



IEEE Council on

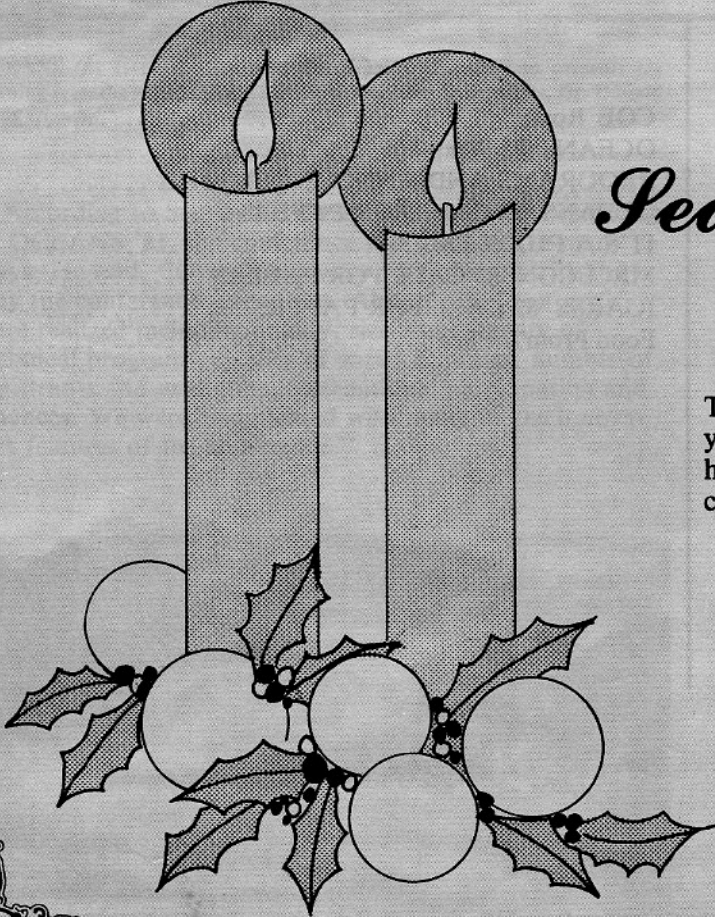
OCEANIC ENGINEERING

NEWSLETTER



EDITOR: HAROLD A. SABBAGH

DECEMBER 1981 (USPS 420-910)



Season's Greetings

The Council on Oceanic Engineering extends to you its wishes for a joyous holiday season, and hopes that the coming year brings to us all the cherished gift

Peace—Good Will

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IEEE Council on Oceanic Engineering Newsletter is published quarterly by the Council on Oceanic Engineering of the Institute of Electrical and Electronics Engineers, Inc. Headquarters: 345 East 47th Street, NY 10017. Sent automatically and without additional cost to each member of the Council on Oceanic Engineering. Printed in U.S.A. Second-class postage paid at New York, NY and at additional mailing offices.

OCEANS '81 Wrap-Up

A record 1600 people attended the 13th annual Oceans Technology Conference and Exhibition, OCEANS '81, held this year at the Sheraton-Boston Hotel September 16-18. This included 830 registrants and an equal number of attendees at the exhibit area.

OCEANS '81 was co-sponsored by the Institute of Electrical and Electronics Engineers and the Marine Technology Society. Featuring a record 300 technical presentations made by speakers from all over the world, OCEANS '81 drew positive comments from attendees and exhibitors alike. Eighty-four exhibitors representing a wide range of marine products, equipment, and services filled all available exhibit space.



OCEANS '81 General Chairman Dr. Stanley Chamberlain presents his opening remarks at the IEEE Luncheon. Dr. John Byrne (left), Dr. Donald Bolle (right).

According to Stanley G. Chamberlain, general chairman of OCEANS '81, the conference was a success in many ways. He said, "Overall, we were very pleased with the way the conference turned out. Almost all of our goals were realized including quality, size and diversity of technical programs, quality of social activities, number of registrants and exhibitors, international participation and finances. We were also pleased with many of the innovative features of the conference."



Head table at the IEEE Luncheon (left to right), Dr. Donald Bolle, Mrs. John Byrne, Dr. Arthur Maxwell (MTS President), Mrs. Arthur Westneat, Lloyd Maudlin, Mrs. Stanley Chamberlain and Barry Oakes.



Dr. Donald Bolle introduces the head table (left to right), Mrs. Donald Bolle, Dr. Stanley Chamberlain, Mrs. Lloyd Maudlin, Arthur Westneat, Dr. John Byrne. On the other side of the lectern (left to right): Dr. Arthur Maxwell, Mrs. Arthur Westneat, Lloyd Maudlin, Mrs. Stanley Chamberlain and Barry Oakes.

In addition to the traditional technical presentations, speakers presented their material in poster format. Subjects covered included acoustics, coastal zone management instrumentation, marine policy and fisheries, ocean energy and engineering, research vessels, seafloor engineering, and wave measurements. The conference also featured a one-day primer on Outer Continental Shelf Petroleum Operations. The primer was designed to provide an introductory technical background for the engineering and scientific community, as well as policymaking groups.

