



IEEE Council on

OCEANIC ENGINEERING

NEWSLETTER



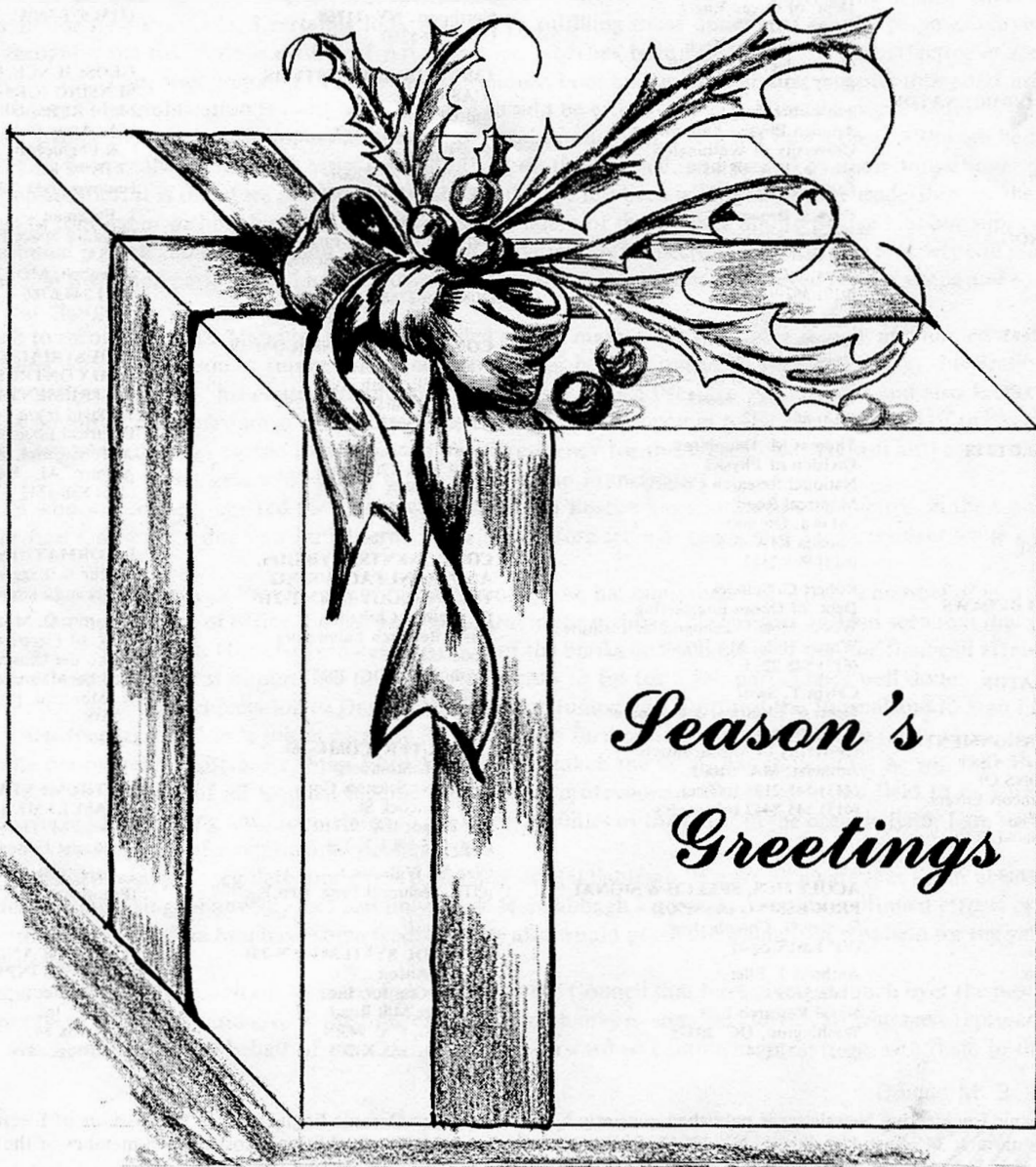
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D.A. SABBAGH

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COUNCIL ON OCEANIC ENGINEERING

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J. Barry Oakes
Applied Physics Lab
Johns Hopkins Univ.
Laurel, MD 20810
(301) 953-7100 X-2821

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Lloyd Z. Maudlin
5461 Toyon Road
San Diego, CA 92115
(714) 287-6935

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Stanley G. Chamberlain
Raytheon Company
P.O. Box 360
Portsmouth, RI 02871
(401) 849-7860

TREASURER/SECRETARY

Edward W. Early
Applied Physics Lab
University of Washington
Seattle, WA 98195(206) 543-1300

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Donald M. Bolle
College of Engrg. & Physical
Sciences
Packard Laboratory #19
Bethlehem, PA 18015
(215) 861-4025/4072

IEEE/MTS AFFAIRS COORDINATOR

Arthur S. Westneat, Jr.
Wadleigh Falls Road
R.D. #1
Newmarket, NH 03857
(603) 659-2195

OTC TECHNICAL PROG. REPRESENTATIVE

Glen N. Williams
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(713) 845-4211/5531

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MEMBER-AT-LARGE

Joseph R. Vadus
NOAA Office of Oceanic
Engineering
6010 Executive Blvd.
Rockville, MD 20852
(301) 443-8655

CURRENT MEASUREMENT TECHNOLOGY COMMITTEE

William E. Woodward
NOAA WSC-5
6010 Executive Blvd.
Rockville, MD 20852
(301) 443-8444

EDITOR, IEEE JOURNAL OF OCEANIC ENGINEERING

Stanley Ehrlich
Raytheon Company
Submarine Signal Division
Box 360
Portsmouth, RI 02871
(401) 847-8000 X-2381

NEWSLETTER EDITOR

Harold A. Sabbagh
Analytics, Inc.
2634 Round Hill Lane
Bloomington, IN 47401
(812) 339-3446

ASSOCIATE EDITORS

Arthur B. Baggeroer
Dept. of Ocean Engrg.
Room 5-326
MA Institute of Tech.
Cambridge, MA 02139
(617) 253-4336

John Ehrenberg
Applied Physics Laboratory
University of Washington
Seattle, WA 98195
(206) 543-1300

Gary S. Brown
Applied Science Associates
105 East Chatham
Apex, NC 27502
(919) 362-9311

Adrian K. Fung
Remote Sensing Lab
Univ. of Kansas
2291 Irving Hill Dr.—Campus West
Lawrence, KS 66045
(913) 864-4832

