-Based Design for engineers and scientists in industry, government, and education. With the extensive MATLAB and Simulink product families, The MathWorks provides software and services to solve challenging problems and foster innovation in automotive, aerospace, communications, financial services, biotechnology, electronics, instrumentation, process, and other industries.

Trellborg CRP Inc. (USA)

Booth # 422
Web: www.trelleborg.com/crp; Tel: +1 (281) 774 2600
Trelleborg CRP Inc. has the largest and most advanced syntactic foam manufacturing facility in the world and produces a range of Syntactic foam buoyancy products including ROV buoyancy modules, Mooring buoys and drilling riser buoyancy modules. The facility is geared to high volume production of syntactic foam based products servicing the oil, gas and telecommunication industries. Trelleborg CRP Inc is constantly evolving, seeking to break new boundaries, develop new materials, new formulations and so on, to ensure that their products not only meet but exceed the current and future demands of its customers.

Triton Imaging, Inc. (USA)

Booth # 615
Web: www.tritonimaginginc.com; Tel. 831 722 7373
Triton Imaging is a leading provider of hardware and software solutions for seafloor search and survey. Triton products are used by scientific/military/commercial organizations worldwide to acquire, process, visualize, and interpret data from a wide array of sensors including: sidescan, multibeam, and synthetic aperture sonars; single beam echosounders; and sub-bottom profilers.

The Ocean Renewable Energy Group (Canada)

Booth #923
Web: www.oreg.ca
The Ocean Renewable Energy Group's industry, academia and government members mobilize Canadian energy project implementation experience, together with new and emerging ocean technologies, to ensure that Canada is a leader in providing ocean energy solutions to a world market. A national organization, it is headquartered in British Columbia.

TSS International Ltd. (USA)

Booth # 406
Web: www.tss-international.com; Tel: (978) 948-6688
TSS (International) Ltd combines the design and manufacturing expertise of more than 25 years of TSS experience in high-tech motion sensing and subsea pipe and cable detection; with more than 100 years of S G Brown experience in marine navigation, gyrocompasses, steering controls and bespoke engineering services.

Turner Designs (USA)

Booth # 544
Web: www.turnerdesigns.com; Tel. 408-212-4001

University of Hawaii, Office of Technology Transfer & Economic Development (USA)

Booth # 810
Web: www.mic.hawaii.edu; Tel. 808-539-3817
OTTED is the technology licensing office for the University of Hawaii (UH) and was organized to help UH researchers commercialize promising new inventions and discoveries and to collaborate with industry research sponsors; to help industry gain access to promising research and new technologies developed at the university of Hawaii; and to promote statewide economic development through University of Hawaii's technology transfer programs.

Universite du Quebec Rimouski (Quebec)

Booth #1111
Web: www.uqar.qc.ca; Tel. (418) 723-1986

VENUS Victoria Experimental Network Under the Sea (British Colulmbia)

Booth #901
Web: www.venus.uvic.ca

VENUS, the Victoria Experimental Network Under the Sea, connects you via the Internet to underwater instruments on the ocean floor. Cable-linked seafloor observatories such as VENUS and NEPTUNE will expand the boundaries of ocean exploration and give us a new way of studying and understanding our planet.

Virtual Marine Technology (Canada)

Booth # 901
Web: www.vmtechnology.ca; Tel. (709) 737-6765

Virtual Marine Technology (VMT) is a marine technology company focused on improving the safety of life at sea by creating effective and realistic training simulators for the operators of small marine craft. Based in St. John's, NL, VMT operates in the centre of ocean engineering expertise, and have worked with local expertise to create a unique lifeboat launching simulator that is used to train lifeboat operators on launches in severe weather.

Wetsat/Satlantic (Nova Scotia)

Web: #908
Web: www.wetsat.com; www.satlantic.com; Tel. 902-492-4780

Satlantic designs, manufactures, and sells a wide range of precision sensors and systems for the study of aquatic environments. In addition to its range of active and passive optical sensors, the firm offers sophisticated instrument integration, large scale ocean observatory solutions and data extraction tools for real-time operational decision making.

Webb Research Corporation (USA)

Booth #210
Web: www.webbresearch.com;

Webb Research Corporation (designs and manufactures scientific instruments for oceanographic research and monitoring. Founded in 1982, WRC specializes in three areas of ocean instrumentation: Neutrally buoyant, autonomous drifters and profilers; Autonomous underwater gliding vehicles; Moored underwater sound sources.

Woods Hole Group, Inc. (USA)

Booth # 210
Web: www.woodsholegroup.com; Tel. 508-540-8080

Woods Hole Group is an international organization with offices in USA and KSA and representatives in 22 nations focused on: Coastal Sciences, Engineering & Planning; Oceanography & Measurement Systems; and Environmental Assessment & Remediation. Consulting specialties include coastal geology and engineering, dredging and shore protection, numerical modeling, marine survey/data collection, measurement systems, physical oceanography, field services, and environmental risk/impact assessment and remediation. Products include metocean instrumentation, real-time monitoring systems, and software. Staff includes Masters and Ph.D. scientists and engineers and field/laboratory technicians providing scientifically-defensible solutions for government, oil, power, manufacturing, defense, private, and research organizations worldwide.