Several prominent persons in the industry spoke at key events in the conference. Among them were Rear Admiral Leland S. Kollmorgen, USN, Chief of Naval Research.



IEEE/COE President Dr. Donald Bolle presiding at the luncheon.

At the opening plenary session, Kollmorgen spoke about the state of marine research today and the efforts of the Office of Naval Research (ONR) to continue funding the research. He said, "Basic research has been reduced drastically in favor of development," and consequently, "we are in trouble" at universities and colleges. There is a serious shortage of college professors in the engineering field and yet an all-time high of engineering undergraduates, he noted.

ONR is trying to maintain a sound scientific base, he said, by meeting the problems. One problem is the need to replace and upgrade the oceanographic research vessel fleet. Steps are being taken by the Navy, he said, in a five-year, \$15 million program to improve the fleet.



Dr. Harold E. Edgerton narrates his films at the Thursday evening banquet.



Dr. John Byrne, NOAA Administrator, speaks at IEEE luncheon, while IEEE/COE president Dr. Donald Bolle and Mrs. Byrne listen.

Speaking at the IEEE/COE luncheon, Dr. John V. Byrne, Administrator of the National Oceanic and Atmospheric Administration (NOAA), made several points. Among them were:

- Despite "severe" budget cuts at the agency, NOAA's mission would continue, with emphasis on science and services, rather than regulation and enforcement.
- There is high unemployment despite many vacancies in high technology positions.
- NOAA's goals are to promote commercial sources for exploiting U.S. ocean resources; increase facilities one third by 1990; provide more balanced management of marine resources; and restructure the National Weather Service.

Ira Dyer, of the Massachusetts Institute of Technology, spoke at the opening plenary session about what lies ahead in the field of ocean technology. He agreed with Rear Admiral Kollmorgen, saying that oceanographic research facilities, including ships, should be improved. "There is also a need," he said, "for real-time information on fishery stocks by population, size, and species. Ultimately we would like nothing less than a quantitative and extrapolative understanding of the dynamics of a fishery."

Dyer also spoke of underwater sensing technology, saying, "In my view, growth in understanding of the ocean will accelerate in the next ten years, supported by the rapid development of data processing technology, by the availability of reliable deep water sensor platforms, and by an unusually keen group of young men and women who have been attracted to the field."

Another highlight of the conference was Dr. Harold E. Edgerton, professor at the Massachusetts Institute of

Technology and one of the founders of EG&G. At the Thursday evening banquet, Dr. Edgerton showed a variety of his historic underwater films demonstrating the development of the strobe, and key scientific events in the sea.

The conference also featured a wide variety of social events including a student/industry mixer, and entertainment by the U.S. Coast Guard Academy Cadet Chorus from New London, Connecticut.



U.S. Coast Guard Academy Cadet Chorus from New London, Connecticut sing a medley of sea chanteys at the Thursday evening banquet.

Several award presentations were made at OCEANS '81. At the IEEE/COE luncheon, Lloyd Z. Maudlin received the Distinguished Service Award. Other awards were also presented at the MTS luncheon.

OCEANS '82 will be held in Washington, D.C., OCEANS '83 in San Francisco.



Lloyd Maudlin (right) receives the Distinguished Service Award presented by IEEE/COE President Dr. Donald Bolle.



OCEANS '81 attracted an assortment of attendees.



Dr. and Mrs. Donald Bolle at the OCEANS '81 exhibit area.



General Chairman Dr. Stanley Chamberlain (center), and Technical Programs Committee Chairman James Barger (right), speak with IEEE Fellow Dr. William Hall who helped man the IEEE booth.



Getting directions at the Hospitality Desk.



Rear Admiral Leland S. Kollmorgen, USN, Chief of Naval Research, speaks at the opening plenary session.



Brisk Business at the OCEANS '81 registration area.

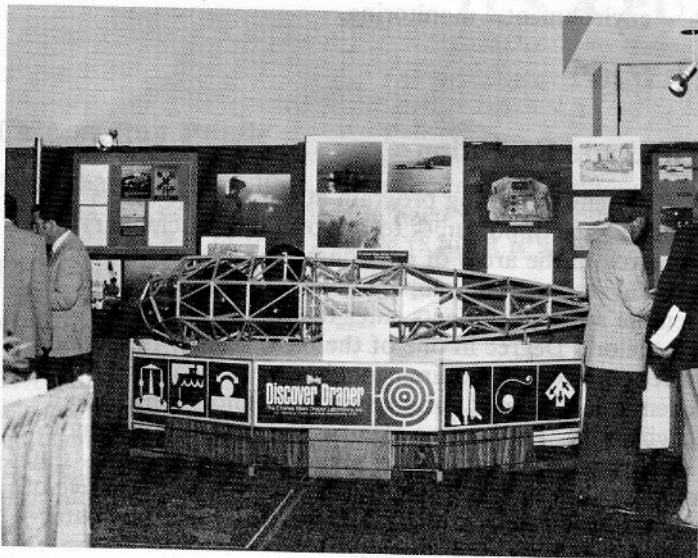


Professor Ira Dyer, professor of ocean engineering at the Massachusetts Institute of Technology, speaks at the opening plenary session.