Thomas M. Dauphinee
Division of Physics
National Research Council
Montreal Road
Ottawa, Ontario
Canada K1A 0R6
(613) 993-2313

Robert C. Spindel
Dept. of Ocean Engineering
Woods Hole Oceanographic Institute
Woods Hole, MA 02543
(617) 548-2283

Calvin T. Swift
Dept. of Electrical & Computer
Engineering
University of Massachusetts
Amherst, MA 01003
(413) 545-2136 (office)
(413) 545-2442 (messages)

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Code 5109
Naval Research Lab
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800 Follin Lane
Suite 245
Vienna, VA 22180
(703) 281-7920

Arthur S. Westneat, Jr.
Wadleigh Falls Road
R.D. #1
Newmarket, NH 03857
(603) 659-2195

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Porter L. Bankhead
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6811 Kenilworth Avenue
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Harb S. Hayre
Electrical Engineering Dept.
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Houston, TX 77004
(713) 749-4503/4534

David E. Weissman
Hofstra University
5 Orchard Drive
Northport, NY 11768
(516) 269-5260

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Rui De Figueiredo
Dept. of Electrical Engineering
Rice University
Houston, TX 77001
(713) 527-8101 X-3569

Sydney R. Parker
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Naval Postgraduate School
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323 N. Elizabeth Ave.
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Naval Research Laboratory
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U.S. Army Cold Regions Research
& Engineering Labs (CRREL)
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NASA
Greenbelt, MD 20771
(301) 344-6786

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J. David Irwin
Electrical Engineering Dept.
Auburn University
Auburn, AL 36849
(205) 826-4333

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Arthur B. Baggeroer
(Associate Editor)
Salvatore D. Morgera
Dept. of Electrical Engineering
Concordia University
1455 De Maisonneuve Blvd.
W. Montreal, P.Q., Canada H3C
1M8
(514) 879-4126

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J. Barry Oakes
(President)

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F. J. Walter
Wal Tec Inc.
P.O. Box 847
Oak Ridge, TN 37830

PRESIDENT'S COMMENTS

In the June issue of 1982, I advised all subscribers to the IEEE Journal on Oceanic Engineering as well as recipients of the *IEEE COE Newsletter*, that the Council was in the process of seeking society status. I will now bring you up to date on the most recent developments.

As I indicated last time, the principal reason for moving to society status is that our current level of activity requires a considerable number of workers particularly in those locales where our annual conferences are organized. Since the Council does not and cannot organize local chapters we find that each year we must build the organization for our annual symposium from scratch. This has become inhibitory and an almost unbearable burden.

In addition, the growth of our technical activities within the IEEE resulting in a more substantial journal requires us to organize in a way which is not possible under the rubric of a council.

The necessity of the Council becoming a society has been recognized by member societies of our Council. I have communicated with each of the members of our Council and particularly with the presidents of each of our member societies to advise them of our need to become a society and to request their reaction to this proposal. I have received a number of responses, all of which were supportive of this new direction. Accordingly, a small committee has drafted the necessary Constitution and Bylaws required of a society. This was presented to the Council in our meeting in Washington, DC on the occasion of Oceans '82 and was reviewed in detail. The modified Constitution and Bylaws have now been prepared for presentation to the executive committee of the Technical Activities Board and will be presented to the full Technical Activities Board at its meeting in November of this year. If approved by TAB, it must then go to the executive committee of the Board of Directors for final approval.

Our hope is that society status will be granted and will be executed sometime early in the calendar year 1983. As our presentations move forward, I am still most interested in receiving comments from readers.

This is my last chance to write you as President of the Council of Oceanic Engineering. My work with the Council in the past and particularly over the last two years has been a source of great satisfaction. In good part, this has been because the Council membership has continued to show increasing interest and energy in furthering the work of the Council. I regret, therefore, that my current responsibilities do not allow me to be considered for a second term. I expect and look forward to continuing to work with the Council although at a somewhat lower level of intensity. As Junior Past President, I certainly look forward to fulfilling those duties that are the responsibility of that position.

I would like to recognize the tremendous efforts of Art Westneat, who has been most energetic and effective in seeing to it that the publication, *The Oceans and You*, was prepared. This is an information booklet for high school students interested in a possible career related to oceanic activities. This publication is most attractive and should be effective in clarifying the opportunities available to students.

Another source of strong and consistent support has been Barry Oakes, our Vice President East Coast. Although he had other responsibilities within the IEEE, he was always ready to assist me and others on the Council, and has taken upon himself over the past few years many and varied responsibilities. It is therefore particularly gratifying that he has been willing to assume leadership for the next two years. I think you will all wish to join me in wishing him well in his term as President of the Council and to pledge him our support. I think we can look forward to a continual growth and improvement in our level of activities. Our expected transition into a society will place a considerable burden on him during that transition period, but I have no doubt that we will emerge from this in even greater shape and with even better opportunities to fulfill our charge.

I particularly wish to recognize Lloyd Maudlin, who has handled a great many affairs for our Council, and has led a number of committees such as those dealing with the location of future conferences. Lloyd has been an unending source of energy, inspiration and leadership.

I must also thank Walter Bacon for his continued and able service as our Vice President West Coast and also for his representing our Council on the IEEE Committee on Environmental Quality. Walter's term of office comes to a close at the end of this year as did mine and we are fortunate that Lloyd Maudlin has agreed to assume the Vice Presidency for the West Coast. He will also at this time coordinate the Council's activities in connection with Oceans '83 which will be held in San Francisco.

Stan Chamberlain who so very ably chaired the Oceans '81 meeting in Boston has continued to be active on the Council and has been elected Vice President East Coast for a one year initial term. He will therefore serve as the Senior Vice President while Lloyd Maudlin will serve as the Junior Vice President.

My thanks must go also to Ed Early, a Past President of the Council, who has continued active over a number of years and has been our Treasurer and Secretary during my term of office. Ed has been bountiful in the giving of his energies and has seen to it that our meetings were recorded and become part of our record. His efforts in keeping track of the books and making sure that the financial affairs were handled in an orderly manner are, of course, of great importance to us all. My thanks to Ed for a job particularly well done.

