IEEE

OCEANIC ENGINEERING SOCIETY

Newsletter

OES

VOLUME XXVIII NUMBER 4

EDITOR: FREDERICK H. MALTZ WINTER 1993 (USPS 420-910) ISSN 0746-7834

(Continued on inside back cover)

IEEE Oceanic Engineering Society Newsletter is published quarterly by the Oceanic Engineering Society of the Institute of Electrical and Electronics Engineers, Inc. Headquarters: 345 East 47th Street, NY 10017. $1.00 per member per year (included in Society fee) for each member of the Oceanic Engineering Society. Printed in U.S.A. Second-class postage paid at New York, NY and at additional mailing offices. Postmaster: Send address changes to IEEE OCEANIC ENGINEERING SOCIETY NEWSLETTER, IEEE, 445 Hoes Lane, Piscataway, NJ 08854

Outgoing President's Message

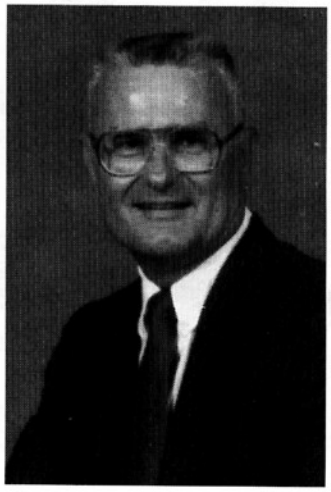
As you can see from the President's Message elsewhere in this issue, the IEEE Oceanic Engineering Society is now under the new leadership of Dr. Joe Czika of TASC. Joe and I have developed a close friendship over the many years of our activities in the Society. I know that he and the other OES officers will lead the Society forward in its service to its members through new and innovative conferences, workshops and other professional activities.

I would like to take the opportunity (and prerogative) of my last President's Message to thank those individuals who were so instrumental in making the right things happen over the last four years. First the Vice-presidents — Joe Czika, Norm Miller and Ferial El-Hawary. Joe was a mainstay in the Society while I was a bit under the weather in 1990, and has continued to serve as the overseer of our Constitution and Bylaws. Norm is the driving force behind the new organization of the governing structure of the OES, and is currently the Society's liaison with students worldwide for our Ocean's Conference student poster sessions. Ferial has served as our Co-Chair of the Membership Development committee, and is responsible for the Society's contacts with our French colleagues for our Oceans '94 Osates Conference to be held in Brest, France in September 1994. These three individuals have contributed significantly to the success the OES has enjoyed over the recent years.

Toby Raisbeck and Claude Brancart have served as Secretaries over the past four years, and have done yeoman service. I appreciate their patience and understanding with me during my incessant telephone calls to them asking for impossible-to-find IEEE Rules and Regulations, in addition to a myriad of other details that only Secretaries know. The Treasurer, Roger Dwyer, has kept the Society on a sound financial footing with complete and timely income/expense data.

During 1990-1993 the Society enjoyed some outstanding conferences and workshops, in both the annual Oceans Conferences and the every-other-year AUV Symposia. Oceans '90 was a technical success in Washington, D.C. due to the efforts of Joe Czika and Tony Eller. Oceans '91 in Honolulu, Hawaii, under the general chairmanship of Kiman Wong, was a super meeting in an unmatched environment. A comment on the technical program at that conference, put together by Joe Vadus and Paul Yuen, was that "there were too many good things going on at the same time." Oceans '92 in Newport, Rhode Island, chaired by Stan Chamberlain with Tom Mottl as the TP Chair, was jointly sponsored with the Marine Technology Society's New England Section. Again, the quality of the technical contributions was outstanding. Oceans '93, described elsewhere in this issue, chaired by Jim Collins with John Preston as the TP Chair, was held in Victoria, B.C., Canada. This conference was outstanding as well, as proven by the 50 new OES members signed up at the meeting.

Tying all of the Oceans conferences together is the strong



thread of technical leadership of the OES membership in the oceanic engineering field. From the Society's point of view, the responsibility for the coordination of these activities in the formation of technical programs for the meetings has been that of Stan Chamberlain as the Technology Committee Coordinator. The technical success of all of our conferences speaks to the job that Stan has done.

The 1990 and 92 AUV Symposia held in Washington, D.C. were also well-received by the community. Under the direction of Charlie Stuart and Captain Al Beam, ably aided by Claude Brancart, this new series of meetings is only the first planned by the OES to address emerging technology areas at the appropriate levels of activity.

I would also like to thank Fred Fisher and Bill Carey for their efforts as Editors of the Journal of the Oceanic Engineering Society. This is the flagship publication of the OES, and it has gained significantly in stature under the directorship of these gentlemen. Thanks also to Fred Maltz for his role in keeping us informed as the OES Newsletter Editor.

I also offer my sincere appreciation to Mr. Ed Early for his dedicated and untiring efforts on behalf of the Society. Ed and I have traveled together to the various conference sites to confer with the responsible individuals, to define the role of the OES, and to offer the Society's support in all of these activities. He also was responsible for the documentation of the IEEE-directed Review of the Society. To be honest, there's no way I could list everything that Ed has done for the OES over the past four years. A very close friend, Ed is rightfully known as Mr. OES. Every Society President has a right-hand man: Ed Early was mine.

I sincerely thank all of you lady and gentlemen, and you, the OES members, for your support and participation in the OES during my tenure.

Now, on to the future. Oceans '94 Osates, to be held in Brest, France during September 13-16, 1994, is shaping up to

A Message From the OES Incoming President

I am honored to be selected as your President for the next two years. I have been a member of OES for over ten years, having been Secretary and a Vice president, and have been on the committees of nearly all the Oceans conferences since 1988. I am a Department Manager at TASC (The Analytic Sciences Corporation) and have over 20 years experience in oceanic engineering. My research interests include naval warfare, especially nonacoustic ASW, as well as environmental sensing and image technology.

I join the entire society in expressing our heartfelt thanks to Glen Williams for his wise stewardship of the OES for the last four years. His leadership was instrumental in strengthening our technology committees, formulating a new Oceans Conference policy, establishing the AUV conference series, and initiating OES globalization by cosponsoring OCEANS 94 OSATES in Brest, France. Glen will continue to serve OES and IEEE in numerous ways, including Chairman of the President's Forum of TAB.

My objective is to meet the collective needs of the OES members. Those needs, as expressed to me and other officers during numerous discussions at chapter meetings, Oceans and AUV conferences, and individual contacts, are focused on maintaining a high degree of technical excellence in our publications, conferences, and professional networks. In addition, there are strongly expressed needs to strengthen chapters, membership, and student programs and otherwise provide national and international forums for representing the interests of the oceanic engineering profession.

My approach to satisfying the members needs is to work closely with the AdCom and newly restructured ExCom in three major activity areas: Technical, Professional, and International. In the technical activities area, I will increase the number of pages of the Journal of Oceanic Engineering, continue to strengthen and expand our technology committees, and to assure the highest technical quality for our conferences. In the professional activities area, I will increase support of our chapters, increase the Society membership, expand our student programs, and increase Newsletter coverage of events important to OES and our profession. In the international activities area, I will promote future international sites for our conferences, increase our international membership, and seek new forums for information exchange and cooperation.

To accomplish these and other objectives, we need your help. Volunteer to be a member of one of the technology committees or to give a paper at a conference. Share your enthusiasm for OES with a coworker or attend a local chapter meeting. Most importantly, talk to us. Call, write, or E-mail any OES official from a local chapter on up. I particularly want to hear from you about our successes and failures.

Joe Czika

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be one of our best conferences yet. Under the Chairmanships of Mr. Pierre Sabathe and Mr. John-luc Lambla, the IEEE-OES, the SEE (the French equivalent of the IEEE), and the Urban Community of Brest are gearing up for the OES's first foray into Europe. Bruno Barnouin and Stan Chamberlain are leading a Technical Program Committee which, as of February, has 450 Abstracts submitted for consideration for the program. Several Special Sessions of major interest to the Oceanic Engineering community area also being planned. Look for the Conference Announcement and the Advanced Program in the near future. (Note: I will continue to be the contact point for North America for authors, exhibitors and attendees. If you have any questions, please do no hesitate to contact me at: Glen Williams, Tel: (409) 845-5484/845-0086; Fax: (409) 847-9284; email: oceans94@cs.tamu.edu)

Oceans '95-MTS '95 is going to be jointly sponsored with the Marine Technology Society and will be held in San Diego, California. The two organizations are working on establishing a mutually beneficial long-term agreement which will better serve the memberships of both societies. Our new President will keep us posted on that topic in the future.

Thanks again for a most enjoyable four years.

Glen Williams

OCEANIC ENGINEERING SOCIETY

Distinguished Technical Achievement Award

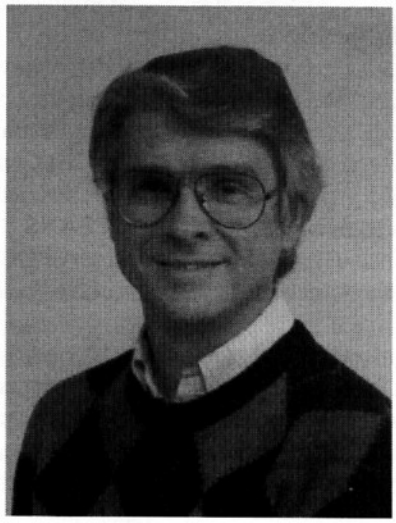
1975	Robert Frosch
1976	Werner Kroebel
1977	Howard A. Wilcox
1978	Richard K. Moore
1979	David W. Hyde
1980	Neil Brown
1981	No Award
1982	Ira Dyer
1983	Alan Berman
1984	John B. Hersey
1985	William N. Nierenberg
1986	Robert J. Urick
1987	James R. McFarlane
1988	Chester M. McKinney
1989	Victor C. Anderson
1990	Robert C. Spindel
1991	Henry Cox
1992	Arthur B. Baggeroer

DISTINGUISHED TECHNICAL ACHIEVEMENT AWARD

Oceanic Engineering Society

Oceans 1993

DR. WILLIAM J. PLANT



The IEEE Oceanic Engineering Society Technical Achievement Award recognizes Bill Plant's record of scientific leadership and technical innovation in the field of microwave radar measurements of the ocean surface. His work in the field of microwave remote sensing (including synthetic aperture radar) has led to major advances in understanding the interaction of electromagnetic waves and the modulation of the short wave spectrum by the dominant sea surface waves. He has authored over 35 research articles and book chapters in these areas.

Bill received the B.S. degree in physics from Kansas State University in 1966. He then went to Purdue University where he received the M.S. and Ph.D. degrees in 1968 and 1972.

He joined the Naval Research Laboratory in 1971, in the Radar Division. He then transferred to the Ocean Sciences Division, where together with the late Dr. Jack Wright, they conceived and developed the dual frequency ocean-wave spectrometer.

He was head of the Ocean Measurements Section at NRL from 1985 to 1988. He has served on numerous panels for government agencies, and he has made valuable contributions to the IEEE/OES through his frequent service as a reviewer for the Journal of Oceanic Engineering, and then as an Associate Editor. He is a member of the American Geophysical Union and URSI, Commission F, and Sigma Xi.

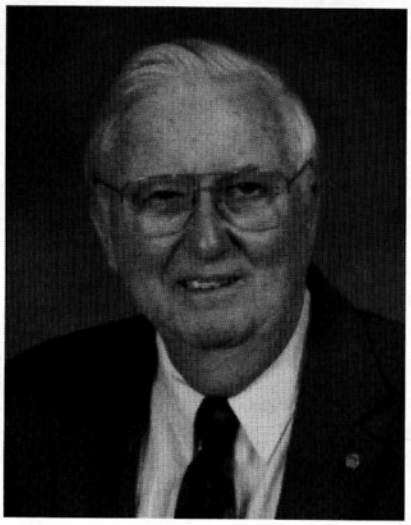
In 1988 he became a Senior Scientist at the Woods Hole Oceanographic Institution. He was named a Co-Scientific Director of the SAXON-FPN Experiment in 1990. Currently Bill is with the Applied Physics Laboratory at the University of Washington. He is now participating in the development of blimps as platforms for a new class of scientific radar measurements of the ocean.

DISTINGUISHED SERVICE AWARD

Oceanic Engineering Society

Oceans 1993

MR. EDWARD EARLY



The IEEE Oceanic Engineering Society Service Award is presented to Mr. Edward Early for his dedicated service and untiring support of the Society. Ed attended Humboldt University (California) and Oregon State University where he earned a B.S. degree in electrical engineering. He currently is partially retired after working for 31 years as an instrumentation engineer in support of research in underwater acoustics at the University of Washington's Applied Physics Laboratory.

Ed joined the IRE (the Institute of Radio Engineers), which later joined with AIEE to become IEEE (the Institute of Electrical and Electronics Engineers), in 1948 as a student. He has been active in the Seattle Section of IEEE as Secretary, Vice Chairman and Chairman, and is now Chairman of the Seattle Chapter of the IEEE/OES. He was Chairman of the IEEE Council on Oceanic Engineering (predecessor of OES) in 1976 and 1977 and presently serves as Oceans Conferences Coordinator for the OES.