Attendees at the opening plenary session. Front row (right to left), Stan Ehrlich, new COE Journal editor, Dr. Dave Wiseman, outgoing COE Journal editor, and Dr. Lloyd Breslau, COE Council Member.

Miscellaneous exhibit shots.



PROGRAMS AND ANNOUNCEMENTS

UNIVERSITY OF DELAWARE CENTER FOR REMOTE SENSING

Basic and Applied Research

The University of Delaware's Center for Remote Sensing serves as a focal point for basic and applied research on remote sensing of the physical, biological, and chemical properties of the oceans and the coastal zone. The Center is an integral part of the College of Marine Studies and specializes in interdisciplinary research and training with emphasis on the marine environment and coastal resources:

- Multispectral analysis techniques are being applied to classify water pollutants by their spectral reflectance signatures and map their concentrations. (NASA, NOAA)
- Satellite, aircraft and ship data of organic and inorganic suspended matter are being correlated to determine nutrient and detritus flux in estuaries and coastal waters. (NOAA, NASA)
- Advanced multispectral analysis techniques are being applied to study wetland habitat, including vegetation type, condition and biomass. (NASA, NOAA)
- A joint study with Delaware state agencies of land use change is in progress, including changes of agricultural land, forest cover, and wetland acreage. (NASA/ERRSAC)
- A study of the current circulation and waste dispersion at industrial and municipal waste dump sites 40 miles off the Delaware coast has been completed. Satellite and aircraft data of waste plumes were correlated with current measurements and water samples to determine the drift and spreading of several pollutants. (EPA)
- An oil slick drift and dispersion model has been verified by tracking oil slicks with aircraft over a wide range of wind, wave and current conditions. Estuarine fronts which capture oil slicks and influence their dispersion were investigated using satellites and are being incorporated into the model. (NSF-RANN)
- The relationship between spectral changes and stress induced in vegetation by soil pollutants is being studied to determine if plants can be used as effective indicators of hazardous wastes in the soil. (DSWA, EPA)
- A satellite study of fronts and mesoscale features in the Norwegian Sea has been initiated. (JHU/APL)
- The Center has mapped Delaware's wetlands in response to Delaware's Wetland Act. A boundary separating the wetlands from the uplands was identified and wetland plant species were inventoried. (DNREC)
- Landsat and other satellites were used to determine current circulation patterns and ice conditions in Delaware Bay. (NOAA)
- Aerial infrared and ground survey techniques were employed to study thermal effluents, pipeline hot spots and heat losses at Delaware River oil refineries. (Oil Companies)

- The variation of thermal infrared emissivity of coastal waters as a function of turbidity is being studied in order to develop a model for correcting ocean temperature mapping procedures using satellites.

International Research and Training

International research and training are also vital components of the Center's operations and include the following:

- The relationships between changes in surrounding land use and pollutant influx and biological effects are being investigated for the Gulf of Nicoya, Costa Rica. (NOAA-SEAGRANT)
- A study of the coastal geology of Turkey using Landsat has been completed. (Univ. of Ankara)
- A study of renewable energy resources in Panama is being conducted in Panama. (IRHE)
- A student exchange agreement has been consummated with Ecuador to develop a coastal study program for that country.
- Through the United Nations Development Program, the Center helps train U.N. Fellows from developing nations.
- The Japanese, Spanish, Turkish, Indian, Australian and Venezuelan governments have sent scientists to the Center to train and work on coastal environmental problems.
- UNDP, NSF and AID sponsored workshops on water resources, coastal processes and oceanography were conducted in Egypt, India, Korea, the Philippines, Mexico, Peru, Ecuador, Costa Rica, Panama and Greece.
- Center personnel serve as consultants to UNDP, NSF, AID and NASA on resources development and environmental monitoring.

Graduate Education

The remote sensing program at the College offers students the opportunity to perform interdisciplinary research in the areas of environmental monitoring and coastal resources development. Before specializing in remote sensing, students enter the program with a Bachelor's Degree in one of the basic science fields and meet core course requirements in marine geology; chemical, biological, and physical oceanography; ocean engineering; and marine affairs. The program in remote sensing awards both Master's and Doctoral Degrees. Eight students have participated in the program to date, five of whom have received M.S. Degrees. The remaining three are in the Doctoral Program.