Xeos Technologies (Nova Scotia)

Booth #1020
Web: www.xeostech.com; Tel. 902-444-7650

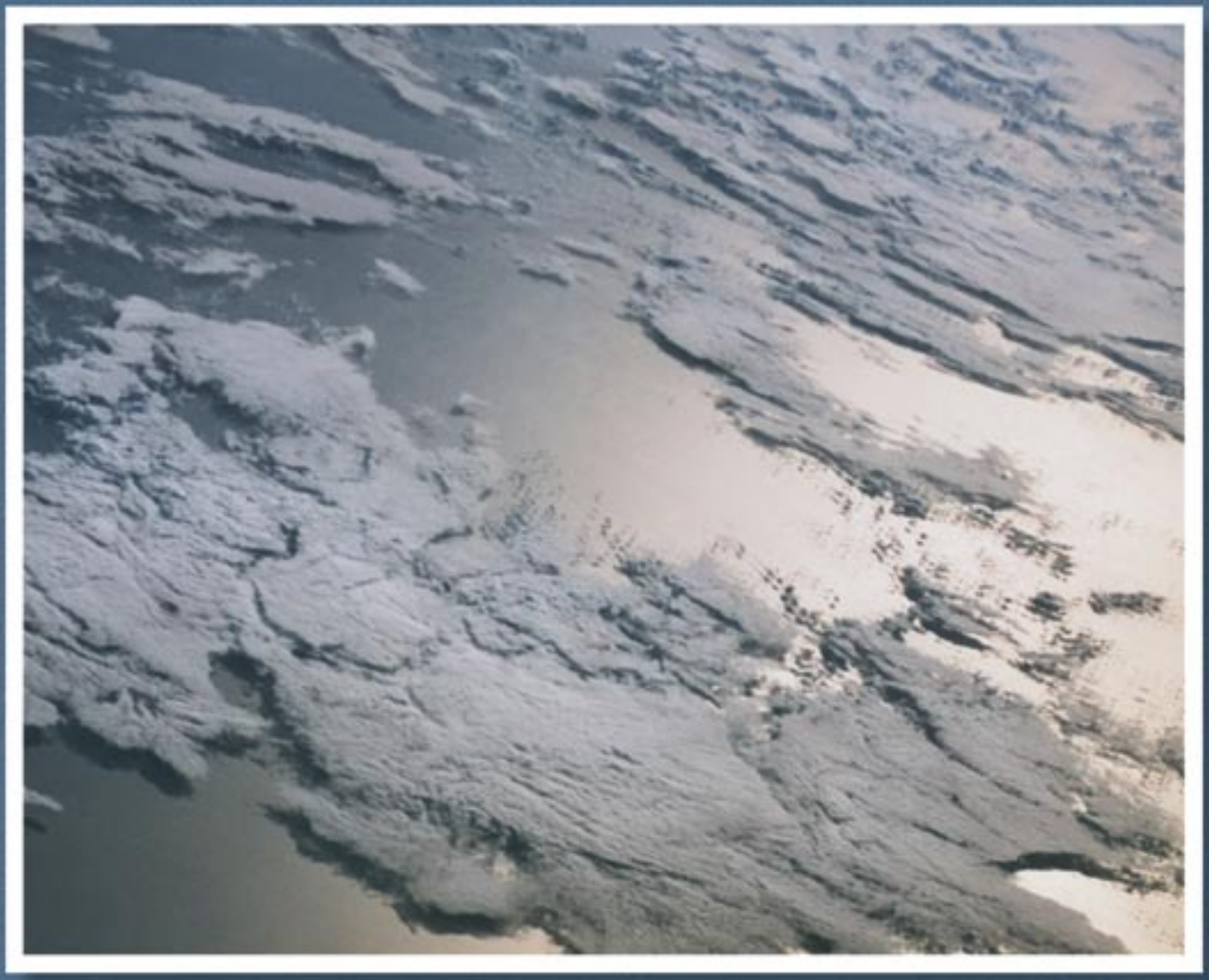
Xeos Technology Inc. are data telemetry specialists. Xeos offer satellite, VHF, UHF, cellular, GPS, low power wireless data collection products. Iridium based mooring location beacons, wireless data loggers and the Serrano-Vee-the first commercially available underwater wireless DVT/TDR for marine wildlife tracking and recording.

YSI/Sontex/Endeco (USA)

Booth # 601,603
Web: www.sontex.com; 858-546-8150

Notes

Notes



The earth's surface is 70% water. That's a lot for a system to cover.

As the leading systems integrator of network-enabled systems, Lockheed Martin provides interoperable solutions for surface, air and undersea customers in our ocean connected world. From air and maritime surveillance systems to undersea surface and space systems, we offer proven, scaleable and technologically advanced solutions for your oceanic and atmospheric requirements. Partnering with you allows us to understand your specific needs and to design inventive solutions to your challenges, now and in the future. Making sure you're covered. No matter what.

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Boston, Massachusetts, September 18-21, 2006

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www.oceans2006.org

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