Ed was Vice Chairman and Manager of Oceans '89 held in Seattle. He is a Life Senior Member of the IEEE and a Fellow of the Marine Technology Society.

Ed is Mr. IEEE/OES. He is the OES corporate memory and has served in all major governance roles in the society. Ed's service to the OES has spanned almost 20 years, for which the Society extends its warmest appreciation.

OCEANIC ENGINEERING SOCIETY

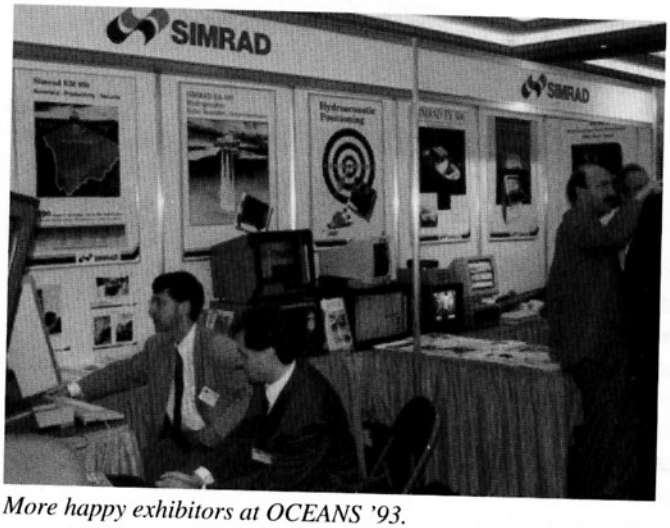
Distinguished Service Award

1975	Arthur S. Westneat
1976	Frank Snodgrass
1977	Calvin T. Swift
1978	Edward W. Early
1979	Richard M. Emberson
1980	Donald M. Bolle
1981	Lloyd Z. Maudlin
1982	Arthur S. Westneat
1983	Elmer P. Wheaton
1984	John C. Redmond
1985	Joseph R. Vadus
1986	Stanley G. Chamberlain
1987	Stanley L. Ehrlich
1988	Harold A. Sabbagh
1989	Eric Herz
1990	Anthony I. Eller
1991	Frederick H. Fisher
1992	Gordon Raisbeck

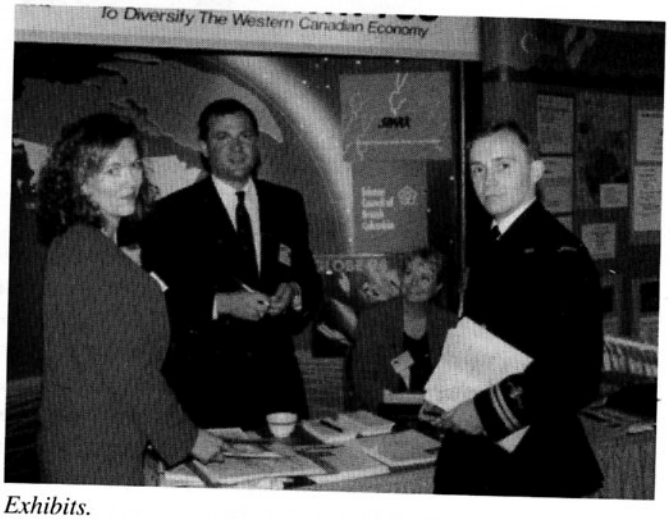
OCEANS '93 Conference
Victoria, Canada

Fascination over the OCEANS '93 Technical Program.

Left to right, Vandelyn Czika, Mary Williams, Vandeen Early, Ed Early, Glen Williams at the IEEE/OES booth.



More happy exhibitors at OCEANS '93.



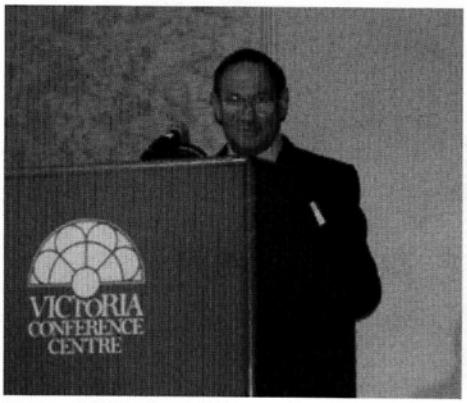
Exhibits.

From left to right, Mrs. Pierre Sabathé (General chairman of OCEANS '94) (Michéle), Dr. Ferial El-Hawary, Mrs. Ed Early (Van).

The Plenary Session '93

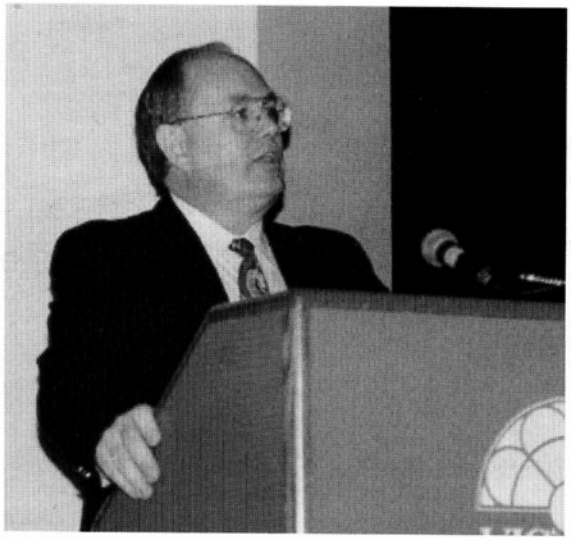
IEEE/OES President Glen Williams addressing the Plenary.

OCEANS '93 Chairman Jim Collins at the Plenary Session.

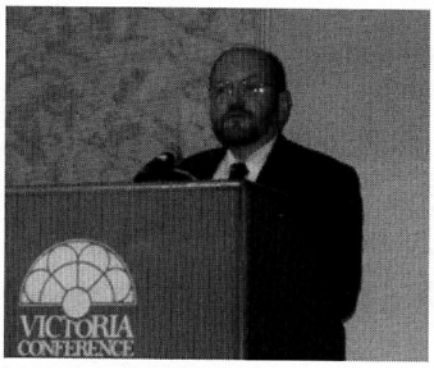


James McFarlane, Plenary Speaker.

The Plenary.



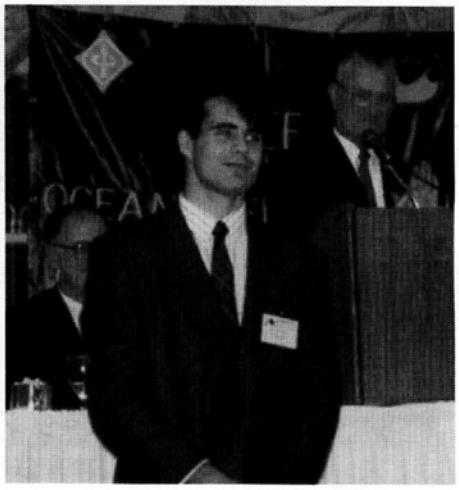
R. Woodward, President of the Science Council of British Columbia, Plenary Speaker.



W.G. Doubleday, Assistant Deputy Minister, Science, Fisheries and Oceans Canada, Plenary Speaker.

Awards and Recognition Lunch '93
Empress Hotel

Ed Early thanking Vandeen Early for her support of him and IEEE/OES activities. Left to right, Jon Preston, Jim Collins, Vandeen Early, Ed Early, Glen Williams, Pierre Sabathé.



Rich Driscoll, Student Paper Winner.

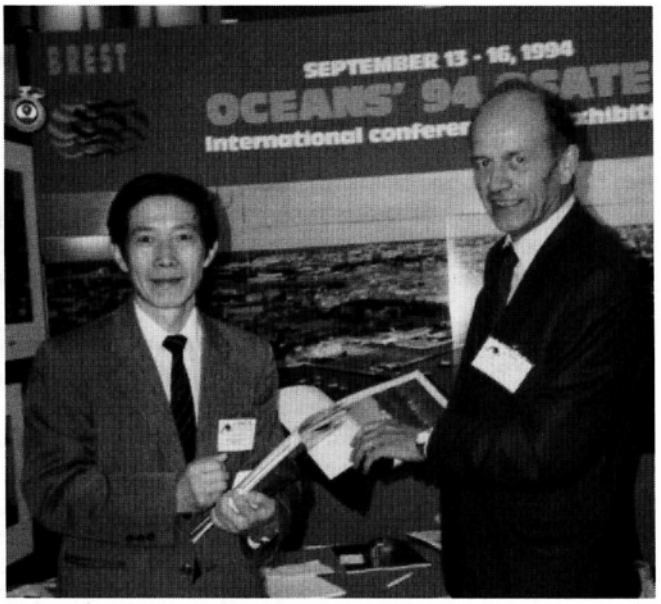
Left to right: Jim Collins, OCEANS '93 Chair; Glen Williams, OES President; Bill Plant, Distinguished Technical Achievement Award Winner; Pierre Sabathé, OCEANS '94 Osates Organizing Committee Chairman; Joe Czika, OES President-Elect.

Ed Early receiving the 1993 Distinguished Service Award. Left to right: John Preston, OCEANS '93 Technical Program Chair; Jim Collins, OCEANS '93 Chair; Ed Early, 1993 Distinguished Service Award recipient; Glen Williams, OES President; Pierre Sabathé, OCEANS '94 Osates Organizing Committee Chair.

Left to right: Ferial El-Hawary, David Weissman, Ed Early, Dan Alspach, Jon Preston, Jim Collins and Glen Williams.

Left to right: Glen Williams, Pierre Sabathé, Joe Czika, William Plant, Stan Chamberlain, Norm Miller and Fred Maltz.

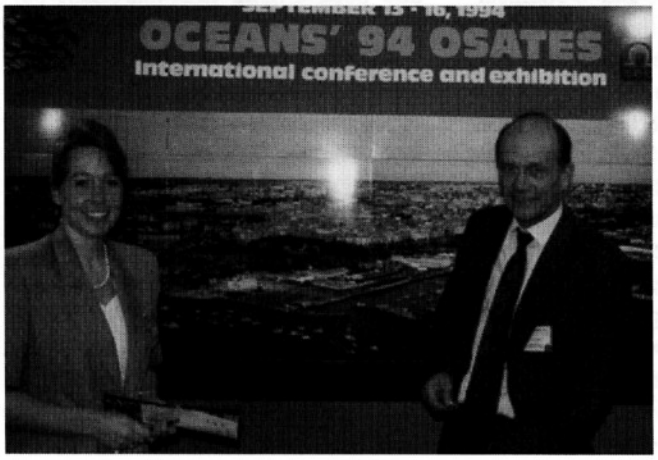
Left to right: Bill Carey, Journal Editor; Christian DeMoustier, Associate Editor and AdCom Member; Jean-Luc Lambla, Thomson Sintra representative to OCEANS '94 Osates; Bruno Lambla, relative of Jean-Luc.



Right to Left: Mr. Jean Vicariot (Director of Technopole de Brest, France), organizing committee of OCEANS '94; one of the conference participants from Japan.

Jean-Yves Jourdain, at the Thomson-Sintra ASM booth, is the chairman of the new Paris chapter of OES.

Bart Huxtable of DTI giving his paper on High Resolution Sythetic Apertur Sonar.



OCEANS '94 Osates, Brest, France. Christine Norbert, Adhesion and Associes; Jean Vicariot, Technopole de Brest representative to the organizing committee.

Professional comradery at the OCEANS '93 registration desk.

Speech to

OCEANS '93

Victoria, B.C.
October 19, 1993

RON WOODWARD
PRESIDENT
SCIENCE COUNCIL OF BRITISH COLUMBIA

Good morning! Thank you very much for that kind introduction. I am very honored to be here today and to address this vitally important conference. To stand before this large group of experts in ocean engineering, research and development from around the world is indeed a humbling and exciting opportunity.

I must commend the organizing committee for the outstanding job they have done in creating this world class symposium here in Canada's gateway to the Pacific Rim. In particular, I want to recognize the efforts of Dr. Jim Collins, the conference chair. I have had the opportunity to work with Jim in the past and am well aware of his dedication and commitment to excellence.

In addition to organizing this conference, Jim continues his teaching and research at Royal Roads College here in Victoria and has provided support and encouragement for his wife Faith who is a candidate in Canada's upcoming federal election. I wonder what you will do to stay busy in November Jim?

As an educator who spent much of my life living on the prairies of Canada speaking to this distinguished group of engineers and scientists about oceans, I feel a bit like the fellow who was out hiking in the mountains. Moving ever so carefully along a cliff he stepped on some loose rock and slipped off the edge. Sliding down the side of the mountain he managed to grab hold of a small branch.