The overall philosophy of the graduate program is to allow students to build on basic skills through interdisciplinary study, to encourage journal publication, and to provide the experience necessary to manage coastal resources. The first year of study emphasizes interdisciplinary course work. In the second year, the graduate student becomes involved in one or more research projects, assuming specific responsibilities for the daily management of one of the projects. This unique feature of the academic program allows the student to develop managerial skills beneficial for employment after graduation. In addition, each student in the Master's or Doctoral Program interns with a national or state agency. (NASA, USGS, Smithsonian Institution, National Academy of Sciences, etc.) The internship can be a summer, a semester, or an entire year while pursuing graduate study. This type of association allows students to become familiar with the work and personnel of those agencies. In

another type of arrangement, state and national agencies send employees to the program for advanced training. All students in the program are fully supported by the research grants or by the agencies that send them to the program.

Additional Information

For additional information contact:

Dr. V. Klemas, Director
Center for Remote Sensing
College of Marine Studies
University of Delaware
Newark, Delaware 19711
(302) 738-2336

PROBABILISTIC AND STATISTICAL METHODS IN MECHANICAL AND STRUCTURAL DESIGN

Place: Ramada Inn, 404 North Freeway, Tucson, Arizona

Presented by: The University of Arizona, College of Engineering

Objective: The objective of this short course and workshop is to review the elements of probability and statistics and the recent theoretical and practical developments in the application of probability theory and statistics to engineering design. Special emphasis will be given to fatigue and fracture reliability.

Dates: January 11-15, 1982

Continuing Education Units: 3.0

For Technical Information Contact:

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The University of Arizona
Tucson, Arizona 85721
Telephone: (602) 626-3159

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The University of Arizona
Tucson, Arizona 85721
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IT'S A PUZZLEMENT NEW PUZZLES

Chinese Rug Puzzle

A rug that is 10 ft by 10 ft is to be cut on a continuous line. The two parts are to be combined with a second rug that is 1 ft by 8 ft to form a single rug that is 9 ft by 12 ft. Show how to make the cut.

Number Sequence

Given the sequence 11, 13, 23, 36, 81, 146, 199, ---. In this sequence each number is defined by a sequence of mathematical operations on the preceding number except for the 11. Determine the sequence of operations and the next number in the sequence.

Auld Lang Sine

Given the curve $y = \sin x$ extending from $x = 0$ to $x = \pi/2$. Determine S , the length of the curve.

Lame Duck

A lame duck sits on her nest at point (1,0) mi in a field adjacent to a lake whose nearest shoreline follows the equation $y = x^{3/2}$. Her feet are killing her and she thinks they would be relieved by dipping them in the lake. What is the least distance that she can travel to reach the lake and what is the angle of inclination of her path with respect to the x-axis?

These puzzles were supplied by our principal puzzler, George V. Mueller, 2229 Indian Trail Dr., West Lafayette, IN 47906, who also provides us with the following official solutions of last issue's puzzles, with the exception of Who Makes More?; Larry Stein solves that one in the accompanying letter.

PAST PUZZLES

Solution: Band the Earth

The diameter of the extended band would be (25,000 mi plus 6 yards) divided by π . This is greater than the diameter of the earth by $6/\pi$ yards. The clearance would be one half of this or $3/\pi$ yards.

Solution: Travel From Here to There

Start at any point that is 115.9 mi north of the South pole. Travel 100 mi south, then travel 100 mi east (going once around the earth) and then retrace the 100 mi going north back to the starting point.

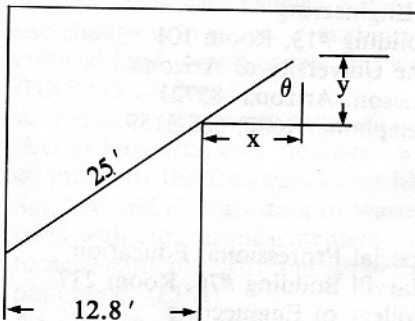
or

Start at any point that is 100 plus $15.9/2$ mi north of the South pole. Travel 100 mi south, then travel 100 mi east (going twice around the earth) and then retrace the 100 mi going north back to the starting point.

or

100 plus $15.9/3$

Solution: Girder Moving



From the geometry of the adjacent figure

$$y = 25 \sin \theta - 12.8 \tan \theta$$

$$x = 25 \cos \theta - 12.8$$

$$\cos \theta = (x + 12.8)/25 = 0.04x + 0.512$$

$$\sin \theta = \sqrt{1 - \cos^2 \theta}$$

$$\sin \theta = \sqrt{0.737856 - 0.0016x^2 - 0.04096x}$$

After combination of the above equations

$$y = \frac{25x \sqrt{0.737856 - 0.0016x^2 - 0.04096x}}{x + 12.8}$$

y is 0 at x = 0 and x = 12.2

y is a maximum of 5.4 when x = 7.2

Solution: Unbalanced Line Currents Produced By Unbalanced Phase Currents

Let $oa = a$, $ob = b$ and $oc = c$. By applications of the cosine law of triangles

$$a^2 + b^2 + ab = 10,000$$

$$b^2 + c^2 + bc = 6,400$$

$$c^2 + a^2 + ca = 3,600$$

From the above equations

$$a = \frac{-b + \sqrt{b^2 - 4(b^2 - 10,000)}}{2}$$

$$b = \frac{-c + \sqrt{c^2 - 4(c^2 - 6,400)}}{2}$$

$$a = \frac{-c + \sqrt{c^2 - 4(c^2 - 3,600)}}{2}$$

Equating the above two values of a yields

$$-b + \sqrt{40,000 - 3b^2} = -c + \sqrt{14,400 - 3c^2}$$

By trial it is found that the above relations are satisfied by $a = 47.080$, $b = 67.770$ and $c = 20.478$.