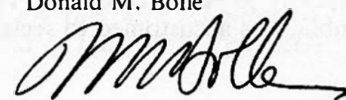
I must also express our collective appreciation to Dave Weissman, our Junior Past Editor of the Journal and to Stan Ehrlich our current Journal Editor. Dave has done a tremendous job in carrying the Journal to further heights and we can be justly proud in the place that the Journal is taking in the oceans related literature. Stan Ehrlich, as he has taken the helm, has shown that he will take the Journal to even greater heights. We need the support of all Council members and of all professionals interested in the field to be sure that the Journal becomes the archival vehicle for recording advances related to the responsibilities of the IEEE in the oceanic field. I am sure we will all watch with interest the further development of our principle publication.

Our *Newsletter* continued to appear regularly under the editorship of Hal Sabbagh. We are all aware that this is at times a trying task to put together a *Newsletter* almost single-handedly and certainly I owe Hal Sabbagh a great deal for his continued efforts on the behalf of me and the Council. Please write him and let him have some feedback. He also would of course willingly accept help for the various departments that appear in our *Newsletter*.

I cannot in the space provided thank all of the many individuals on the Council that have given so much over the past several years and will undoubtedly continue to participate and give in the future. I must give thanks to some 30 individuals who have represented their societies on the Council and who have worked on behalf of the Council. I look forward to continued interaction with them in the years ahead.

Sincerely yours,

Donald M. Bolle



MEET YOUR COE

Reprinted from the New York Times,
Sunday, September 19, 1982

Scanning the Seas Through the Clouds by Lawrence Van Gelder



Dave Weissman is a member of the COE and is the immediate past editor of the *Journal of Oceanic Engineering*.

When David E. Weissman of Northport received his doctorate in electrical engineering from Stanford University in 1968, he found himself at a crossroads.

For the five previous years, while earning his doctorate, he had also been employed at a think tank called the Stanford Research Institute, working on a National Aeronautics and Space Administration project aimed at overcoming the disruption of radio communication on spacecraft re-entering the earth's atmosphere.

"The doctorate," he said, "represented a place to reassess where I was going. I felt I had two interests I couldn't really fulfill at the institute. One is that I really liked to stay close to the interpretive side of the body of my professional knowledge. When you're in any sort of business institution, you pretty much take care of the day-to-day business life of your client.

"The other aspect of my feeling was that I really felt it was nice to work with other people and see them go through the system and develop. I said: Wouldn't it be nice to educate and motivate other people to electrical engineering or science in general?"

With that, Dr. Weissman sought work in the academic world. Today, he is a professor of engineering at Hofstra University, where he has been teaching a wide range of courses on all undergraduate levels since his arrival on the faculty 14 years ago.

But Dr. Weissman—whose 45th birthday was yesterday—has been active in other realms as well, continuing his relationship with NASA, mainly in the summer. In conjunction with James W. Johnson, a colleague at the NASA Langley Research Center in Hampton, Va., near Norfolk, Dr. Weissman has been involved for the last several years in the development of sophisticated radar for use in the measurement and study of the ocean surface.

"The significance to the public at large," he said of his work, "is that it is extremely important to this country and other countries to be able to monitor ocean conditions from space."

Changing oceanic levels, he said, could menace the future of coastal cities and such barrier beaches as Fire Island, and, he noted, ocean wave conditions have significant impact on such matters as commerce in the form of shipping, on the accuracy of weather forecasting and on the construction of oil company rigs for seabed drilling.

Dr. Weissman has been involved in research on a type of radar called two-frequency radar, designed to measure the actual length of waves, and with the development of high resolution synthetic aperture radar, which has the capacity to penetrate clouds. He pointed out that the public was accustomed to seeing satellite pictures from

outer space but that these pictures do not show penetration of the clouds.

The New York-born Dr. Weissman, who is married and has four children, traces his own involvement in engineering to President Eisenhower's appeal in the mid-1950's for more scientists in the aftermath of the launching of Sputnik by the Soviet Union. "I was really inspired by the space program," he said.

Dr. Weissman, who had been thinking of a career in law or medicine, promptly switched to the engineering program at New York University, where he earned both his bachelor's and master's degrees.

"People talk about how technological the world is today. I sensed this, in my way, back 25 years ago," he said. "The world was changing tremendously because of the space program. It was interesting and a good chance to contribute to society and break new ground."



Stanley L. Ehrlich (SM'65) was born in Newark, NJ, on January 7, 1925, and moved to Providence, RI, the following year. In 1944 he received the Sc.B. degree in engineering and in 1945 the Sc.M. degree in physics, both from Brown University, Providence, RI. He also did postgraduate study from 1945 to 1948 at MIT, Cambridge, MA, and from 1951 to 1953 at the University of Connecticut, Storrs.

From 1948 to 1953 he was a Physicist at the USN Underwater Sound Laboratory, now the Naval Underwater Systems Center, New London Laboratory, New London, CT. Since 1953 he has been at Raytheon Company's Submarine Signal Division, where he is a Consulting Engineer. His fields of interest include magnetostriction, electrostriction, electroacoustics, design of transducers, development of sonar systems, and normal modes in solids.

Mr. Ehrlich has served on the IEEE Committee on Piezoelectric and Ferroelectric Crystals (member 1954-1966, Vice-Chairman 1962-1966); as IEEE Alternate Representative to ANSI Committee SI (Acoustics; 1971-present); and with the *IEEE Journal of Oceanic Engineering* (Associate Editor 1975-1982; Editor 1982-). He has also been active in the Acoustical Society of America on the Technical Council, Editorial Board, Regional Chapters Committee, Medals and Awards Committee, and as General Chairman of the 1978 Spring Meeting and was the U.S. representative to ISO/TC 43, Working Group 2 (Reference Quantities for Acoustical Levels; 1974-1976). He is a Fellow of the Acoustical Society of America and a member of the American Physical Society, National Security Industrial Association, AAAS, and the New York Academy of Sciences.



Robert C. Spindel (S'63, M'70) received the B.S.E.E. degree from The Cooper Union, New York, NY, in 1965, and the M.S. and Ph.D. degrees in engineering and applied science from Yale University, New Haven, CT, in 1966 and 1971 respectively.

From 1971 to 1972 he was a Postdoctoral Fellow at the Woods Hole Oceanographic Institution, Woods Hole, MA, where he worked on underwater acoustic scattering and value reverberation. In 1972 he joined the Staff of the Woods Hole Oceanographic Institution where he is now a Senior Scientist and Chairman of the Department of Ocean Engineering. He has worked on acoustic propagation, signal processing, precision navigation, ocean instrumentation and ocean acoustic tomography.