He immediately began to cry out for help. After what seemed like an eternity he heard a deep majestic voice from above. "Be still, have faith and I will help you my son." The man replied "Yes, yes, tell me what to do." The voice replied "Let go of the branch." There was a long period of silence and then the man spoke in a very loud whisper "Is there anybody else up there?"

Well, I shall let go of the branch and tackle this important and exciting theme "engineering in harmony with the oceans."

Certainly 20 years ago, and perhaps even 10, I doubt this would have been the theme for a science and/or engineering symposium. We have historically viewed our oceans as a perpetual resource for food, minerals, oil with much more just waiting to be discovered. Conquered and exploited. We presumed that it would be impossible to deplete the resources that the oceans provide.

For centuries human kind has viewed the oceans as a formidable foe — challenging us to struggle and conquer. Whether we talk about fishing, oil exploration or travel the sea has been a challenge that often wins in the struggle with human kind. The history of maritime activities is a history of increasingly effective technology in ships, navigational equipment and gear for transport warfare or fishing. But regardless of how proud we may be of our technology, the seas demand respect. Almost a century later the Titanic remains a popular symbol of the contest between our engineering and technology accomplishments of people and the power of the ocean.

We have viewed the oceans as romantic, a foe to be battled and overcome, an asset for economic gain, and a challenge to our scientific and engineering intellect. But not many of us have looked at our oceans from the perspective of harmony. Harmony between our technology and the ocean environment.

You people attending this conference are at the forefront of developing and popularizing this important perspective of harmony. Though many of you are aware of the relationship of oceans and climate and your instrumentation may have measured many of the key variables, I as a layman have only learned of El Ninio in the past few years. I know it affects our water temperatures, weather and fisheries but don't really understand the complex shifts in ocean water masses or the fall extent of the consequences.

We are only beginning to understand and appreciate this central importance of oceanic processes to world climate. I think too that we are only beginning to understand the importance of ocean sciences and technology as the basis for

responsible and sustainable management of our oceans. The perspective of this conference of engineering in harmony, as opposed to conquering, challenging or exploiting is an exciting and much needed one.

You as scientists, engineers — researchers and business people have some critical responsibilities and challenges in creating harmony in our relationship with the oceans. I would suggest there are at least two responsibilities you have.

First, to borrow an athletic shoe slogan — DO IT! I believe (and hope you do) that science and technology are key to our future — socially, economically and environmentally. The challenge to you is to ensure that we use appropriate technology and engineering in a sustainable manner to control the depletion of natural resources, enable the biodiversity of our oceans to be retained and ensure that we use the marine environment in a sustainable manner. Whether you work in theoretical research modeling ocean currents, build submersible vehicles, or develop aquaculture projects, all citizens of this fragile planet need your intellect and leadership in developing harmonious relationships with the oceans. Achievements like more than 250 offshore oil and gas platforms and the 8000 km Trans-Asean pipeline built at a cost of $10B are examples of projects that reflect necessity of this new relationship.

Second, you need to tell others (the public and especially government and political leaders) what you are doing, what you are learning, and what we all must do to live and work in harmony with our world's oceans. I should mention that this is Science and Technology week aimed at the next generation. I am delighted that Jim Collins and SPARK Oceans have arranged to bring 30 selected high school students around the Oceans '93 exhibition on Thursday to get a flavour of this technology.

One of my "pet criticisms" of scientists and engineers is that you don't do a very good job of educating the public and politicians about the importance and relevance of what you are doing. There is no one who can better tell the story of the critical importance of all your technologies to understanding oceans and managing human use of oceans. Events like this create an outstanding opportunity to share with the public — not only here in B.C. but "back home" about what is happening as engineering works in harmony with the oceans.

In British Columbia the Science Council has provided a vehicle for industry, the academic and research community and government and other marine users to work together to define this important direction for marine engineering and technology. Using our Strategic Planning for Applied Research and Knowledge (SPARK) initiative a strategic framework for ocean industry, science and engineering, and technology has been developed.

This initiative took about a year to complete and involved several hundred volunteers who participated in 15 working groups. These groups looked at the present status and opportunities in marine activities ranging from biotechnology, robotics and information management to fisheries and aquaculture, tourism and recreation, and coastal communities. A steering committee consolidated the extensive work of all these groups into a comprehensive report that is providing a framework for sustainable and complimentary actions by the various sectors on the West Coast of Canada in who study, manage and otherwise use our oceans. This framework is recognized as essential for all future activities and the realization of economic opportunities identified in the report.

First Nations representatives participated in the process. They will play an increasingly important role in shaping marine activities and will continue to participate in determining how science and technology can best support the harmony that has characterized their long and close relationship with the ocean.

The report identifies and recommends on actions that will create wealth and jobs in oceanic and coastal activities.

These include the necessary first step of mapping and exploration of the natural resources, on our continental shelf and within our 200 mile limit, optimizing the value of fisheries, and the use of new technologies and biotechnologies to add value to these resources. These activities reflect a much more knowledge intensive marine economy as well as diversifying our existing technology base.

Perhaps the most important recommendation, in that it must happen first, is the establishment of an oceans coordinating mechanism forum. This forum would first of all give policy advice on sustainable policies and coordinate all of the various activities underway and to be initiated. A mechanism like this needed to coordinate the diverse jurisdictions, interests and activities in marine affairs; seek consensus on the way forward; identify and implement opportunities. Above all it would take the necessary actions toward sustainable economic management of the ocean and our coastal zone. In short — ensure science engineering and technology and all human activities are in harmony with the oceans.

In the material I have read about this symposium and in the SPARK Oceans report, I believe there are three important dimensions to science and engineering in harmony with the oceans.

The first of these is globalism. We hear much these days about globalism and its impact on the social, economic and environmental on each of our geographic jurisdictions. In the era of international trade commodities and products produced by head office/branch plant corporations dominated business activities between countries.

In the new global economy investment and technological innovation are the drivers of global trade. Companies in the global marketplace have little regard for geographic jurisdiction. They attract money and technology from a variety of places. For example an American semiconductor company uses Russian scientists living in Israel to design chips that are manufactured in the United States and assembled in Asia.

It is important for us to recognize that there are new rules for the game. I be-

lieve this is especially so for those of you who work in the truly global arena of oceans. For you to work in harmony with the oceans, develop new products, and effectively manage this immense resource you need to think and act using the oceans as a global, not an international resource. How is your work impacting on and contributing to this truly global arena?

The second dimension I see resounding through this symposium is technology. The development and application of appropriate technology, based on science and engineering is essential in every activity, project and initiative being discussed here — and included in all ocean related activities. Whether you are studying ocean currents, modeling weather patterns, building ships and submersible, collecting and analyzing ocean related data, building instruments and marine equipment, or are in the aquaculture business, technology is at the centre of what you are doing.

I expect at a gathering like this, this point is a bit obvious and may appear trite. However, I suggest to you that you have a large responsibility to assess how technology can be used effectively and appropriately in harmony with the oceans. Engineers and scientists are "technology people", you thrive on asking questions, doing science and engineering to answer the questions and develop solutions (products and services). A challenge to you at this conference and in your every day work is to responsibly develop and appropriately use ocean science, engineering and technology.

The third, and perhaps most important, dimension of engineering in harmony with the oceans in people. People are the primary resource of the global community we are all a part of. They are to the 1990's what trees are to the forest industry or fish to the seafood industry. The difference is that this people resource is completely renewable and the more we use the resource the more valuable it becomes.

In all developed and developing countries of the world education and training are recognized as essential to social and economic success. We recognize that education must continue throughout life so people are equipped to deal with the never ending change brought on by globalism and technology.

But education is not enough. In our global community people must enjoy the necessities of food, shelter and clothing. A simple, but profound, reality of the people dimension is that they perform best when their social and environmental conditions allow them to use their intellect to identify questions and find answers. Education is critical, but not sufficient.

This has implications for each of us here both in how we go about our daily work with people and in how the results of our work impact on people. I have learned from our Japanese friends that innovation is really a social process — society must want and demand it. Each of you has challenge to ensure ocean related innovation, based on science and engineering, is expected by the consistent with the expectations of each of your societies and included the global community.

These dimensions bring me back to the conference theme — Engineering in Harmony with the Oceans. They are indeed parts of a whole that require each other if indeed what each of you is doing is to make a positive and harmonious impact on our oceans and this incredible planet which is our home.

I wish you challenge, enjoyment, friendship and harmony as to participate in Oceans '93.

Thank you.

Autonomous Underwater Vehicles

Engineering in Harmony with the Oceans

Oceans '93 Plenary Session
Victoria, British Columbia
October 1993

Dr. James R. McFarlane, O.C., C.D., P.Eng.
International Submarine Engineering Ltd.

"You look at things and you say, why; but I dream of things that never were and say, why not." George Bernard Shaw.

This describes the vision of Tesla who devised the first autonomous vehicle ninety-seven years ago. At the time, Tesla wrote:

"They will be produced capable of acting as if possessed of their own intelligence and their advent will create a revolution."

Although there have been some examples of AUVs since then, it has been during the last decade that the major effort has been made to develop autonomous underwater vehicles.

AUVs are platforms which are used to deliver sensors. Dr. Clark at the US National Science Foundation suggested that anything that goes in the water and carries a sensor is an AUV. With the exception of small AUVs produced at universities, most have thought of AUVs as being about 20 ft. long. However, in the future, they will undoubtedly span the range from very small to at least 50 ft. long. AUVs can deliver the same sensor suites as ships at a fraction of the cost. They are, thus, more affordable. However, AUV efficiency can be measured not only in terms of first cost, but also life cycle cost. Energy use in the production of materials and energy consumption in operation are small. There is also trivial potential for pollution. Collectively taken, these attributes make a powerful statement for the use of AUVs. To-date, Autonomous Underwater Vehicles, have been used as platforms for hydrographic survey instruments, data collection, test beds for sensors for certain defensive roles, and university research. Levels of activity in the development and use of AUVs is accelerating.

In many of the scientific communities the lament has been there is not enough data. This is sometimes true. There is not only not enough, there's not enough where and when, or in some circles, spatial-temporal data. Lower cost AUV platforms can be used to advantage here. However, we need to define missions and also define what are realistic sampling rates? We have not properly established criterion to define what is over sampling and what is under sampling. This is an important issue which has a major effect on cost. The issue re whether data needs to be transmitted in real-time or not can also affect cost as bandwidth costs money.

When sampling moves from remote sensing of the surface of the ocean to below the surface, the number of data points available per day changes by several orders of magnitude. The problem is how do we increase the sampling while keeping the cost down? There seems to be a notion that if we can get enough surface data we could understand from what we are observing at the surface what is going on in the deep. This is sometimes attempted by studying small sites say with buoy mounted sensors and then extrapolating to a much larger scale. This approach would seem to be more than a bit optimistic where spatial and temporal data is required, AUVs can provide part of the answer.

We need to start the design process with mission statements which are reasonable, as laws which describe physical phenomenon are immutable. Even achievable specifications can sometimes be overly demanding for the marginal improvement in performance produced. Over demanding specifications can have little or often negative cost and performance benefit. We also have to establish boundary conditions and a design starting point.

We need references for our design starting point, because we learn by doing. The technological maturity of a system provides such references. If we don't have a starting reference, or in cases where there is a major design departure, we need to "rapid prototype" in order to establish a reference. We all think we know what an aircraft looks like. However, the notions of what an aircraft should look like were different prior to the DC-3 than after.

If a system is not a harmonious union of parts then it will not be successful. It

also will not be successful in the market place if the attributes are not mission driven. When considering systems, subsystems, and elements without reference to mission, we often overlook these considerations. Integrations are multidimensional problems and are, therefore, never uniquely solved. We must rely on successive iterations and judgment to achieve convergence. The iterative approach to system evolution and system mutation is one of our most useful design tools. In order to iterate effectively, we need experience. This means it is mandatory for us to exercise our capabilities if progress is to be made. Therefore, in order for technology to evolve, successive generations have to be produced; analogous in some ways to Darwin's notion of evolution. Even the PC has evolved through evolution. Thus, exercising one's capability is a *sine qua non* of development/evolution. It is interesting to note that the subsea evolutionary approach to system development has been relatively low cost.

It is unfortunate that we seem to have used this process to evolve our capability for the production of paper. In some cases this has evolved to the point where we felled more tons of paper than hardware.

In general, I hold the view that we are currently not technology limited. That is not to say that we cannot benefit from additional technological advances. However, I believe we are limited because we have not exercised our integration skills enough. Integration is one of the few parts of the design process which is not amenable to arithmetic calculation, hence experience is required to produce quality results.

We see some users making their own hardware. In these cases the packages or subsets of the packages often become curiosity-driven rather than mission-driven. The preoccupation with technology can be at the expense of the mission or, in the end, there can be insufficient time to adequately consider the mission. We have to remember that the optimization of the subsets is not a sufficient condition for system optimization.