Dear Harold:

Re Puzzlements in Sept. 1981 OCEANIC ENGINEERING, How about these answers: *Who makes more?* — They make the same, but Smith earned more in the three years in question.

Band the earth: 3 yards.

Travel from here to there: Approximately 131.38 miles north of the south pole, anywhere on that parallel of latitude. If we are using nautical miles, that should be latitude 87 degrees, 48.62 minutes south.

Unbalanced line currents: Approximate solution, $oa = 47.3$ [0] amperes, $ob = 67.80$ [120] amperes, and $oc = 20.30$ [240] amperes. There is also a neutral current of 41.27 [85.48] amperes.

In the same issue, re Crossed Ladders, however did you get my last name to be Stemp. My handwriting?

Sincerely,

Laurence B Stein Jr.

Laurence B. Stein, Jr.
374 East St.
Hingham, MA 02043

CALL FOR PAPERS

OCEANS 82

MTS-IEEE
CONFERENCE
& EXPOSITION 

1730 M Street, N.W., Suite 412, Washington, D.C. 20036 / Tel. 202/659-3251

GOVERNMENT, INDUSTRY, AND ACADEMIA —PARTNERS IN OCEAN PROGRESS—

The Marine Technology Society (MTS) and the Institute of Electrical and Electronics Engineers (IEEE) Council on Oceanic Engineering (COE) invite papers from all interested authors for the OCEANS 82 conference and exposition. Each accepted paper is to be presented by the principal author at the conference in Washington, D.C., which will be held at the Shoreham Hotel, September 20-22, 1982. Published proceedings distributed at the conference will contain all accepted papers.

"Government, Industry and Academia—Partners in Ocean Progress" expands on the OCEANS 81 theme of the ocean as a workplace. Many in the ocean community have spoken of the eighties as a decade of Ocean Development. We find ourselves at a critical juncture in our use of the sea. Certainly, for many of the world's maritime nations, ocean margins and national domain have become one concern. Independent actions are developing into multiple-use conflicts. As we meet in the Nation's capital to share our expertise, we are

presented a challenge. How can we apply our technical and political skills to describe this ocean domain for its rational utilization and promote its economic development. OCEANS 82 can meet this challenge.

Papers are requested which:

- examine the needs of the U.S. and the nations of the world for solutions which marine technology may provide;
- highlight technological potentials and problems where successful realization could make significant contributions to the peoples of the world;
- illuminate deficiencies in research and development; and
- propose methods to foster ocean development.

The general theme has been subdivided into a number of topic or session areas, which are listed on the next page. Papers that do not conform to these suggested topics but contain information of new developments in marine science and technology will receive equal consideration.

DEADLINE . . . FEBRUARY 14, 1982

CATEGORIES

Acoustic systems
Buoy technology
Cables and connectors
Coastal zone management
Cold-water engineering
Communication
Current measurements
Diving technology
Economic potential of the oceans
Education
Expendable instrumentation
Geology and geophysics
Information systems
Instrumentation
Marine biology
Marine fisheries
Marine food and drug resources
Marine geodesy
Marine law and policy
Marine materials

Marine mineral resources
Navigation
Ocean energy
Ocean margin drilling
Oceanographic ships
Ocean survey
Offshore structures
Positioning, localization and tracking
Remote sensing from satellites and aircraft
Salvage and towing
Seafloor engineering
Seismic measurements
Technology exchange
Transportation systems
Undersea physics
Undersea vehicles
Underwater inspection
Underwater photography and sensing
Water quality/pollution
Wave measurement

Submittal of Abstracts

Abstracts should be submitted no later than February 14, 1982, on the form provided in this announcement. Authors of papers selected for presentation at the OCEANS 82 Conference will be notified by mail in March 1982. Detailed instructions for the preparation of final manuscripts will be provided with the notification of selection. Final manuscripts and accompanying illustrations must be received by the Technical Program Chairman by June 21, 1982.

Abstracts and final manuscripts should be sent to:
OCEANS 82 Technical Program Chairman
1730 M Street, N.W.
Suite 412
Washington, D.C. 20036

Evaluation of Abstracts

Each abstract received will first be reviewed by the technical program committee. As appropriate, authors should indicate on the submittal form which session or sessions they feel most appropriate to their subject matter.

Presentation of Papers at the Conference

The Technical Program Committee will make the final determination of the sessions and organization of papers after the selections are made. Since formal papers and supporting data will be contained in the conference proceedings, presentations generally will be limited to 15 to 20 minutes, with 5 minutes for floor discussion.