Dr. Spindel is a Fellow of the Acoustical Society of America and he serves as an Associate Editor for the IEEE Journal of Oceanic Engineering.

mensurate with previous disbursements. This will mean that most members, groups and societies will, over the years, have received an over tenfold return on their original investment. The remaining reserve of the Council will be needed to continue the activities in which we are presently engaged and allow us to meet current and outstanding commitments.

I would be most grateful if you would send me your questions and comments or call me, (215) 861-4025, before I leave for New Orleans on the 18th so that I can advise the Technical Activities Board not only of the support by the Presidents of the member societies, as indicated by responses to my earlier letter, but also indicate that there is an understanding of the financial aspect of this transition.

The Council, in moving to a societal status, will not only continue the responsibilities of the Council but will also maintain financial continuity. This follows the precedence set by the Council on Quantum Electronics which made this transition a couple of years ago.

Best regards,

Donald M. Bolle

CORRESPONDENCE

October 15, 1982

November 10, 1982

Harold A. Sabbagh
Analytics, Inc.
2634 Round Hill Lane
Bloomington, IN 47401

Harold A. Sabbagh
Editor
Oceanic Engineering Newsletter
Institute of Electrical and Electronics Engineers, Inc.
345 E. 42nd Street
New York, New York 10017

Dear Hal:

Dear Mr. Sabbagh:

It has been suggested to me that I write you again so that you will stay advised of the progress being made in moving the IEEE Council on Oceanic Engineering to societal status. I wrote you some time ago concerning the need for the Council to do this and you may wish to refer to that letter. The principle reason driving us toward a society is that a council does not have a mechanism for establishing local sections. Such sections are needed badly in that our conferences have become very substantial with well over 1,000 attendees and large technical exhibit areas. As it is now, each year we must begin to build local organizations two years in advance of the meeting as we move the conferences around the country. This has become an almost impossible burden.

In the awards section of your September 1982 *Oceanic Engineering Newsletter* you give congratulations to Robert Spendell on receiving the A. B. Wood Medal, however, your photograph is in error. To identify the man pictured, he is Dr. Robert S. Jones, Managing Director of Harbor Branch Foundation. Dr. Jones succeeded Ms. Marilyn Link as Managing Director of Harbor Branch in February of this year. Prior to this time he was Director of Science with the same organization.

The matter of society status for the Council will be considered by the Technical Activities Board in New Orleans when it meets on November 19, 1982. Past letters received from you in response to my letter have indicated nothing but support for our move. However, I should at this point, also advise you of the financial aspect of this move. At this time, the Council's principle income has resulted from successful annual conferences. We have thus developed a sound financial reserve. In past years, the Council has disbursed a certain fraction of its income to members groups and societies. If the transition to a society is approved, two things will be done. First of all, the initial \$500 fee that each society and group paid into the Council for support of Council operations would be returned. In addition, there will be final disbursement com-

Harbor Branch Foundation, Inc. is a not-for-profit corporation established primarily for research in the marine sciences and for the development of tools and systems for underwater oceanographic research.

If you ever require any additional information regarding Harbor Branch Foundation, please do not hesitate to contact me.

Sincerely,

David L. Clayton
Director,
Link Engineering Laboratory

The correct photo of Bob together with his autobiography can be found at the end of the "Meet Your COE" Section (see top of this page).

OF OCEANIC INTEREST

TEXAS INSTITUTE FINDS SHIP FROM BRONZE AGE

By Walter Sullivan

A sunken Bronze Age ship that underwater archaeologists hope will prove to have the oldest intact hull yet discovered has been found off the coast of Turkey. The wreck is in 150 feet of water near the port of Kas.

From the shape of 50 copper ingots and four jars visible in the wreck, it is believed that the ship dates from about 1500 BC, which would make it the third oldest ship discovered. Dr. George Bass, director of the Institute of Nautical Archaeology at Texas A&M University in College Station, received word of the discovery by telephone Friday.

Bass said in a telephone interview that in neither of the two earlier finds was any of the hull structure preserved. One, found by his group off Sheytan Deresi, Turkey, and believed to date from 1600 BC, consisted of widely scattered jars that had apparently been dumped when a ship capsized. The earliest remains, found by another group in the Greek islands, have been dated at 2500 BC.

It is believed that ships began plying the Mediterranean 10,000 years ago, before the domestication of animals.

The new find lies on the Mediterranean floor between Rhodes and Cyprus. Since Cyprus was the ancient world's chief source of copper, the ship presumably loaded there.

Reprinted from the New York Times News Service

"HOT SPOT" DEEP SEA POLYMETALLIC SULFIDES EXCITE INTEREST

From these deep sea hot spot areas of the Pacific Ocean there was news last month of rich ore deposits. If assays of samples taken so far show the promise hinted by marine geologists current deep sea mining negotiations of the United Nations Conference on Law of the Sea (UNCLOS) could be affected strongly, some observers believe. Late in September samples were brought back from the Galapagos Ridge west of Ecuador, taken at depths of 3,000 meters. They were being assayed by the Department of the Interior's Bureau of Mines. They were obtained by Dr. Alexander Malahoff, chief scientist (geologist) of the National Ocean Survey of the Department of the Interior, diving on the site of seafloor spreading in the submersible *Alvin*, whose manipulator arm dug the samples . . . Scientists hoped that the assays will show rich concentrations of valuable metals; especially silver . . . Piled on top of this was the news, revealed at the Oceans '81 Conference and Exhibition in Boston Sept. 16-18, that Dr. Robert Ballard of the Woods Hole Oceanographic Institution had discovered more rich deposits in the area of the Easter Island Fracture Zone of the east Pacific Rise. Ballard, who pioneered in exploring the ridge seafloor spreading zones of the Atlantic and Pacific, says that at the fractures near his most recent finds the spreading rate is 18 centimeters a year, permitting ejection of an increased amount of the rich ores from the earth's mantle. The

Galapagos spreading rate is 6 centimeters and the Mid-Atlantic Ridge 2 centimeters. Ballard believes that mining of the rich ores will become widespread in the near future and foresees development of a new mining industry, with greater returns than from manganese nodules at depths of 5,000 meters. Mining would take place at sites of former hot spots rather than the present spots where magma oozes from the earth's interior . . . The third area that has excited scientists is the Juan de Fuca Fracture Zone off Oregon and Washington. H. Edward Clifton, chief of the Pacific-Arctic Branch of Marine Geology of the U.S. Geological Survey last month revealed the discovery of polymetallic sulfides 270 miles off the coast of Oregon. He said that analyses of water, ore samples and photographs were expected to show copper and zinc sulfides and possibly silver . . . That discovery was in international waters. According to present sea law based on the treaty of 1958 any bottom resources beyond the 200 meter depth line belong to the adjacent nation if a resource is exploited.