Some of you may observe that many types of underwater vehicles already exist, or at least subsets exist. Therefore, some might conclude, if they are any good, why are not more people using them? The reasons are that there is confusion regarding where to establish the boundary conditions for proper comparisons of performance and also there is intellectual inertia. Additionally, until there is more time to become acquainted with the possibilities available through the use of underwater vehicles, there will remain a substantial repository of conventional wisdom and it will take some time to change that mind set. Another important aspect of acceptance limiting the use of vehicles, is represented by the changes required in personnel establishment and training. We are in a period of transition, and in these transitional periods false starts can be expected as the vision of the customer and the supplier is not necessarily clear because of a lack of hands-on experience. We sometimes see this lack of experience manifested in specifications which describe impossible-to-build vehicles.

The cost benefits of new platforms are also not understood because of inadequate comparisons. The systematic analysis of comparative advantage among several approaches has not been undertaken. There must be cost trade-off analysis which defines cost vise. Productivity for a given mission. For example, cost trade-offs need to be made among:

- Ships vs. AUVs;
- Ships and ROVs and AUVs;
- Ships vs. Buoys and AUVs;
- Ships vs. AUV/ROV/Buoy/Bottom installations mix or combinations of aircraft launched buoys and small AUVs.
- Ships vs. heterogeneous networks.

Ultimately, the use of autonomous vehicles in the on a large scale is inevitable. This is not only because of reduced cost and reduction in risk to personnel, but the introduction of vehicles is an integral part of the computer/microprocessor robotic revolution. If we take our cue from the rest of the robotics and computer revolution, which is in some areas more evolved, we will see that multi-vehicle networking and interactive operations among homogeneous and heterogeneous sets are on the way. This suite of vehicles with diverse capabilities will range from near surface to full ocean. AUVs operating on preprogrammed grids, acquiring targets and obstacle avoidance have already been implemented. In many cases these developments will obviate or at least limit the need to go to sea in ships.

In summary, AUVs represent a solution to data gathering that is in harmony with the oceans. AUVs which are a mission driven design problem cannot be uniquely solved. Thus we must reply on a combination of experience and iterations used together to achieve convergence. The use of this approach is necessary for the development of AUV platforms to deliver instrument and tools and, in some cases, associated subsystems. Autonomous Underwater Vehicle developments are intertwined with developments in PCs, the remote sensing and robotics. All of these developments are permeating every facet of human activity. Additionally, as the cost/benefit potential of new platforms is more universally understood, there will be a rapid increase in diversity and use of Autonomous Underwater Vehicles.

In some cases the timing and implementation of specific developments may be speculative, but the outcome is not in doubt.

OCEANS '93 Student Poster Competition

Eleven student posters were presented at OCEANS '93. There were three posters from Canadian schools, one from France, and seven from schools in the United States. Judges selected one poster as the winner and two posters received "Honorable Mention" at the Awards Luncheon. The winning poster was presented by Frederick Driscoll from the University of Victoria. Rick Driscoll is a senior majoring in Mechanical Engineering. His poster was entitled: "Passive Damping to Attenuate Snap Loading on Umbilical Cables of Remotely Operated Vehicles". Honorable mention awards were given to Saeed Seatayeshi from the Technical University of Nova Scotia and Robert Zimmerman from Texas A&M University. Saeed Seatayeshi is a doctoral candidate. His poster subject was "Fuzzy Min-Max Neural Network Based Classification of Underwater Layered Media Due to Attenuation Effects". Robert Zimmerman is a Masters candidate. His poster subject was "Bioacoustic Surveys of Planktonic Sound Scatterers and of Their Diel and Seasonal Variability in the Northwest Gulf of Mexico".

Passive Damping To Attenuate Snap Loading On Umbilical Cables Of Remotely Operated Vehicles

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ABSTRACT

The development of a passive design to attenuate snap loading of marine umbilical cables used in the operation of deep sea Remotely Operated Vehicles (ROV) is described in this paper. A computer model developed to predict the dynamics of the tethered ROV system at various operating conditions is also presented. Based on the results of the modeling, a conceptual design for a continuous tension horizonal ram tensioner is proposed. This passive tensioner mounts on the top of the ROV cage and is predicted to reduce snap loading by a factor exceeding 150. Implementation of this design is presently being pursued.

INTRODUCTION

Deep sea tethered ROV systems typically consist of a ship, boom, armoured umbilical cable, cage, and ROV as shown in Figure 1. The cage is used to transport the ROV from the ship, through the air-sea interface, to the subsea worksite. The cage is suspended from the boom by an armoured umbilical cable which is used to raise, lower and support the cage and ROV. Housed within the protective armour of the cable are fibre optic communication lines and power cables used for operating the ROV. A cross-section of the cable is shown in Figure 2.

Presently, deep sea ROV systems have a narrow operating envelope and cannot operate in sea states greater than four. Since the sea often exceeds such a calm state, the operating times available to the ROV are severely limited. If the system operates in higher sea states, the heaving and rolling motion of the ship produces an oscillatory excitation acting on the

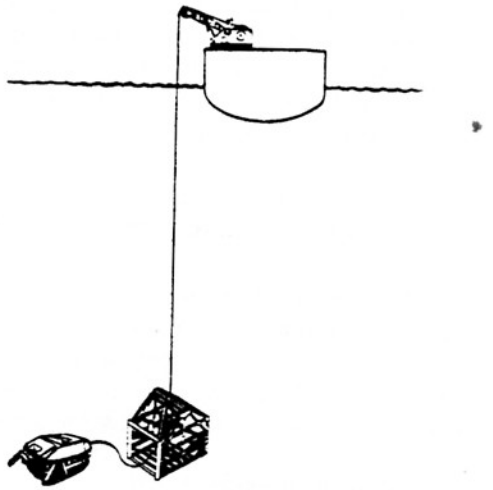

Figure 1. Tethered ROV System [1]

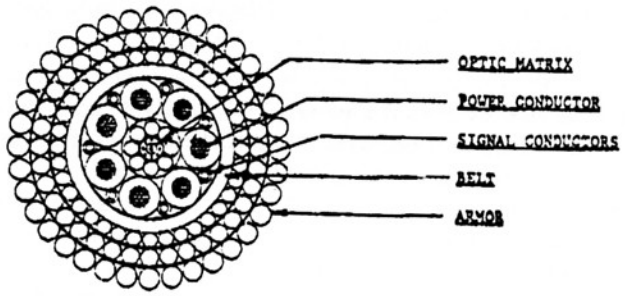

Figure 2. Cross-Section, Armoured Umbilical Cable

cable. As the amplitude of the excitation increases or the oscillatory frequency decreases, the cable may experience alternating periods of slackness and reloading. This results in "snap loading" which is characterized by a near instantaneous, large magnitude, tensile loading of the umbilical cable. This loading can be several times larger than normal operating loads and cable design loads.

Snap loading occurs when the down swing of the boom allows the cable to accelerate through the water. Due to the larger viscous drag experienced by the cage, the cable accelerates faster than the cage, thus subjecting the cable to compressive forces. Since the cable is incapable of supporting compressive loads, the cable buckles and slack develops. If the rate of retensioning is rapid, the cable will experience severe impact loading, known as snap loading. This can result in damage to the umbilical cable through cable elongation, cross-sectional deformation or buckling. Complete cable failure is catastrophic, but even microscopic damage to the fibre optics will cause signal attenuation resulting in loss of communication with the ROV.

Several designs have been attempted to attenuate snap loading. One design consists of modifying the boom to create a topside dynamic system to actively eliminate all vertical translations of the end of the boom. This design to attenuate snap loading has several drawbacks: it requires substantial modification to the boom; is required to support the mass of the cage, ROV and cable; tends to be large; is non-transferable between ships; and is costly to implement. Another design consists of the addition of mass to the cage. This results in faster acceleration of the cage through the water; however, if snap loading occurs, the additional mass will result in substantially larger snap loads. It was therefore decided to design a passive damping device that would mount on the top of the cage. In this configuration, the passive damper only has to support the mass of the cage and ROV, thus reducing the passive damper's size and cost. Also, as the passive damper is attached to the cage, it will travel with the system and will be transferable between ships.

To aid in the design of a passive damping system while avoiding the costs of field experimentation and measurement, the tethered ROV system was mathematically modeled. This was necessary to determine the dynamic characteristics of the system and the effects associated with the addition of the passive damper to the system. Further, the model was used to determine the optimal values for the spring constant and damping coefficient to be used in the passive damper. Therefore, this paper is the result of two parallel, interconnected design steps, the physical design of the passive damper and the mathematical model approximating the system.

DYNAMIC MODELLING OF THE CABLE

The objective of the model is to aid development of a design which produces a smooth position, velocity and acceleration profile for the cage. The model was developed to approximate the system's motion in the vertical direction. Motion in the horizontal direction was assumed to be negligible and have little effect on the system. The configuration of the tethered cable system was described relative to an inertial reference frame fixed at the mean location of the end of the boom. The variable Z was used to represent any motion in the vertical direction.

The model was broken down into four sub-systems:

1) The boom and ship;
2) The cable;
3) The passive damper; and
4) The cage and ROV.

The excitation provided by the boom and ship was modeled with a harmonic displacement function. This was based on the ship having a very large inertial mass, therefore the dynamic effects of the cable, cage and ROV on the ship would be negligible. Furthermore, this assumption allows the program to employ experimental data recorded from motion sensors located on the boom or ship. Equation 1 shows the harmonic displacement function that was chosen to model the motion of the boom:

$$Z = A \sin \omega t \qquad [1]$$

where Z is the vertical displacement, A is the excitation amplitude of the boom, ω is the excitation frequency and t is the time. The first and second derivatives give the velocity and acceleration of the boom respectively.

The cable is a continuous system and exhibits highly non-linear dynamic characteristics. Therefore, it was decided to model the cable's dynamics using discrete elements. Each cable element was modeled using a spring and damper with viscous drag [2]. The single degree of freedom (SDOF) differential equation governing the motion of a discrete cable element is:

$$M\frac{d^2Z}{dt^2} + C_I\frac{dZ}{dt} + C_V\left|\frac{dZ}{dt}\right|\left(\frac{dZ}{dt}\right) + K_cZ = M_bg + F(t) \qquad [2]$$

where, M and M_b are the inertial mass and buoyant mass of the cable element respectively, C_I is the internal damping coefficient, C_V is the hydrodynamic damping coefficient, K_c is the axial stiffness, g is the gravitational constant and F(t) represents a possible forcing function acting on the element.

The passive damper was assumed to be a combination of a spring and damper. Therefore the SDOF equation governing the motion of the damper is:

$$M_{pd}\frac{d^2Z}{dt^2} + C_{pd}\frac{dZ}{dt} + K_{pd}Z = M_{pd}g + F(t) \qquad [3]$$

where, M_{pd} and M_{pdb} are the inertial mass and the buoyant mass of the passive damper respectively, C_{pd} is the viscous damping coefficient and K_{pd} is the spring stiffness.

The cage was represented by a mass with hydrodynamic damping and the SDOF governing equation can be expressed as:

$$M_C\frac{d^2Z}{dt^2} + C_{VC}\left|\frac{dZ}{dt}\right|\left(\frac{dZ}{dt}\right) = M_{bC}g + F(t) \qquad [4]$$

where, M_C and M_{bC} represent the inertial mass and buoyant mass of the cage and C_{VC} represents the hydrodynamic damping coefficient.

To obtain a model that reasonably approximates the complete system, the SDOF equations are assembled to form a single, multi degree of freedom system (MDOF). Figure 3 shows the discrete element model. The interaction of the boom is represented by the displacement function on the top of the model. The cable is modeled with multiple discrete cable elements, in effect, dividing the large cable system into smaller, more manageable sections. The inertial mass and the buoyant mass of each cable elements is equally distributed at the upper and lower nodes. The passive damper is modeled using its governing SDOF equation. The mass of the passive damper and cage are simultaneously placed on the last node, the N+l node. The mass of the ROV can easily be incorporated into this mass to simulate conditions when the ROV is in the cage. For simplification purposes, the motion of the water is assumed to be negligible. Therefore, the velocity terms used for calculating the hydrodynamic drag on the cable and cage are developed such that the velocities of the cable and cage are absolute with respect to the stationary inertial reference frame. The velocity terms used for calculating the internal damping between two nodes are calculated as differences between the absolute velocities, with respect to the fixed reference frame of the respective nodes.

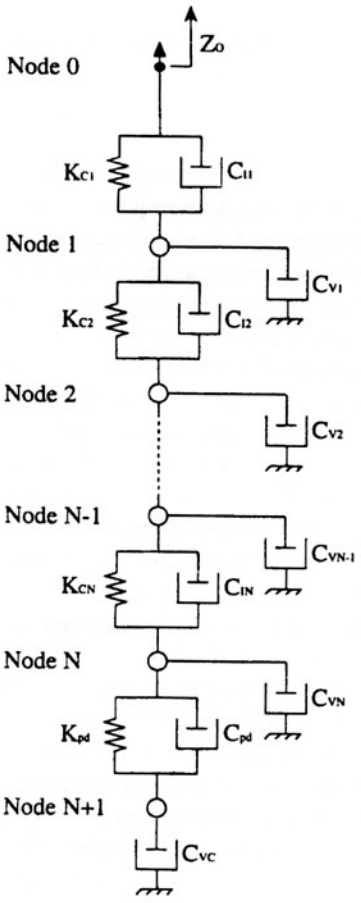

Figure 3. Discrete Element Model of System

Proper modeling of the cable requires the program to simulate slack build up in the cable due to the cable's inability to withstand compressive forces. Slack buildup is modeled assuming, once compressive forces occur, the nodes are incapable of transmitting loads in the downward, negative Z, direction. Once in compression, the node is allowed to fall through the water until a tensile load is experienced.