A Poster Session is contemplated wherein a large meeting room will be filled with bulletin boards on which the participants place graphs, diagrams, data,

pictures, and a small amount of text to illustrate the main points of their presentation. The participants then remain with the display for a set period—generally 1 to 1½ hours—to expand on the material and answer questions. Authors should indicate if they are interested in presenting their papers in this Poster Session.

Expenses Related to Papers and Their Presentation

Authors are responsible for all expenses incurred, including time spent, costs for preparation of manuscripts and illustrations, travel to the conference, and conference registration fees. It is also the responsibility of the authors to prepare camera-ready manuscripts, including half-tone photographs, for the conference publication.

Workshops and panels

Workshop and panel discussions in which formal papers will not be presented will be an integral part of the OCEANS 82 Conference. Information regarding these activities will be found in future editions of the MTS Journal and the IEEE Spectrum.

Exhibits

An extensive exhibit of marine products and services is planned as part of the OCEANS 82 conference and exposition. For further information please contact, Mr. Richard M. Shamp, Exhibits Chairman, at the following address:

Marine Technology Society
1730 M Street, N.W.
Suite 412
Washington, D.C. 20036
202/659-8800

OCEANS 82

MTS-IEEE CONFERENCE & EXPOSITION

Washington, D.C.

• Shoreham Hotel

• September 20-22, 1982

All information requested below and on the reverse side of this form must be included to be considered by the OCEANS 82 Conference Program Committee. Deadline for submission of abstracts is FEBRUARY 14, 1982, and they are to be mailed to:

**OCEANS 82 Technical Program Chairman
1730 M Street, N.W.
Suite 412
Washington, D.C. 20036**

PAPER TITLE _____

ABSTRACT

Please summarize the scope and nature of the information to be presented and indicate relation to the theme topics. If appropriate, please provide information on related projects and state differences between this project and others. Generally, abstracts should be limited to 250 words but authors may provide additional data on attached sheets if they feel more detailed information is required for program committee deliberation.

CONCLUSIONS OR GENERAL OBSERVATIONS

State specific conclusions of work and describe how it differs from previous work on the same or similar subjects.

Suggested topic area most appropriate for this paper

Other suggested topic areas

Are you interested in participating in the poster session?

Session recommended

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Business Address

Business Telephone Number: ()

Co-Author

Business Address

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OCEANS '82

CALL FOR PAPERS
Deadline February 14, 1982



IEEE REGION 8

melecon'83



mediterranean electrotechnical conference
ATHENS, GREECE MAY 24-26, 1983

FIRST ANNOUNCEMENT AND CALL FOR PAPERS

The IEEE Region 8 invites you to participate in MELECON '83 in Athens.

The Mediterranean Electrotechnical Conference 1983 will cover topics in Energy and Information Systems with special emphasis on applications of interest to the Mediterranean countries. It will provide an opportunity for interaction among the electronic, computing and power communities in the area.

The conference will concentrate on the following three areas of interest in parallel:

I. Solar Energy and Electric Power Systems

- Photovoltaics.
- Solar-thermal electricity and solar ponds.
- Wind power systems.
- Economic modelling of energy systems.
- Reliability, monitoring, and flow control in power systems.

II. Communication Systems

- Transmission systems (codecs, modems, channels).
- Communication switching and traffic theory.
- Transmission, transportation and communication networks.
- Computer communications and data transmission.
- Communication needs in the mediterranean countries.
- Microwaves, antennas and optical communications.

III. Computers

- Microprocessor applications.
- Control and industrial automation.
- Computer modelling and evaluation of performance.
- Distributed processing and data bases.
- Trends in software development.
- Simulation and mathematical foundations of computing.
- Computer applications in government, medicine, and office automation.

Two-day tutorials in the above fields, conducted by distinguished instructors, will be organized to follow the technical program of the conference.

MELECON '83

ATHENS, GREECE MAY 24-26, 1983

PRELIMINARY REGISTRATION FORM

Please complete in block capitals and return as soon as possible.

Name _____ First Name(s) _____

Address _____

Country _____

Job Affiliation _____

- I am a member of IEEE.
- I am a student at _____ in my _____ year of studies.
- I am under 28 and will participate in the Young Engineer Contest.
- I wish to receive registration forms and the final program.
- I wish to receive information on social events and organized excursions.

I intend to present a paper on: _____

Signature

Date

MISCELLANEOUS PROGRAMS AND EVENTS

A Young Engineer Contest for graduates under 28 years will be included in the Conference on the basis of papers accepted for presentation. Details will be announced later.

Special arrangements and participation at a reduced price will be provided for students.

The annual IEEE Region 8 Student Paper Contest will be held during the Conference.

Events during and after the Conference will include social gathering, visits to archeological sites and acquaintance with ancient, medieval and modern Greek cultural life.