Reprinted from the Sea Technology, November 1980

MacINNIS TEAM USES BENTHOS VEHICLE TO PHOTOGRAPH HMS BREADALBANE IN ARCTIC

Working from a Canadian Coast Guard icebreaker September 2-8, a team lead by Arctic underwater explorer Dr. Joseph MacInnis deployed a Benthos, Inc., remotely piloted vehicle called the RPV to take color video and still photos of the three-masted British barque *HMS Breadalbane*, holed by shifting Arctic ice and sunk in 1853. On August 13, 1980, following several years of research, MacInnis located the wreck, which has remained remarkably unaffected by exposure to water for 128 years. Two of the ship's masts are still standing. The 38.1 m ship is resting upright on its keel, as shown by the videotape. Water temperature was 1.5° below freezing, the expedition's members "flew" the Benthos vehicle to the wreck site, at the depth of 100 m. Visible through a large hole in the ship's side were what appeared to be a tool cabinet, compass, navigation instruments and the ship's wheel. MacInnis, to whom diving beneath the Arctic ice is nothing new (he once escorted Britain's Prince Charles in a dive under the ice) praised the RPV since it made it possible to accomplish in four to six hours of time spent comfortably ensconced in the ship, what otherwise would have required a series of 30-minute dives with four hours of decompression each. Using techniques developed by National Geographic photographer Emor Kristof, the RPV was outfitted with six cameras, including black and white and color low light level TV. In a press conference September 14 at the Washington, D.C., headquarters of one of the mission's cosponsors, the National Geographic Society, MacInnis sounded a note of concern over the wreck's continued welfare, since a future seaward of the north, for transport of oil from the coast of Alaska and the Beaufort Sea, will pass directly over the wreck which is located one mile south of Beechey Island in the

Arctic . . . In other ship diving news, divers of the National Underwater Marine Agency, Arlington, VA, have found the remains of two Civil War vessels off Newport News, VA. One is the *Cumberland*, a wooden Union frigate, and the other the *Florida*, a Confederate raider. They are within a few hundred meters of each other in the James River in about 21 m of water. The *Cumberland* was sunk in March, 1862. The *Florida* was scuttled in Newport News in 1864.

Reprinted from Sea Technology, October 1981

MORE TREASURE FROM A SUNKEN SHIP

The year 1981 has produced a bumper crop of discoveries of sunken ships and treasure recoveries from them. In the case of the *Andrea Doria* (ST Oct., page 22), the treasure in precious items awaits the "live" opening of a safe on television, but the greatest income will be derived from the broadcast company. But by far the greatest find and retrieval in actual treasure was revealed Oct. 8 when the salvage ship *Stephaniturm* came into the north-western Russia port of Murmansk. Expedition leader Keith Jessop, who had tried for six years to find the sunken World War II 10,000 ton British cruiser *HMS Edinburgh*, said that he and his team of divers had brought up from a depth of 244 meters 431,023 pound, gold bars each worth roughly \$200,000 for a total of \$86 million. The bars were to be in payment of U.S. arms sold to the Soviets. But on April 30, 1942, the ship, leading a convoy of 13 ships in the Barents Sea 170 miles out of Murmansk, was attacked by German U-boats and crippled. It was scuttled to keep the gold from the Germans. Some 60 men of the crew of 850 were entombed in the wreck. The consortium headed by Jessop will receive

45% of the total, a little less than \$40 million. By an insurance agreement, the Soviet Union will receive two-thirds of the remainder and the British government one-third. The U.S. receives nothing because it had been reimbursed by the insurance companies. About \$4 million was spent in the salvage operation. What made the operation more dangerous was that crates of bombs shared the hold with the crates of gold bars.

Reprinted from the Sea Technology, November 1981

EL CHICHON VOLCANO CLOUD MAY AFFECT WORLD WEATHER FOR SEVERAL YEARS

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'TIS A PUZZLEMENT

NEW PUZZLES

Puzzlement Editor: George V. Mueller, 2229 Indian Trail, West Lafayette, IN 47906

WATTMETER CONNECTIONS

When two wattmeters are properly connected in a 3-phase 3-wire circuit it sometimes happens that one wattmeter has a downscale deflection. Most writers state that when this happens the connections on either the current coil or the potential coil should be reversed to bring the deflection upscale and the reading recorded as negative. It is true that either reversal will bring the deflection upscale but the reversal of connections should be on the current coil. Why may the reading be in error if the potential coil connections are reversed?

THE MONKEY AND THE COCONUTS

Five men were shipwrecked on an island. They took stock of the food supply and found a lot of coconuts and a monkey. After spending a day gathering the coconuts, they decided to wait until the next day to divide them and went to bed. One man feared that the others might cheat him, so he got up, divided the coconuts into five equal piles and had one left over that he gave to the monkey. He then hid one fifth, repiled the remaining coconuts, and went back to bed. Then a second man had the same thought. So he divided the pile into five equal piles, had one coconut to give to the monkey, hid his one fifth, repiled the remaining coconuts, and went back to bed. Each man in turn did the same thing, so all told the monkey got five coconuts. The next morning the remaining coconuts divided evenly among the five. What was the minimum number of coconuts originally?

Arctic . . . In other ship diving news, divers of the National Underwater Marine Agency, Arlington, VA, have found the remains of two Civil War vessels off Newport News, VA. One is the *Cumberland*, a wooden Union frigate, and the other the *Florida*, a Confederate raider. They are within a few hundred meters of each other in the James River in about 21 m of water. The *Cumberland* was sunk in March, 1862. The *Florida* was scuttled in Newport News in 1864.