The differential equations of motion resulting from MDOF discrete system shown in Figure 2 are as follows:

Node 0

$$Z_0 = A \sin \omega t \qquad [5]$$

Node 1

$$\left(\frac{M_1}{2} + \frac{M_2}{2}\right)\frac{d^2Z_1}{dt^2} + C_{I1}\left(\frac{dZ_1}{dt} - \frac{dZ_0}{dt}\right) + C_{I2}\left(\frac{dZ_1}{dt} - \frac{dZ_2}{dt}\right) + C_{V1}\left|\frac{dZ_1}{dt}\right|\left(\frac{dZ_1}{dt}\right) + K_{C1}(Z_1 - Z_0 - L_1) + K_C(Z_1 - Z_2 + L_2) = \left(\frac{M_{b1}}{2} + \frac{M_{b2}}{2}\right)g \qquad [6]$$

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Node N

$$\frac{M_N}{2}\frac{dZ_N}{dt^2} + C_{I_N}\left(\frac{dZ_N}{dt} - \frac{dZ_{N-1}}{dt}\right) + C_{pd}\left(\frac{dZ_N}{dt} - \frac{dZ_{N+1}}{dt}\right) + C_{VN}\left|\frac{dZ_N}{dt}\right|\left(\frac{dZ_N}{dt}\right) + K_{CN}(Z_N - Z_{N-1} - L_N) + K_{pd}(Z_N - Z_{N+1} + L_{pd}) = \left(\frac{M_{bN}}{2}\right)g \qquad [7]$$

Node N+1 (cage)

$$(M_C + M_{pd})\frac{d^2Z_{N+1}}{dt^2} + C_{pd}\left(\frac{dZ_{N+1}}{dt} - \frac{dZ_N}{dt}\right) + C_{VC}\left|\frac{dZ_{N+1}}{dt}\right|\left(\frac{dZ_{N+1}}{dt}\right) + K_{pd}(Z_{N+1} - Z_N - L_{pd}) = (M_{Cb} + Mpdb)g \qquad [8]$$

Clearly, solving this system becomes difficult due to the nonlinear nature of the governing equations. To obtain a solution to the time varying dynamics, a variable time step numerical integration was employed. Fourth and fifth order Runge-Kutta numerical integration formulas were employed to a tolerance of 1×10^{-6} using MATLAB[1]. Since the system experiences instances when the dynamics of the system change greatly over a short period of time, variable time steps were used so that the simulation could achieve specified tolerances.

1. MATLAB is a high performance numerical compuption and visualization software package.

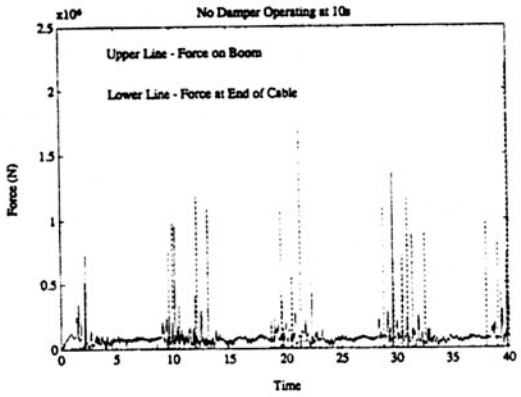

Figure 4.

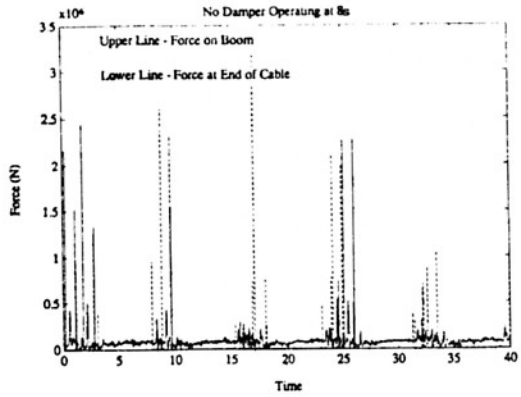

Figure 5.

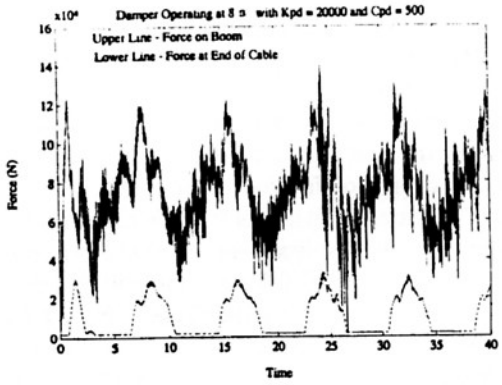

Figure 6.

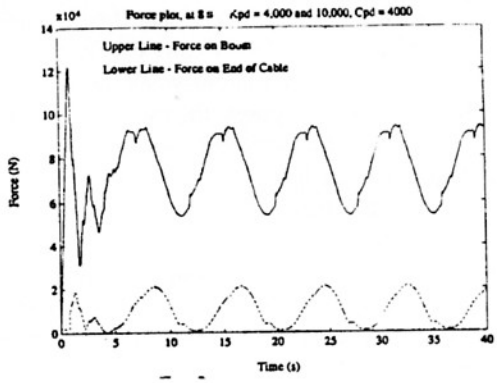

Figure 7.

When given the physical data for the system, the simulation then calculates the position, velocity, acceleration and tensile force for each node in the system. Further, the simulation calculates dynamic data for the passive damper, such as the amount of line fed out of the passive damper. Complete sets of empirical data for this type of system were not available. Therefore, verification was performed by comparing the model output with behaviour of the system as predicted by dynamic, vibration and fluid theory. Cases such as the free-fall of the cage mass, damped free-fall, static displacement, free vibration at natural frequency, forced vibration at natural frequency, and an initial displacement scenario were used.

Values for the axial stiffness and hydrodynamic drag for the cable were obtained using empirical relations. For a cable in tension, the axial stiffness was calculated using:

$$K_C = \frac{A_C E}{L} \qquad [9]$$

where A_C is the effective cross-sectional area of the load bearing windings of the cable, E is the modulus of elasticity of the cable material and L is the length of a cable element [3].

The determination of the viscous drag was based on equation 10.

$$C_V = (1.89 + 1.69\log\frac{l}{\varepsilon})^{-2.5} \qquad [10]$$

where, ε is 1/2 the diameter of the cable strands and l is the length of the cable element.

NUMERICAL SIMULATIONS

For a range of 8-12 seconds for the ship's period, a range from 0-2.6 m for the excitation amplitude (a maximum vertical motion for the boom of 5.2 m) and a cable length of 1900 m, the first simulations were performed to find the operating condition that would cause maximum snap loading [1]. These simulations were performed for the existing system without the passive damper. Figures 4 and 5 show the forces in the cable at the boom and cage for the excitation amplitude of 2.6 m. The maximum snap loading was found to occur at a period of 8 seconds and amplitude of 2.6 m. The model also indicated that larger snap loads would occur if the period was decreased further. The passive damper element was then added to the model. Initial values for the spring constants and damping coefficients were input. A trial and error iterative method was then employed to optimize the damper characteristics. During the optimization process, factors such a obtaining minimum cable loading, continuous tensile loads, variable depth operation, easy surface handling and operation through the interface were considered. Simulation runs are presented in Figures 6 through 8. Figure 6 shows the system operating with a large value for the spring constant. Regions where slack build-up occur are indicated by horizontal, zero load lines. For this case, the force profile is still very rough, and small snap loads are still occurring. Also, the passive damper is acting as a shock absorber, rather than a device that provides continuous tension

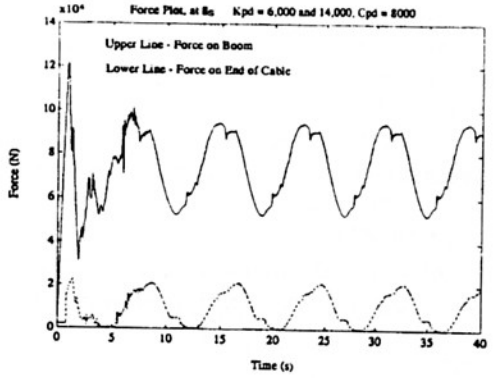

Figure 8.

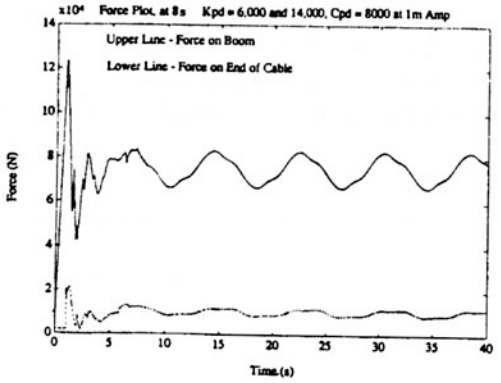

Figure 9.

in the cable. Figure 7 presents the system with a lower spring constant and higher damping. This configuration gave a smooth force profile but had undesirable operating characteristics. During operation, the damper fed out excessive amounts of line, making surface retrieval and recovery of the cage difficult. The final iteration is presented in Figure 8 and 9. For this simulation, a non-linear spring was employed with larger spring constants. Figures 8 shows this iteration gave a smooth force profile. Also, the simulation indicated very little motion would occur when the cage and ROV were in the air, giving desirable surface operating characteristics. Figure 9 shown the system operating at a excitation amplitude of 1 m. This indicates that reducing the excitation amplitude results in the cage experiencing a more constant force.

RAM-TENSIONER CONCEPTUAL DESIGN

A horizontal ram-tensioner was chosen as the device to best implement the "optimal" values for the spring constants and damping coefficients indicated by the simulation. Figures 10 though 12 show the conceptual design. The design consists of several sub-systems: linear rail guides, non-linear springs, spring retainers, dampers, pulleys, system limiters, and cable guides. This horizonal design allows the passive damper to be incorporated into the top of the cage and take up a minimum vertical height. The umbilical cable is terminated above the passive damper and spliced onto a wire rope cable. After the termination point, the wire rope enters the passive damper around the top pulley and is subsequently wrapped around the internal pulleys. The fibre optic and power bundles leave the umbilical cable at the termination point and enter the ROV cage, separate from the wire rope cable.

The internal pulley assembly selected gives the passive damper a 3:1 ratio for cable feedout to spring compression. Furthermore, the absorption of vertical cable motion and subsequent transformation into horizontal passive damper motion reduces the vertical translations of the cage, resulting in a more static position of the cage. This stabilized motion will allow easier deployment and recovery of the ROV at depth and permit the use of the cage as a work platform. Also, to reduce the size of the passive damper, the diameter of the pulleys must be minimized. The factors that govern the size of the pulley are the minimum bending radius of the wire rope cable and the effects of cyclic bending and loading on the wire rope cable.

Through the use of a non-linear spring, the motion of the cage at the surface will be reduced. When the cage is lifted from the water, the damper will further compress the springs, hence increasing the spring stiffness, significantly reducing the cage motion and resulting in a more easily handled system. Another important aspect of this design is that it eliminates the possibility of hyperextension or full compression occurring in the passive damper. Hyperextension may occur if the system is rapidly unloaded; conversely, full compression may occur if the system is rapidly loaded. Internal damping coupled with system limiters are employed to reduce compression velocity

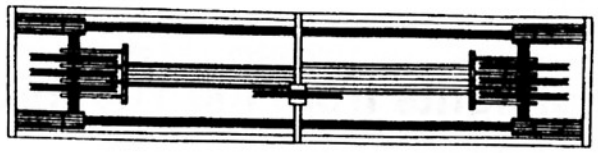

Figure 10. Top View of Passive Damper.

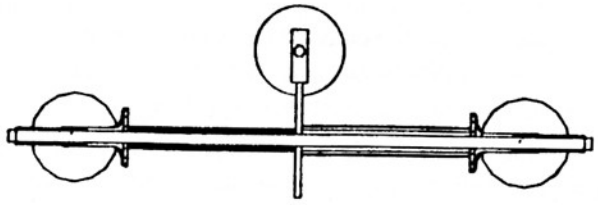

Figure 11. Side View of Passive Damper

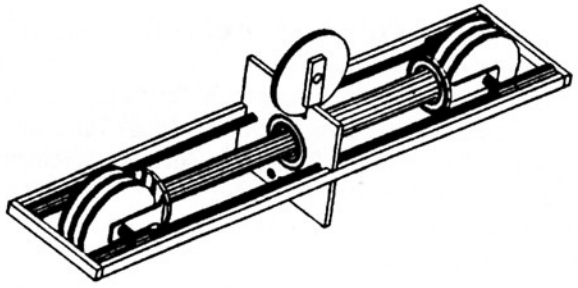

Figure 12. Oblique View of Passive Damper

and retain the system within operating boundaries. Finally, this design configuration internalizes the forces exerted by the compression of the spring and dampers between two outer spring retainers. This allows simple rail guides to be used to control the translational motion and restrict the rotational motion of the spring retainers.