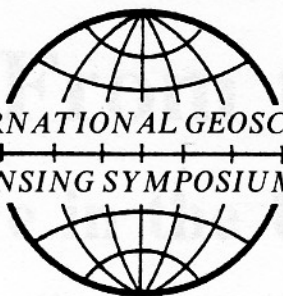
A special program will be organized for persons accompanying the participants.

SUBMISSION OF PAPERS

Prospective authors are invited to submit titles and 200-word summaries for consideration in the areas overleaf. The Technical Program Committee will select the final program. The official language is English. Participation in the program is conditional on receipt of the photo-ready paper by 30 January 1983. The schedule for the authors is:

- Authors should submit three (3) copies of a 200-word summary along with author's name, address, affiliation, telephone and telex numbers —30 September 1982
- Notification of acceptance —30 November 1981
- Submission of photo-ready paper —30 January 1983
- Summaries should be submitted to
Professor E. N. PROTONOTARIOS
National Technical University
42, October 28th Street
Athens (147), Greece

To: MELECON '83 SECRETARIAT
c/o Prof. E. N. PROTONOTARIOS
National Technical University
42, October 28th Street
Athens (147), GREECE



1982 INTERNATIONAL GEOSCIENCE AND
REMOTE SENSING SYMPOSIUM (IGARSS '82)

Munich, 1-4 June 1982

Sponsor: IEEE Geoscience & Remote Sensing Society

Co-sponsors: BMFT (D), CNES (F), DFVLR (D), EARSeL (EU), ESA (EU), NASA (US)

The Promise of Remote Sensing

CALL FOR PAPERS

The 1982 IEEE International Geoscience and Remote Sensing Symposium (IGARSS '82) will be held at the University of Munich, Federal Republic of Germany on 1-4 June 1982. This Symposium will be the *second* of its kind. Because of the great interest that this type of international symposium on geoscience and remote sensing arouses, it is intended to rotate the conference locations. Munich will be the first place outside of the USA. The meeting is being sponsored by the IEEE Geoscience and Remote Sensing Society and co-sponsored by BMFT, CNES, DFVLR, EARSeL, ESA and NASA.

A primary goal of the symposium is to enable participants to gain a general overview of the present status and future prospects of the geoscience disciplines and the techniques of remote sensing, together with more detailed summaries of recent technical progress in these fields.

The broad view will be stressed in a small collection of *Review Papers* to be presented by a number of distinguished authorities in geoscience and remote sensing. Most of the Review Papers, together with a limited number of *Invited Papers*, are intended to demonstrate the standard of experience in geoscience and remote sensing in Europe. Recent technical progress in these areas will be reported in *Contributed Papers* and other Invited Papers. Specially organised sessions will emphasise a number of topics of current interest.

Technical sessions will be co-ordinated to provide a well-balanced, comprehensive programme stressing the problems and perspectives of the geoscientific disciplines, instrumentation systems & data processing techniques, and sensor-target models. Within this context, the topics listed overleaf are intended as suggestions, although full consideration will be given to papers on other relevant subjects. Authors are invited to submit proposals for papers (in Summary form) to the Vice-Chairman of the Technical Committee or the US-Liaison Officer not later than 1 November 1981. Inquiries regarding the technical programme may be directed to the Chairman of the Technical Programme Committee.

IGARSS'82 General Chairman
Prof. Dr. J. Bodechtel
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US Liaison Officer
Prof. Dr. K. Carver
NASA HQ - Office of Space
& Terrestrial Applications (Code ER)
Washington, DC 20546 USA

MAIN TOPICS

- Land Observation
- Sea Observation
- Atmospheric Observation
- Geophysics/Geodynamics
- Geodesy.

These topics will cover experimental and operational aspects comprising:

- sensor systems
- data acquisition
- data processing
- data interpretation.

REVIEW PAPERS

The European SAR-580 Project. *by A. Haskell, ESA, Toulouse & B. Sørensen, JRC, Ispra*

Status and Future Plans for ERS-1. *by E. Mallett, ESA-HQ, Paris*

Remote Sensing Programme in Germany. *by H. Häberle, DFVLR, Oberpfaffenhofen*

Radar Research Programme in the USA. *by K. Carver, NASA-HQ, Washington*

Ground Segment of SPOT. *by G. Brachet, CNES, Paris*

Remote Sensing as a Tool for Resource Development *by R. Muehlfeld, BGR, Hannover*

Remote Sensing in Oceanography. *by F. Bretherton, NCAR, Boulder*

Determination of Geodynamical Parameters from Satellites. *by F.O. von Bun, NASA/GSFC, Washington*

Remote Sensing for Coastal Areas. *by Gierloff-Emden, University of Munich & J. Klemas, Newark*

Monitoring for Agriculture and Land Use. *by N.N.*

Education and Training in Remote Sensing. *by C. Voute, ITC, Enschede*

PUBLICATIONS

Texts of *summaries/synopses* should be typed single-spaced on 2 full pages of A4 format (about 500–600 words) and sent to the Programme Committee before 1 November 1981 for selection.