Reprinted from Sea Technology, October 1981

MORE TREASURE FROM A SUNKEN SHIP

The year 1981 has produced a bumper crop of discoveries of sunken ships and treasure recoveries from them. In the case of the *Andrea Doria* (ST Oct., page 22), the treasure in precious items awaits the "live" opening of a safe on television, but the greatest income will be derived from the broadcast company. But by far the greatest find and retrieval in actual treasure was revealed Oct. 8 when the salvage ship *Stephaniturm* came into the north-western Russia port of Murmansk. Expedition leader Keith Jessop, who had tried for six years to find the sunken World War II 10,000 ton British cruiser *HMS Edinburgh*, said that he and his team of divers had brought up from a depth of 244 meters 431,023 pound, gold bars each worth roughly \$200,000 for a total of \$86 million. The bars were to be in payment of U.S. arms sold to the Soviets. But on April 30, 1942, the ship, leading a convoy of 13 ships in the Barents Sea 170 miles out of Murmansk, was attacked by German U-boats and crippled. It was scuttled to keep the gold from the Germans. Some 60 men of the crew of 850 were entombed in the wreck. The consortium headed by Jessop will receive

45% of the total, a little less than \$40 million. By an insurance agreement, the Soviet Union will receive two-thirds of the remainder and the British government one-third. The U.S. receives nothing because it had been reimbursed by the insurance companies. About \$4 million was spent in the salvage operation. What made the operation more dangerous was that crates of bombs shared the hold with the crates of gold bars.

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PAST PUZZLES

Solution: Phase Sequence Indicator

(The expression for V_c is incorrect. The sign of the second term in the numerator should be negative.)

1. The expressions for V_b and V_c are derived as follows. Consider the resistance of each lamp L_b and L_c to be 1,000 ohms. Also consider the respective line currents to be I_b , I_a and I_c positive from left to right. The following equations apply

$$V_{ab} = -jI_a X_c - 1,000I_b$$

$$V_{bc} = 1,000I_b - 1,000I_c$$

$$I_a + I_b + I_c = 0$$

For one sequence $V_{ab} = 100 \angle 0^\circ = 100 + j0$ and $V_{bc} = 100 \angle -120^\circ = -50 - j50\sqrt{3}$. The voltage $V_b = 1,000I_b$. After the above relations are used to determine I_b then

$$V_b = 100 \frac{\sqrt{10^6 + \sqrt{3} \cdot 10^3 X_c + X_c^2}}{\sqrt{10^6 + 4X_c^2}}$$

In a similar manner it is determined that

$$V_c = 100 \frac{\sqrt{10^6 + \sqrt{3} \cdot 10^3 X_c + X_c^2}}{\sqrt{10^6 + 4X_c^2}}$$

2. Substitution of the value $X_c = 1,000$ ohms in the above equations yields $V_b = 86.4$ v and $V_c = 23.15$ v.

To determine the value of X_c for which V_b is a maximum, first square the equation for V_b and obtain

$$V_b^2 = 10^4 \frac{10^6 + \sqrt{3} \cdot 10^3 X_c + X_c^2}{10^6 + 4X_c^2}$$

Taking the derivative of this with respect to X_c , setting the result equal to zero and solving the resulting equation for X_c yields $X_c = 228.43$ ohms. For this value of X_c , $V_b = 109.45$ v and $V_c = 73.70$ v. The ratio of V_b to V_c is 1.49.

4. To determine the value of X_c for which V_c is a minimum, square the expression for V_c and obtain

$$V_c^2 = 10^4 \frac{10^6 + \sqrt{3} \cdot 10^3 X_c + X_c^2}{10^6 + 4X_c^2}$$

Take the derivative of this equation with respect to X_c and set the result equal to zero. Solving the resulting

equation for X_c yields $X_c = 1094.45$ ohms. For this value of X_c , $V_b = 84.07$ v and $V_c = 22.84$ v. The ratio of V_b to V_c is 3.68.

5. The ratio R of V_b to V_c squared is

$$R^2 = \frac{10^6 + \sqrt{3} \cdot 10^3 X_c + X_c^2}{10^6 + \sqrt{3} \cdot 10^3 X_c + X_c^2}$$

Take the derivative of this equation with respect to X_c , set the result equal to zero and solve the resulting equation for X_c . Here $X_c = 1,000$ ohms. The values $V_b = 86.4$ and $V_c = 23.15$ are those determined in (1) above. The ratio of V_b to V_c is 3.73.

By applying Thevenin's Theorem the relations in the circuit can be shown graphically. Draw an equilateral triangle that is 100 units on each side. Letter the corners a , b and c . Draw a line from a to the center of the opposite side. The line is $\sqrt{3} \cdot 50$ units long and represents the voltage that would appear across a break in the circuit between a and the capacitor. Next draw a semicircle, with the line as a diameter, on the side of the line nearest to c . The semicircle represents the locus of the path followed by the potential of the junction point of the circuit as X_c is varied from 0 to infinity. V_b is the distance from b to the semicircle. It is a maximum when a line from b passes through the center of the semicircle. The maximum value of V_b can be scaled from the figure. The corresponding value of V_c can also be scaled from the figure as the distance from c to the point on the semicircle representing the extremity of the V_b phasor. Note that V_c is not a minimum when V_b is a maximum.

The minimum value of V_c occurs when a line from c to the semicircle extended passes through the center of the semicircle. The minimum value of V_c can be scaled. The corresponding value of V_b can also be scaled.

Solution: Right Triangles

Consider the perpendicular sides of a triangle to be a and b and the hypotenuse to be c . The area of the triangle is $ab/2$. In this case the area is given as 840 square units. Then $ab = 1680$. After listing the various factors a and b compute the corresponding values of $c = \sqrt{a^2 + b^2}$. If c is an integer then a set of values a , b , c for a triangle is determined. It is found that the three triangles are 15, 112, 113; 24, 70, 74 and 40, 52, 58.

For the triangles with an area of 210 square units, by listing the factors and testing for integral values of c , it is found that the only possible triangles are those listed: 20, 21, 29 and 12, 35, 37.

(If you have a puzzle that you would like to submit for consideration, please send it to the Puzzle Editor)

ANNOUNCEMENTS

1983 INTERNATIONAL GEOSCIENCE AND REMOTE SENSING SYMPOSIUM (IGARSS '83)

The 1983 International Geoscience and Remote Sensing Symposium (IGARSS '83) will be held August 31-September 2, 1983 at the San Francisco Hilton Hotel, San Francisco, California. IGARSS '83 is sponsored by the IEEE Geoscience and Remote Sensing Society and is being held jointly with URSI (International Scientific Radio Union), U.S. National Committee, Commission F on Propagation in Non-ionized Media. It is being co-sponsored by the IEEE Aerospace and Electronic Systems Society, the IEEE Antennas and Propagation Society, the European Association of Remote Sensing Laboratories, NASA, NOAA, DFVLR, ESA, the Canada Centre for Remote Sensing, the Canadian Remote Sensing Society, and the European Association of Exploration Geophysicists. The General Chairman is Dr. Keith R. Carver, Code EL-4, NASA Headquarters, Washington, D.C. 20546.