CONCLUSIONS

The dynamics of an umbilical cable used in the operation of a deep sea ROV were simulated using a complex MDOF discrete model. This model proved to be a valuable and cost effective tool for predicting and optimizing the dynamic behaviour of a tethered ROV system with a passive damper. Several simulations were performed employing a trial and error iterative method and "best" values for spring and damping coefficients were obtained. The model indicated that the system would have desirable operating characteristics with the optimized passive damper selected. Furthermore, the passive damper would attenuate snap loading by a factor exceeding 150. The passive damper design was achieved using a horizontal ram-tensioner mounted to the top of the ROV cage. With this passive damping system in place, improved operating characteristics should be obtained. This will result in a greatly increased operating envelope for the ROV system.

ACKNOWLEDGEMENTS

The authors would like to thank James R. McFarlane for having suggested this project and his continuing support.

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Technical Activities Newsbriefs

Highlights from the Technical Activities Board Meeting
NOVEMBER 20, 1993

The third meeting of the 1993 Technical Activities Board (TAB) was held on November 20, 1993 at the North Raleigh Hilton, Raleigh, North Carolina. The following actions were taken:

Election of TAB Liaison Council Chairman. TAB elected Dr. Frederick H. Dill as Chairman of the TAB Liaison Council for the term 1994-95.

Election of TAB Periodicals Council Chairman. TAB elected Mr. Robert A. Dent as Chairman of the TAB Periodicals Council for the term 1994-95.

Election of Society President Representatives to the TAB Administration Council. The Society Presidents' Forum elected Dr. David G. Goodenough, Dr. Gerald F. Harris, Prof. Christine Nielsen, Prof. T.J. (Tzyh-Jong) Tarn, and Dr. Ching-Ping (C.P.) Wong as Society President Representatives to the TAB Administration Council for the term 1994, with Dr. Harris and Prof. Tarn also serving as members of the TAB Finance Committee for the term 1994.

Election of Society President Representatives to the TAB Steering Committee on Design and Manufacturing Engineering. The Society Presidents' Forum elected Dr. Richard D. Klafter, Dr. Dennis R. Olsen, Dr. Yacov Shamash, Prof. Madan G. Singh and Prof. Alfred C. Weaver as the Society President Representatives to the TAB Steering Committee on Design and Manufacturing Engineering for the term 1994. One representative is yet to be named.

1994 Memberships of TAB Councils. TAB announced the 1994 memberships of the TAB Periodicals, Products and Technical Meetings Councils.

TAB Staff Recognition for Excellence. TAB approved implementing a program for a token of appreciation to be given to staff.

IEEE Electronic Data Repository. TAB agreed in principle with the proposed establishment of the IEEE Electronic Data Repository, which will be used as an alternate means for delivery of technical materials worldwide to reduce lengthy delays.

Proposed Additions to IEEE Policy Statement 10.1 - Objectives. As requested by the TAB Technical Meetings Council, TAB endorsed additions to IEEE Policy Statement

10.1 regarding the ethics of handling papers and/or abstracts submitted to conferences for recommendation of approval by the IEEE Board of Directors.

Proposed Revisions to IEEE Policy Statement 6.9 - Page Charges. TAB endorsed for recommendation of approval by the IEEE Board of Directors modifications to IEEE Policy Statement 6.9 permitting voluntary page charges for magazines.

TAB Research Initiation Grants Committee Charter. As requested by the TAB Liaison Council, TAB approved the TAB Research Initiation Grants Committee Charter.

TAB Liaison Council Charter. As requested by the TAB Liaison Council, TAB approved modifications to the TAB Liaison Council Charter to bring it in conformity with a prior TAB Motion to dissolve the TAB/USAB U.S. Technology Policy Conference Committee.

Institute Pre-College Programs. As requested by the TAB Liaison Council, TAB requested that the IEEE Board of Directors coordinate pre-college programs Institute wide.

TAB Administration Council Charter. TAB approved modifications to the TAB Administration Council Charter to bring it in conformity with the IEEE Bylaw revisions changing voting status of members.

Society Review. As requested by the TAB Society Review Committee, TAB accepted the report of the reviews of the IEEE Nuclear and Plasma Sciences Society (NPS) and IEEE Solid-States Circuits Council (SSC).

IEEE Signal Processing Society Field of Interest Change. TAB endorsed the IEEE Signal Processing Society's revised Field of Interest Statement which more accurately describes the Society's scope and recommended its approval by the IEEE Executive Committee.

1994 Society/Council Budgets. TAB endorsed for recommendation of approval by the IEEE Board of Directors the 1994 Society/Council budgets.

TAB Committee on IVHS. TAB approved that the TAB Ad Hoc Committee on Intelligent Vehicle Highway Systems (IVHS) become a Committee reporting directly to TAB.

Balanced Information on Candidates in IEEE Publications. TAB recommended to the IEEE Board of Directors that it should be IEEE Policy that all IEEE publications discussing IEEE elections shall provide balanced information on candidates by permitting presentations by the candidates and/or their supporters.

Conference Audit Process. TAB endorsed for recommendation of approval by the IEEE Board of Directors a conference audit process.

Proposed Additions to IEEE Bylaw 301.14 -Board of Directors Vacancies. TAB tabled a Motion to endorse additions to IEEE Bylaw 301.14 governing guidelines for handling vacancies in IEEE Board of Directors positions.

Proposed New IEEE Policy Statement 9.20 -IEEE Metric Policy. As requested by the TAB Periodicals Council, endorsed a new IEEE Policy Statement 9.20 outlining the IEEE Metric Policy for recommendation of approval by the IEEE Board of Directors.

IEEE PUB Task Force on SPECTRUM/THE INSTITUTE. TAB endorsed the recommendations of the IEEE PUB Task Force on SPECTRUM/THE INSTITUTE, which proposes to increase the publication frequency of the Institute and restructure the production of the newspaper.

TAB/USAB Ad Hoc Committee on Technology Policy Development Report. TAB received the document "Technical Information for the Public Welfare" (fifth working draft dated August 30, 1993) in principle, and requested that the Technical Information Statement (TIS) Oversight Committee be established in 1994 for a trial period of one year. TAB also approved charging the TIS Oversight Committee with determining the viability of the overall process during 1994 and reporting back to USAB and TAB.

IEEE Strategic Plan. TAB endorsed for recommendation of approval the IEEE Strategic Plan.

Preliminary 1994-95 TAB Operational Plan. TAB approved the preliminary 1994-95 TAB Operational Plan.

Proposed Revisions to IEEE Bylaw 406.6 - Chapters. TAB recommended to the IEEE Regional Activities Board modifications to IEEE Bylaw 406.6 outlining Chapter management responsibilities.

Proposed Revisions to IEEE Bylaw 406.4 - Chapters. TAB recommended to the IEEE Regional Activities Board modifications to IEEE Bylaw 406.4 detailing Chapter membership and the amount of technical meetings.

Impact of New Rebate Schedules on Chapter Activities. TAB commended the IEEE Regional Activities Board for sharing concerns regarding the perceived adverse impact of the new rebate schedules on Chapter activities and expressed appreciation for the supportive action taken by RAB during its November, 1993 meeting.

TAB Steering Committee on Design and Manufacturing Engineering. TAB tabled a Motion to allocate $20k in 1994 to the TAB Steering Committee on Design and manufacturing Engineering to be spent on new product development.

Society Awards. TAB approved the following actions regarding awards:

- Revision to IEEE Antennas and Propagation Society Sergi A. Schelkunoff Transactions Prize Paper Award
- Revision to IEEE Antennas and Propagation Society Harold A. Wheeler Applications Prize Paper Award
- Revision to IEEE Antennas and Propagation Society R.W.P. King Award
- Revision to IEEE Communications Society Leonard G. Abraham Prize Paper Award in the Field of Communications Systems

- Revision to IEEE Communications Society Stephen O. Rice Prize Paper Award in the Field of Communications Theory
- Revision to IEEE Communications Society William R. Bennett Prize Paper Award in the Field of Communications Circuits and Techniques
- Revision to IEEE Communications Society Magazine Prize Paper Award
- Revision to IEEE Reliability Society Chapters Award
- Establishment of IEEE Broadcast Technology Society Clyde M. Hunt Memorial Student Paper Award
- Establishment of IEEE Communications Society Best Tutorial Paper Award
- Establishment of IEEE Components, Packaging, and Manufacturing Technology Society Transactions Part B Prize Paper Award
- Establishment of IEEE Consumer Electronics Society Outstanding Service Award
- Establishment of IEEE Engineering Management Society Honorary Life Member Award
- Establishment of IEEE Lasers and Electro-Optics Society Best Student Paper Award
- Establishment of IEEE Power Engineering Society Outstanding Engineer Award
- Establishment of IEEE Robotics and Automation Society King-Sun Fu Memorial Best Transactions Paper Award
- Establishment of IEEE Robotics and Automation Society Best Conference Video Proceedings Award
- Establishment of IEEE Robotics and Automation Society Anton Philips Award for Best Student Conference Paper

IEEE NEWS

Electrical Engineers Seek Federal Commitment For Space Commercialization Program

WASHINGTON, Dec. 22 — "Today, the only way to realize the vaunted scientific and cultural missions of the U.S. space program is to hitch them to the powerful rocket of commercial development." This is the position of the United States Activities unit of The Institute of Electrical and Electronics Engineers Inc. (IEEE-USA), included in a report released last week and calling for a federal commitment to achieve the economic promise of space.

According to Charles K. Alexander Jr., chairman of the IEEE-USA Board, "Just as we made space the arena of military competition during the Cold War, keen international economic competition compels us to make space the high frontier of commerce and industry." Citing the successful $15 billion-per-year satellite communications industry, Dr. Alexander stressed that space commercialization can become profitable if the basic cost of space infrastructure is brought low enough. The IEEE-USA position listed several recommendations for an effective federal program to enable private commercialization of space:

- The highest national space priority must be given to achieving improvements in basic space infrastructure by increasing the safety and reliability as well as decreasing the unit cost.
- The U.S. should develop a much safer, more reliable and less expensive alternative to the shuttle — a new passenger- and cargo-carrying vehicle.
- Large, economically-attractive, space-related markets must be created.

Dr. Alexander emphasized that such a space commercialization program would not exclude other important civil space activities. "By generating the required revenues for the large expenditures needed for solar system human activities, space industry would ensure the strong public support necessary for all other areas of the U.S. space program," he said.

For a copy of the IEEE-USA report, "What the United States Must Do to Realize the Economic Promise of Space," contact Sharon Richardson at 202-785-0017 (voice) or 202-785-0835 (fax).

The IEEE is the world's largest technical professional society, with an international membership of more than 320,000 electrical and electronics engineers and computer scientists. IEEE-USA, which is celebrating its 20th anniversary this year, promotes the professional careers and technology policy interests of U.S. IEEE members.

Proposed Amendments to the Oceanic Engineering Society Constitution and Bylaws

The following amendments were approved by the AdCom on 19 October 1993. These amendments are submitted for your review. If you object or have any comment please contact, in writing, the Society Secretary within 30 days. If more than five percent of the members object, then the proposed amendments will be submitted by a mail ballot to all members. The amendments will otherwise take effect in 30 days.

Proposed Amendments to the OES Constitution

In the following amendments, underlined words denote additions and bracketed [] words denote deletions (The entire copy of the Constitution and Bylaws can be found in the 1990 Membership Directory.)

PROPOSED AMENDMENT 1

It is proposed to delete the Vice President, East Coast, and the Vice President, West Coast, and add Vice Presidential offices as specified in the Bylaws. The AdCom feels that these changes will more accurately represent the technical nature of the Society and will afford the flexibility of society governance to the Administrative Committee.

Article V — Administration

Section 2. The officers of the Society shall be the President, [the Vice President, East Coast, and the Vice President, West Coast,] the Vice Presidents as specified in the Bylaws, the Secretary, and the Treasurer. These officers shall constitute the Executive Committee (ExCom). The offices of Secretary and Treasurer may be combined and held by one individual as Secretary-Treasurer. The senior and junior Past Presidents shall be ex-officio members of the AdCom. The terms of office of the members of the Administrative Committee shall be three years, one third of the members being elected each year. Only two consecutive full terms are permitted, but eligibility is restored after a lapse of one year. The Journal Editor and ex-officio members are limited to the same membership time limitations.