Selected authors will receive by 30 November an 'Author's Kit' to prepare their *final papers* which should be sent to the Editor by 15 February 1982 for publication in the Symposium Digest.

REGISTRATION AND OTHER INFORMATION

Advance registration and information on hotel reservation will be mailed with the advance programme in April 1982. For further information at an earlier date, please contact Dr. W. Keydel, Institute for Radio Frequency Technology, DFVLR, 8031 Oberpfaffenhofen, FRG. Phone (08153) 28305 – Telex 0526419 (dvlop/d).

Food From the Sea

Aquaculture in the United States

Staff Report

Eurocean, a publication of the European Oceanic Association, estimates that less than 15% of the world's total annual food production comes from the sea while at the same time more than 70% of the world's surface is covered with water and about 75% of all known living species live in the sea. The same magazine estimated that in 1975, out of a total of 6.1 million tons of aquaculture products produced in the world (including seaweed), the production breakdown for various regions of the world was as follows: Asia 80.8%; Europe 10.0%; Russia 3.4%; U.S. and Canada 2.6%; Africa 1.8%; Latin America 1.2%; and Australia and New Zealand 0.2%.

From 1974 to 1979, the total world aquaculture output was approximately doubled. In the same time span, the amount of seafood produced in the U.S. remained almost unchanged.

As the figures show, Americans are not, for the most part, a seafood loving people. Although an estimated one-fifth of the world's fishery resources lie within 200 miles of the United States, each American consumes an average of only 13 pounds of seafood per year. By comparison, in Japan an estimated 70 pounds of seafood per person is consumed annually.

Why then do many feel that aquaculture in the U.S. could be big business? Dr. Tapan Banerjee, the Aquaculture Coordinator at the National Marine Fisheries Service in Washington, D.C. is one such expert who sees many reasons to be very optimistic about the aquaculture industry in the U.S.

First, despite a low consumption of seafood in the U.S., an estimated 60% of the seafood consumed in the U.S. is imported. Secondly, Banerjee believes, Americans are beginning to recognize the health benefits associated with the consumption of seafood—the high protein and low cholesterol content of most seafood.

In addition, Banerjee adds: "The United States possesses a number of advantages that can be used to develop aquaculture. These include abundant soil and water resources capable of supporting fish, shellfish, and aquatic-plan firms. The same capabilities that have made the U.S. a world leader in agricultural production could be utilized to expand aquacultural technology and production."

U.S. Government Support

The U.S. government has taken an active interest in the development of the domestic aquaculture industry. Among the agencies involved are the Department of Agriculture, which spent nearly \$5.5 million on aquaculture-related projects in 1978; the Commerce Department through the Economic Development Administration (EDA) and the National Oceanic and Atmospheric Administration (NOAA); and the Department of the Interior.

The EDA supports aquaculture through programs aimed at job creation and income generation or preservation. In the past 13 years, this agency has provided various Native American groups with an estimated \$7.5 million for aquaculture-related development.

The National Marine Fisheries Service (NMFS) has seven laboratories around the nation with research capabilities and in-house scientists engaged in aquaculture development work. NMFS also provides state agencies with an additional \$756,000 for aquaculture research.

More than 100 aquaculture projects involving 26 different universities or other not-for-profit organizations are supported in part by funds provided through the NOAA Office of Sea Grant.

The Department of the Interior, through the Fish and Wildlife Service (FWS), is the third major source of government support to the U.S. aquaculture industry. The FWS budget for aquaculture related

projects was \$24,235,000. These funds helped support research at the National Fishery Center, 11 laboratories and 21 biological stations dispersed throughout the nation.

A Booming Business Expected

There is an area of the world where seafood farming is expected to blossom. To many experts, one of the prime locations for the intensive development of aquaculture is Hawaii (See also page 10). By some accounts, shellfish harvesting is growing into one of the major industries of that state.

The Hawaii Department of Land and Natural Resources estimated in July of last year that the commercial wholesale value of the Hawaiian shellfish harvest was about \$2 million. They predict an additional investment of \$25 million into aquaculture in the next two years—additional investments which are predicted to boost the harvest value to well over \$20 million in the next decade.

Some state authorities are even more optimistic. According to the 1981 edition of "All About Business in Hawaii", a \$344 million aquaculture business is predicted for Hawaii by the year 2000.

Many companies worldwide are looking toward Hawaii as a probable place to begin aquaculture programs:

- Amfac Aquatech, a subsidiary of Amfac, Inc., has opened up shop on the island of Kauai, and is currently exploring the possibilities of freshwater prawn culture
- A Japanese company called Ikko Hawaii Aquaculture Ltd. is experimenting with the production of the Japanese tiger shrimp for possible shipment back to Tokyo.
- Even Coca-Cola is getting a piece of the action. A joint research venture of the Coca-Cola Company and a Chicago food investments company, F.H. Prince & Company, has been experimenting with the culture of a salt-water shrimp in Hawaii since 1979. □

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