Technical sessions will be coordinated to provide a well-balanced, comprehensive program stressing the problems and perspectives of the geoscientific disciplines, instrumentation systems, data processing techniques and sensor-target models. In particular, there will be a special mini-symposium on August 31 on Remote Sensing as applied to the Interaction of the Biosphere with the Environment. Proposals for papers are invited in the following areas: land, sea, and atmospheric observations; marine and solid earth geophysics; geodynamics and geodesy; remote sensor systems; remote sensing programs and trends.

Authors of papers for IGARSS '83 are invited to submit proposals in summary form (see instructions below) not later than December 10, 1982 to Dr. D. G. Rea, Co-Chairman of IGARSS '83 Technical Committee, Jet Propulsion Laboratory, M.S. 180-704, 4800 Oak Grove Drive, Pasadena, CA 91109. Further IGARSS '83 details are available in the Call for Papers, which can be obtained by contacting Mr. Mike Buettner, Chairman of the Publicity Committee, M.S. L-156, Lawrence Livermore National Laboratory, P.O. Box 5504, Livermore, CA 94550, phone (415) 422-7888.

SUBMISSION OF SUMMARIES TO IGARSS '83

Texts of IGARSS '83 summaries should be typed single spaced on 8½ × 11 inch white paper (about 500-600 words). The title should be typed in capitals, centered at the top, with the author's name and affiliation in capitals and lower case centered below the title. Since these summaries will be used by the Technical Program Committee for selection of accepted papers and composition of the program, the summary should clearly state the problem addressed, the technique used and the central conclusion(s). The summary must be received by the Technical Program Chairman by December 10, 1982. Authors of accepted papers will receive an author's preparation kit by January 24, 1983 for use in the preparation of their final papers, which will be due on May 20, 1983 for publication in the Symposium Digest.

CALL FOR PAPERS



MTS-IEEE
CONFERENCE
& EXPOSITION

Oceans '83 P.O. Box 70970 Sunnyvale, California 94086

"EFFECTIVE USE OF THE SEA—AN UPDATE"

CALL FOR PAPERS The Marine Technology Society (MTS) and the Institute of Electrical and Electronic Engineers (IEEE) Council on Oceanic Engineering (COE) invite papers from all interested authors for the OCEANS '83 Conference and Exposition. Each accepted paper will be presented by the author(s) at the conference in San Francisco, California, which will be held at the Hilton Hotel, 29 August through 1 September 1983. All accepted papers will be published in the Proceedings and mailed to the participants at the conclusion of the conference.

The theme of OCEANS '83 is "Effective Use of the Sea — An Update". This theme serves to underscore the objectives of marine science and technology to explore, conquer, develop, and utilize ocean resources for the benefit of all mankind. The goal of the conference will be to identify the current and future technology, knowledge, and programs needed to achieve these objectives by the year 2000.

Papers are requested which:

- Highlight technological advances in the understanding, use, and recovery of marine resources.
- Identify/suggest other technologies that could be used to advance marine science and engineering.

OCEANS '83 will be international in scope and will focus on the science and technology required for the utilization of five major ocean resource areas: MINERAL RESOURCES and ENERGY, NON-MINERAL RESOURCES, TRANSPORTATION, OCEAN SCIENCE, and MILITARY OCEAN ENGINEERING. The emphasis in each of these areas will be on critical technologies, technology assessment, application, and programs. Papers that address other important developments applicable to marine science and technology will also receive consideration.

BACKGROUND Controversy arose in 1965 concerning the adequacy of our national effort to explore, understand, and develop the ocean. The President's Scientific Advisory Committee (PSAC) formed a Panel on Oceanography in May 1965 to address this controversy. In June 1966 the PSAC report, titled after their proposed national objective "Effective Use of the Sea", was issued.

After extensive hearings, Congress enacted the Marine Resource and Engineering Development Act of 1966. This Act expressed the conviction that serious and systematic attention should be given to the marine environment. It took steps to stimulate marine exploration, science, technology, and financial investment on an augmented scale. The Act also established a Commission, which became known as the Stratton Commission after its chairman, J. A. Stratton. This Commission examined the nation's need for development, utilization, and preservation of the marine environment. It also reviewed contemplated marine activities to assess their adequacy to achieve the national goal. The Commission report, entitled "Our Nation and the Sea, A Plan for National Action", was issued in 1969.

During this same period, the National Academy of Engineering was asked to assist and advise various government activities with their marine programs. The Academy formed an advisory committee, the Committee on Ocean Engineering (which later became the Marine Board), to carry out these tasks. The Committee, and later the Board, undertook a study of ocean technology, and what would be required to fulfill the national goals established by the PSAC and Commission reports. The results of this study were released in a Marine Board report in 1972 entitled, "Towards Fulfillment of a National Commitment".

Much has happened in the ocean affairs arena in the decade since these reports were issued. The goals of the OCEANS '83 technical program are to evaluate the progress towards achieving the objectives of these historic reports, assess the present state of technology, and describe programs that will make "Effective Use of the Sea" by the year 2000.

DEADLINE..... 11 February 1983

PAPERS ARE REQUESTED IN THE FOLLOWING CATEGORIES

- Ocean Engineering • Physical, Chemical, Biological Oceanography
 - Marine Geophysics & Geology • Hydrography
- Vessels, Instruments & Platforms • Underwater Construction & Habitats
 - Remote Sensing • Robotics • Ocean Data Management
 - Other Ocean-Related Topics

CONFERENCE FORMAT

OCEANS '83 will feature two plenary sessions. A beginning session will review our increased knowledge of the ocean, developments in marine affairs, and the use of marine resources over the last decade. A session in cooperation with the Marine Board of the National Academy of Science/Engineering will conclude the conference. This session will update the progress that has been made in The Effective Use of the Sea over the last decade and provide a critical assessment of the present and

future status of ocean technologies and programs.

There will be numerous technical sessions comprised from this Call for Papers. Many of the sessions will begin with invited speakers who will address focal programs, and the issues, requirements, and political aspects of Marine Science and Technology. Technical papers identifying critical technologies and/or describing activities in the marine environment are invited. The working language of the Conference will be English.

SUBMITTAL OF ABSTRACTS & PAPERS

Abstracts should be submitted no later than 11 February 1983, on the form provided in this announcement. Authors of papers selected for presentation at the OCEANS '83 Conference will be notified by mail in April 1983. Detailed instructions for the preparation of final manuscripts will be provided with the notification of selection.