Section 3. The Administrative Committee shall elect every two years [one of] from its elected members [as] a President, [a Vice President, East Coast, and a Vice President, West Coast, whose terms shall be two years and staggered] and Vice Presidents as specified in the Bylaws. These officers shall be of at least IEEE Member rank. The President shall appoint a Secretary (not necessarily a member of the AdCom) for a two year term. The president shall appoint a member of the AdCom as Treasurer for a two-year term. The President may not serve for more than two consecutive terms. Should the President's term as an elected member of the Administrative Committee expire prior to the end of his office, and should be not be eligible for re-election, then he may complete his term of office as an "ex-officio member with vote" of the Administrative Committee.

PROPOSED AMENDMENT 2

It is proposed that official Society governance meetings may be held by either the Administrative Committee or the Executive Committee with the minutes of the latter meeting subject to approval of the Administrative Committee. This change will reduce Society travel expenditures and yet still maintain the appropriate level of Society business activities.

Article VIII — Meetings

Section 4. The Administrative Committee or its Executive Committee shall hold at least two meetings each year. One of these meetings may be delegated to the Executive Committee with the minutes of such meeting submitted to the Administrative Committee for approval by a majority of the elected members. Other meetings of the Administrative Committee shall be held at such times as are found necessary and convenient. Special meetings of the Administrative Committee may be called at the discretion of the President or upon request of three other members of the Administrative Committee, with at least 15 days notice to all Administrative Committee members.

PROPOSED AMENDMENT 3

This change only updates communications capabilities.

Section 6. Business of the Administrative Committee may be handled by correspondence [telephone, or telegraph] or telecommunications where, in the opinion of the President, matters requiring action can be adequately handled in that manner. A majority vote of the voting members of the Committee is necessary for approval of actions handled in this manner, except as otherwise provided herein.

Proposed Amendments to the OES Bylaws

The purpose of the following amendments is to replace the offices of Vice Presidents, East and West with following Vice Presidents:

- Technical Activities
- Professional Activities
- International Activities

The amendments will also define the Vice Presidents' activities.

The following changes are proposed. The brackets indicate deletions, the underlines indicate additions.

3.1. The Executive Committee of the AdCom consists of the President, [Vice President, East Coast, Vice President, West Coast], the Vice Presidents, Treasurer, Secretary, and the junior and senior Past Presidents.

5. **Officers** — At the final AdCom meeting of every other calendar year, the Administrative Committee shall conduct an election to fill the offices of President, and in the alternate year for [Vice President, East Coast, or Vice President, West Coast] the Vice Presidents whose terms expire that year. [for the succeeding terms.] Eligible candidates for these offices shall be current and incoming elective Administrative Committee members. A majority of votes at the above election meeting shall determine the election.

5.1. The terms of [elected officers] the President and Vice Presidents shall be two years, commencing on January 1. The

President may be re-elected to a second term, but shall not again be eligible for election as President until one year has elapsed. Similarly, a President who is not immediately re-elected to a consecutive second term shall not be eligible for election as President until one year has elapsed The Vice Presidents may hold office for not more than two consecutive terms. Eligibility for election as Vice President is restored after one year has elapsed.

The following amendments are completely new sections.

5.6. Vice President Responsibilities — Vice Presidential duties and responsibilities shall be as defined below:

5.6.1. Vice President-Technical Activities shall exercise general oversight of and provide liaison among the committees, the President, and the AdCom for the entities listed below and others as approved by the AdCom:

a. Technology Committee
b. Standards Committee
c. Steering Committee
d. Meetings Committee
e. Publications Committee
f. Publicity Committee

5.6.2. Vice President-Professional Activities shall exercise general oversight of and provide liaison among the committees, the President and the AdCom for the entities listed below and others as approved by the AdCom:

a. Chapters Committee
b. Membership Services
c. Awards and Fellows
d. Distinguished Service and Distinguished Technical Contributions Committee
e. Student Affairs Committee

5.6.3 Vice President-International Activities shall be responsible for the activities of the Society around the world exclusive of the North American continent to include those listed below and others as approved by the AdCom:

a. Assist the Oceanic Community outside North America in establishing chapters.

b. Act as liaison between International groups involved in oceans-related work and the OES AdCom to facilitate and sustain chapter activities.

c. Initiate International programs and activities such as Oceans' Conference and specialized workshops designed to foster cooperation and give a higher visibility to the OES outside North America.

d. Form, when necessary, ad hoc committees to foresee specific activities at certain sites in connection with activities related to conferences and workshops.

5.6.4 The Vice Presidents shall be ex-officio members of all committees under their purview and shall regularly report to the AdCom regarding the committee activities.

The following amendments affect the technology committee structure.

10. **[Technical] Technology Committee** - A [technical] technology committee, which may organize a subgroup if desired, shall function in a specific technical area with a scope to be approved by the AdCom.

10.1 **Appointment** — Chairpersons of [technical] technology committees shall be appointed for a term of one year with the approval of the AdCom and shall be ex-officio members of the AdCom "with vote" in accordance with the provisions and limitations of Article V of the Constitution, if not already elected as members of the AdCom. Members of [technical] technology committees shall be appointed for one-year terms by the [technical] technology committee Chairpersons. [Technical] Technology committee members [other than the chairpersons] are eligible for reappointment without limitation regarding length of service. [Technical] Technology committee Chairpersons are eligible for reappointment without limitation regarding length of service. [may not serve in that capacity for more than three consecutive years. Eligibility for appointments as Chairperson is restored after two years have elapsed] Chairpersons of technical committees will normally be selected from among the elected members of the AdCom unless the technical requirements of the assignment, in the judgment of the AdCom, make it desirable to do otherwise.

The following amendments are completely new sections.

10.5 **Technology Committee Coordinator** — The AdCom may appoint a Technology Committee Coordinator to exercise supervision and administration of technology committees established by the AdCom. The Technology Committee Coordinator may normally be selected from among the elected members of the AdCom unless the technical requirements of the assignment, in the judgment of the AdCom, make it desirable to do otherwise. The Technology Committee Coordinator shall be an ex-officio member of each Technology Committee and if not an elected member of AdCom shall be an ex-officio member "with vote." The Technology Committee Coordinator shall be appointed for a three-year term. Only two consecutive terms are permitted, but eligibility is restored after a lapse of one year. The Technology Committee Coordinator shall be an ex-officio member of the Technical Program Committee for each OCEANS Conference.

11.9. **Student Affairs Committee** — A standing committee on student affairs shall be appointed. The Committee shall promote student participation at OCEANS' conferences and workshops. The Student Affairs Committee may make use of IEEE Potentials to promote OES activities and provide articles of interest to IEEE student members. The Student Affairs Committee shall encourage student branch chapters and work with IEEE Student Branch coordinators to promote the interests of the OES.

11.9.1. **Student Affairs Coordinator** — The AdCom shall appoint a Student Affairs Coordinator to exercise supervision and administration of the Student Affairs Committee. The Student Affairs Coordinator will normally be selected from among the elected members of the AdCom unless the technical requirements of the assignment, in the judgment of the AdCom, make it desirable to do otherwise. The Student Affairs Coordinator shall be an ex-officio member of the Student Affairs Committee and if not an elected member of the AdCom shall be an ex-officio member "with vote." The Student Affairs Coordinator shall be appointed for a three-year term. The Student Affairs Coordinator shall be an ex-officio member of the Technical Program Committee for each OCEANS Conference. The Student Affairs Coordinator shall serve as a representative to the IEEE Educational Activities Board.

OCEANS 94 OSATES

Ocean engineering for today's technology and tomorrow's preservation

Oceans 94 Osates
13-16 Sept. 94 Brest France

IEEE OES see Communauté urbaine BREST

Technical Program Committee

Technical Program Chairman
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IFREMER, France

Technical Program Vice Chairman
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RAYTHEON, USA

Technical Program Committee Members
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Locating OCEANS 94 in France, its first venue outside North America, is a major move in the long and successful series of OCEANS annual conferences. It is expected that this will lead to an increase in international cooperation and an expansion of our contributions to long term worldwide ocean monitoring programs.

OCEANS 92 OSATES will offer much to its participants, through a large **Business exhibit**, already a success in the previous 1991 OSATES conference, a **Naval Exhibition** of high technology, ocean research vessels in Brest Harbor, and the **Technical program**, which will include conference and poster sessions along the following topics:

1 - Underwater Acoustics
2 - Detection, Classification & Localization
3 - Boundary Effects & Propagation
4 - Matched Field Processing/Tomography
5 - Sonar Signal Processing
6 - Transducers & Arrays
7 - Ocean Monitoring Systems
8 - Water Currents
9 - Polar & Severe Environments
10 - Oceanographic Instrumentation
11 - Remote Sensing
12 - Metrology & Calibration
13 - Autonomous Benthic Stations
14 - Satellite Oceanography & Meteorology
15 - Signal and Information Processing
16 - Modeling, Simulation & Data Bases
17 - Neural Networks & Fuzzy Systems
18 - Knowledge-Based Expert Systems
19 - Geographical Information Systems
20 - Non-Acoustic Imaging
21 - Supercomputers
22 - Communications, Navigation & Control
23 - Autonomous Vehicles
24 - Satellite Navigation/GPS
25 - Underwater Telemetry & Communications
26 - Underwater Robotics
27 - Intelligent Control
28 - Power Sources

The Institute of Electrical and Electronics Engineers, Inc.
United States Activities

Announces the 22nd Annual Competition for

1995
IEEE-USA Congressional Fellowships

PROGRAM: Electrical and Electronics Engineers and Allied Scientists are competitively selected to serve a one-year term on the personal staff of individual Senators or Representatives or on the professional staff of Congressional Committees. The program includes an orientation session with other Science-Engineering Fellows, sponsored by the American Association for the Advancement of Science (AAAS).

PURPOSE: To make practical contributions to more effective use of scientific and technical knowledge in government, to educate the scientific communities regarding the public policy process, and to broaden the perspective of both the scientific and governmental communities regarding the value of such science-government interaction.

CRITERIA: Fellows shall be selected based on technical competence, on ability to serve in a public environment, and on evidence of service to the Institute and the profession. Specifically *excluded* as selection criteria are age, sex, creed, race, ethnic background, and partisan political affiliations. However, the Fellow must be a U.S. citizen at the time of selection, must have been in the IEEE at Member grade or higher for at least four years, and must have at least 10 years' professional experience, which may include graduate education. Additional criteria may be established by the selection committee.

AWARDS: IEEE-USA plans to award at least two Congressional Fellowships for the 1995 term. Additional funding sources may permit expansion of awards.

APPLICATION: Further information and application forms can be obtained by calling Chris J. Brantley at (202) 785-0017, by faxing (202) 785-0835, by electronic mail to c.brantley@ieee.org (Internet), or by writing:

Congressional Fellows Program
IEEE United States Activities
1828 L Street, N.W.
Washington, D.C. 20036-5104

Applications must be postmarked no later than March 31, 1994 to be eligible for consideration.

IEEE USA HOT LINES

IEEE-USA Office, 1828 L Street, N.W., Suite 1202, Washington, DC 20036-5104, USA (202) 785-0017
IEEE-USA telephone hotline recording: (202) 785-2180
James A. Watson, Editor—Georgia C. Stelluto, Associate Editor

In Memory Of David A. Roberson

IEEE United States Activities volunteers and staff note with sadness the passing of David A. Roberson, P.E., valued contributor to IEEE and IEEE United States Activities, on October 15, 1993. He was serving as IEEE-USA's 1993-94 Government Activities Council Chairman. Throughout his career he volunteered his services to numerous IEEE functions and activities.

In 1982, Roberson retired as Manager of the Utilities Branch of Arnold Engineering Development Center, the Air Force's largest wind tunnel testing complex. He was a registered professional engineer in New York, Florida, and Tennessee. We will miss his steady hand, his abiding sense of fairness, his down-home good humor, and the warm personal friendship he extended to so many.

Future City Competition Needs Volunteers

Registration has begun for the second annual National Engineers Week (NEW) Future City Competition. Local contests will be held in Atlanta, Chicago, Dallas, Detroit, Milwaukee, Los Angeles, and Washington, D.C. National finals will occur during NEW '94, February 20-26.

Teams of seventh- and eighth-grade students will design and build models of futuristic urban centers using computer software. Working with teachers and local engineers, the students will create cities of the year 2010 that are energy-efficient, cost-effective, and environment- and people-friendly.

Schools may recruit their own volunteer engineer or may be assigned one by the local contest coordinator. If you are interested in volunteering as an engineering consultant, contact Chris Currie at the IEEE-USA Office in Washington, D.C.

IEEE-USA Wins Award for Future City Competition

IEEE United States Activities has won a place on the Associations Advance America Honor Roll for developing the first National Engineers Week (NEW) Future City Competition. Sponsored by the American Society of Association Executives (ASAE), the Honor Roll recognizes outstanding association programs that help make America a better place to live. Future City participants have credited the program with motivating students to study math and science and helping them understand complex urban systems.