Final manuscripts and camera-ready illustrations must be received no later than 1 August 1983. Papers not received by this deadline cannot be published in the Proceedings. Abstracts and final manuscripts should be sent to:

OCEANS '83 Technical Program Chairman
P.O. Box 71030
Sunnyvale, CA 94806

POSTER SESSIONS

Poster sessions will be an important part of the OCEANS '83 program. They afford the author(s) an opportunity to communicate the results of their work to the conference participants in a more relaxed environment than the formal paper sessions. Authors wishing to participate in the poster sessions will be provided with format and style guidelines and with instructions for the preparation of manuscripts for publication in the Proceedings, with the notification of selection.

EVALUATION OF ABSTRACTS

Each abstract received will be reviewed by the Technical Program Committee. To guide the Committee, authors should indicate on the submittal form which of the five major ocean resource areas they feel are most appropriate to their subject matter.

PRESENTATION OF PAPERS

The Technical Program Committee will make the final determination of the sessions and organization of papers after the selections are made. Technology papers will be limited to 15 to 20 minutes, with 5 minutes for questions and discussion.


EXPENSES Authors are responsible for all expenses incurred including writing and preparation of camera-ready manuscripts and illustrations, travel to the conference, and conference registration fees.

EXHIBITS An extensive exhibit of marine products and services is planned as part of the OCEANS '83 Conference and Exposition. For further information, please contact the Exhibits Chairman at the following address:

OCEANS '83 Exhibits Chairman
P.O. Box 70970
Sunnyvale, CA 94086

DEADLINE..... 11 February 1983

OCEANS '83



**MTS-IEEE
CONFERENCE
& EXPOSITION**

All information requested below *and* on the reverse side of this form must be included to be considered by the OCEANS '83 Technical Program Committee. Deadline for submission of abstracts is 11 February 1983. Abstracts should be mailed to:

OCEANS '83 Technical Program Chairman
P.O. Box 71030
Sunnyvale, CA 94086

Paper Title _____

Summarize the nature and scope of the information to be presented and indicate relation to theme topics. Be clear and complete, yet succinct. Abstracts should be limited to 250 words, but authors may submit longer abstracts if they feel more detailed information is required for Technical Program Committee deliberation.

SUPPLEMENTARY INFORMATION

State specific conclusions of work and describe how it differs from previous work

Suggest ocean resource area most appropriate for this paper
I would like to participate in the following sessions (check one):

- Poster
- Formal
- Either

----- (Fold In) -----

Recommendation of Technical Program Committee (Do *not* write here)

- Paper accepted
- Paper not accepted
- Include in formal sessions
- Include in Poster Session
- Overview or Focal Program
- Technology

AUTHOR INFORMATION

From:

Author
Business Address
Telephone Number ()

Title

Co-Author
Business Address
Telephone Number ()

Title

Co-Author
Business Address
Telephone Number ()

Title

----- (Fold Over) -----

OCEANS '83
Technical Program Chairman
P.O. Box 71030
Sunnyvale, CA 94086

PLACE
STAMP
HERE

To:



IEEE 1983 INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY



**August 23-25, 1983
Hyatt Regency Hotel
Arlington, VA**

CALL FOR PAPERS

The 1983 IEEE International Symposium on Electromagnetic Compatibility will be the Silver Anniversary celebration for the EMC Society. The theme of the symposium will be "A Quarter Century of EMC Progress" and it is fitting that this SYMPOSIUM be held in the Nation's Capital. We expect a large attendance from both industry and government. The symposium will focus on the current "state-of-art" after a quarter century of EMC progress and look into the future to see where we should be directing our efforts. Particular emphasis will be given to the systems approach to EMC which involves reduction of undesired emanations and the reduction of the susceptibility of electronic devices and systems. Authors are invited to submit original, unpublished papers in all areas of EMC theory and practice. Suggested topic categories include, but are not limited to the following:

TECHNICAL AREAS

Design	Lightning
Control	EMP
Analysis	ESD
Regulations	Materials
Standards	Management
Measurements	Filters
Instrumentation	Systems
Radiation Hazards	Vulnerability
Sequency Theory	

APPLICATION AREAS

Aerospace	Defense
Automation	Electrical Power
Bio-Medical	Environments
Communications	Production
Components	Remote Sensing
Computers	Spectrum Utilization
Automotive	Legislation
Consumer Products	Non-Sinusoidal
Signal Processing	Applications
Carrier-free Radar	

Prospective authors should submit a 50 to 70 word abstract and a 500 to 700 word summary (up to five illustrations) that clearly explain their contribution, its originality, and its relevance to the EMC discipline. For anonymity during review, please identify author(s) only on the cover sheet. Upon acceptance, authors will receive forms and instructions for the preparation of materials to be printed in the Symposium Record. If poster presentation is desired, please indicate on the material submitted. Papers written by bona fide students will be eligible for a student prize.

AUTHORS' SCHEDULE

Abstract and Summary (3 copies required)	January 3, 1983
Notification of Acceptance	February 15, 1983
Camera-ready Copy	May 2, 1983

Submit Abstracts and Summaries to:

William G. Duff
Technical Program Chairman
Atlantic Research Corporation
5390 Cherokee Avenue
Alexandria, VA 22314

COUNCIL ON OCEANIC ENGINEERING (continued)

POWER ENGINEERING (PE-31)

R. L. Hurter
Brown Boveri Electric, Inc.
Electrical Sales Division
P.O. Box 55328
Houston, TX 77055
(713) 686-6010

RELIABILITY (R-07)

Edward W. Early
(Treasurer)
Francois Envent
Man Tech. Inter. Corp.
2341 Jefferson Davis Hwy.
Arlington, VA 22202
(703) 979-0733

SONICS AND ULTRASONICS

(SU-20)
Harold A. Sabbagh
(Newsletter Editor)

VEHICULAR TECHNOLOGY

(VT-06)
Cmdr. R. H. Cassis, Jr.
17th CG Dist. EEE
U.S. Coast Guard
P.O. Box 3-5000
Juneau, AK 99802
(907) 586-7327

EX OFFICIO MEMBERS

Eric Herz
Irving Engleson*
*IEEE Headquarters
345 East 47th Street
New York, NY 10017
(212) 705-7863

Robert E. Larson
26515 Anacapa Drive
Los Altos, CA 94022

John C. Saccante
Tenneco, Inc.
P.O. Box 2511
Houston, TX 77001
(713) 757-4500