IEEE-USA conceived and helped coordinate the competition, which challenged teams of middle school students to design and model computer-simulated cities for the 21st century, with the help of teachers and volunteer engineers. Two hundred schools participated nationwide, and the national champions from Tilden Middle School in Rockville, Maryland, met with President Clinton to describe their futuristic cities.

IEEE was the lead society of NEW '93, working in conjunction with 60 scientific and technical organizations. IEEE-USA's award was presented by ASAE during its annual convention in Minneapolis, Minnesota.

USAB Calls For Award Nominations

The Awards and Recognition Committee of IEEE's United States Activities Board is seeking nominations for a new Electrotechnology Transfer Award. Introduced this year by IEEE-USA's Defense Research and Development Policy Committee, the award honors individuals contributing to the successful transfer of Federal or state advanced electrical, electronic, or computer technologies to the commercial sector. Both government and civilian employees are eligible for this award. Selection will be based on the nominee's direct involvement in the application or transfer aspects of the technology in its original form or in a broader application than originally envisioned in the research.

Since 1992, USAB has also honored individuals with the Harry Diamond Memorial Award for distinguished technical contributions in the field of electrotechnology while in U.S. Government service. Recipients of both awards receive an engraved plaque presented by IEEE's Vice President for Professional Activities.

Nominations for the Electrotechnology Transfer Award and the Harry Diamond Memorial Award, as well as other USAB awards, should be submitted by March 30, 1994. Contact the IEEE-USA Office in Washington, D.C., for information and nomination forms.

Pension Portability Legislation Would Help Ease Gender Gap

IEEE-USA is supporting the ***Pension Portability Improvement Act***, H.R. 1874. This legislation would also help reduce the "pension gender gap" by lowering pension vesting requirements from five to three years.

Although engineers have longer average employment tenures than most American workers, the gap between men and women engineers is even greater. According to a recent survey by the Society of Women Engineers, the typical female engineer accrues 4.4 years of continuous service per employer—two years less than male engineers. Mary-Ann M. Boyce, Chair of IEEE-USA's Pensions Committee, said this disparity means that women engineers are much more likely than men to leave their current positions without retirement provisions.

The American Nurses Association, representing 200,000 nurses in 50 states, recently joined IEEE-USA in support of H.R. 1874. Ninety-seven percent of nurses are female and typically change jobs every three years, leaving them disadvantaged by the current pension system.

IEEE USA HOT LINES

IEEE-USA Office, 1828 L Street, N.W., Suite 1202, Washington, DC 20036-5104, USA (202) 785-0017
IEEE-USA telephone hotline recording: (202) 785-2180
James A. Watson, Editor—Georgia C. Stelluto, Associate Editor

USAB Chairman Urges Congressional Action

United States Activities Board (USAB) Chairman Charles K. Alexander recently sent letters to Members of Congress and the Administration on behalf of IEEE-USA's Technology Policy Council (TPC). The letters expressed IEEE-USA's views on the National Information Infrastructure (NII), bioengineering research, the National Science Foundation's (NSF) proposed name change, the ***Omnibus Budget Reconciliation Act of 1993***, and Government research and development (R&D) projects.

Alexander wrote to Senator Ernest F. Hollings (D-South Carolina), chair of the Committee on Commerce, Science, and Transportation, providing Hollings with information on IEEE's recent NII conference. He urged the Senator to conduct further hearings on related legislation.

Alexander also wrote to Dr. Jay Moskowitz, deputy director for science policy and technology transfer at the National Institutes of Health (NIH). The letter offered TPC's support and assistance to NIH in conducting a bioengineering implementation study as outlined in the ***NIH Reauthorization Act of 1993***.

Further, Alexander replied to Representatives George E. Brown, Jr. (D-California) and Rick Boucher (D-Virginia) about NSF's name change proposal. IEEE-USA supports the name change, which would incorporate engineering explicitly, as the "National Science and Engineering Foundation." He noted that engineering R&D can be highlighted as a distinct but complementary activity to scientific research, without deemphasizing its importance, and that the name change would reflect this balance.

On behalf of IEEE-USA, Alexander opposed the proposed elimination of the deduction for lobbying expenses contained in the ***Omnibus Budget Reconciliation Act of 1993***. In a letter to Representative Dan Rostenkowski (D-Illinois) he wrote that compliance with the proposed Act would be extremely costly and time consuming.

A letter was also sent under Chairman Alexander's signature to John H. Gibbons, Assistant to the President for Science and Technology, expressing TPC's support for initiation of an FY 1996 budget cross-cut on electrotechnology. The letter urged Government agencies to provide information on existing electronics R&D projects to help determine where Federal R&D expansion is possible and where deficiencies exist.

IEEE Members Receive National Honors

IEEE congratulates members Alfred F. Cho, Amos E. Joel, Jr., William H. Joyce, George Kozmetsky, and Kenneth H. Olsen, all recipients of the National Medals of Science or Technology. Presented by President Clinton in a White House ceremony on September 30, 1993, the medals are the nation's highest recognition for distinguished contributions to scientific discovery and technological innovation. IEEE joins the President in celebrating the ingenuity, heroism, and accomplishment of these five distinguished members.

An IEEE Fellow, Alfred Cho of AT&T Bell Laboratories was honored with the National Medal of Science for his pioneering work in developing molecular beam epitaxy. Revolutionizing thin film growth, Cho's efforts made possible anatomically accurate structures for electronic and optoelectronic devices.

A former director of Bell Telephone Laboratories and an IEEE Fellow, Amos Joel received the National Medal of Technology for his vision, inventiveness, and perseverance in introducing technological advances in telecommunications. His work in switching has had a major impact on the evolution of the telecommunications industry nationally and internationally.

William Joyce, president of Union Carbide Corporation, received a Technology Medal for his vision, entrepreneurial talents, and business leadership in creating and commercializing a process that revolutionized the production of plastics.

George Kozmetsky, director of the Icz Institute at the University of Texas-Austin, received a Technology Medal for his role in commercializing various technologies by establishing and developing more than one hundred technology-based companies that employ tens of thousands of people and export more than one billion dollars' worth of products worldwide.

Kenneth Olsen was similarly recognized for his contributions to the development and use of computer technology and for his entrepreneurial contributions to American business. An IEEE Fellow, Olsen is also the founder, president, and chief executive officer of Digital Equipment Corporation.

IEEE-USA Supports Patent Law Reform

David M. Ostfeld, Vice Chairman of IEEE-USA's Intellectual Property Committee, testified recently before the U.S. Patent and Trademark Office. Ostfeld stressed that the United States must coordinate its patent filing system with worldwide standards to lower costs for U.S. inventors and increase U.S. competitiveness.

Ostfeld also emphasized that the U.S. patent system must convert from first-to-invent to first-to-file, since nearly every other country in the world maintains such an arrangement. He further recommended that patent regulations allow filing of a preliminary application meeting technical standards, which could be drafted by a layperson without patent counsel assistance. Ostfeld argued that an introductory filing could make patent procedures easier and less costly for independent inventors and small businesses.

USAB Position Statements Inform U.S. Members

Position statements on U.S. members' concerns are approved periodically by IEEE's United States Activities Board. To ensure that such important information is disseminated to members, this copy of the Licensure and Registration statement is being circulated with Hot Lines for direct republication in Section newsletters. The IEEE-USA Office in Washington, D.C., will also make available on request a list of USAB positions and copies of any other of its statements.

ENTITY POSITION STATEMENT

LICENSURE AND REGISTRATION

of Electrical and Electronics Engineers, Inc.

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This statement was developed by the Licensure and Registration Committee of the United States Activities Board of The Institute of Electrical and Electronics Engineers, Inc. (IEEE), and represents the considered judgment of a group of U.S. IEEE members with expertise in the subject field. The IEEE United States Activities Board promotes the career and technology policy interests of the 250,000 electrical, electronics, and computer engineers who are U.S. members of the IEEE.

It is our position that engineering licensure and registration contributes to the profession's efforts to protect the health, welfare, and safety of the public by ensuring that practitioners meet minimum recognized levels of education, experience, and competence.

In support of this position:

- We aggressively represent the interests of IEEE members in the licensure and registration process;
- We actively participate in the development of sound engineering licensure and registration procedures on a continuing basis;
- We strive to promote the adoption of uniform engineering licensure and registration requirements among all states and territories;
- We participate in developing content and specifications for national examinations that are used to evaluate engineering competence; and
- We strongly encourage individuals to pursue engineering licensure and registration, not only as a means of meeting the legal requirements for protecting the health, welfare, and safety of the public, but also to ensure that they can be prepared to meet the needs of international, national, and state engineering practices.

IEEE USA HOT LINES

IEEE-USA Office, 1828 L Street, N.W., Suite 1202, Washington, DC 20036-5104, USA (202) 785-0017
IEEE-USA telephone hotline recording: (202) 785-2180
James A. Watson, Editor—Georgia C. Stelluto, Associate Editor

Health Care Reform On National Agenda

President Clinton presented draft legislation to be known as the *Health Security Act of 1993*, along with his Report to the American People on Health Security, on October 27. The proposal seeks various reforms of the national health care system. IEEE-USA is examining the President's proposals and considering developing a position on the role that technology can play in improving delivery and containing the costs of health care.

As a service to members, IEEE-USA is providing copies of the President's report and plan summary on a DOS-formatted computer disk in ASCII. The report and summary outline the proposed reforms contained in the new legislation. To obtain a copy, send your request, along with a check payable to IEEE-USA for $7.50, to Health Care Reform at the IEEE-USA Office in Washington, D.C. Please specify whether you prefer a 3½" or 5¼" computer disk. Disks will be sent by first class mail. Allow up to two weeks for processing and delivery.

IEEE Offers New Financial Package

IEEE is now offering a new financial package for members and their immediate families. Providing such products as mutual funds, loans, annuities, and a new IEEE-endorsed credit card with special options and features, IEEE's Financial Advantage Program was developed in consultation with Vista Capital Management Group of the Chase Manhattan Bank, N.A., and Seabury & Smith.

According to IEEE President Martha Sloan, "The Board of Directors strongly believes we must develop new ways to serve members that go beyond traditional products and services." For more information about mutual funds and loan services, call toll-free (800) GET-IEEE or (800) 437-4333. The line is open 24 hours daily, seven days a week. Annuity information is available by calling (800) 829-8763.

USAB Calls For Award Nominations

The Awards and Recognition Committee of IEEE's United States Activities Board is seeking nominations for a new Electrotechnology Transfer Award. Introduced this year by IEEE-USA's Defense Research and Development Policy Committee, the award honors individuals contributing to the successful transfer of Federal or state advanced electrical, electronic, or computer technologies to the commercial sector. Both government and civilian employees are eligible for this award. Selection will be based on the nominee's direct involvement in the application or transfer aspects of the technology in its original form or in a broader application than originally envisioned in the research.

Since 1992, USAB has also honored individuals with the Harry Diamond Memorial Award for distinguished technical contributions in the field of electrotechnology while in U.S. Government service. Recipients of both awards receive an engraved plaque presented by IEEE's Vice President for Professional Activities.

Nominations for the Electrotechnology Transfer Award and the Harry Diamond Memorial Award, as well as other USAB awards, should be submitted by March 30, 1994. Contact the IEEE-USA Office in Washington, D.C., for information and nomination forms.

IEEE Members Respond to NAFTA

More than 100 engineers responded to a recent IEEE-USA survey published in *Electronic Engineering Times* on the North American Free Trade Agreement (NAFTA). The poll was commissioned after inquiries from Members of Congress, the Clinton Administration, news media, and other organizations concerning IEEE-USA's views on NAFTA.

Forty-two percent of IEEE members responding favored support of NAFTA; however, 58 percent of nonmembers opposed the agreement. Respondents exhibited strong regional differences, with those in the Northeast and South evenly divided on NAFTA support. Midwestern and Western respondents opposed the Agreement by a two-to-one margin.

Opinions converged on the perceived economic effects of the agreement. Eighty percent of those surveyed maintain that NAFTA would increase the transfer of investment capital from the United States to Mexico or Canada, and more than 70 percent are concerned that NAFTA will increase the cross-border transfer of U.S. manufacturing jobs.

Data Base of Technology Assistive Devices Available

The National Rehabilitation Center (NARIC) is now offering ABLEDATA, an extensive data base listing information on more than 18,000 technology assistive devices for individuals with disabilities. Operable on computer modem setting 2400 baud, 8-N-1, ABLEDATA provides information on commercial and noncommercial devices for professional or individual use.

Users can access the listing through the electronic bulletin board ABLE INFORM, which lists assistive technology, disability, and rehabilitation information maintained by NARIC and ABLEDATA. ABLE INFORM also includes REHABDATA, a bibliography of the NARIC Library, as well as the NARIC KnowledgeBase, listing more than 3,000 sources of local and national information.

For more information about these bulletin boards, write to ABLEDATA, 8455 Colesville Road, Suite 935, Silver Spring, MD 20910-3319, or call (800) 346-2742. To access the bulletin board directly with a modem, call (301) 589-3563, Monday through Friday, between 8:00 a.m. and 6:00 p.m. Eastern Standard Time.

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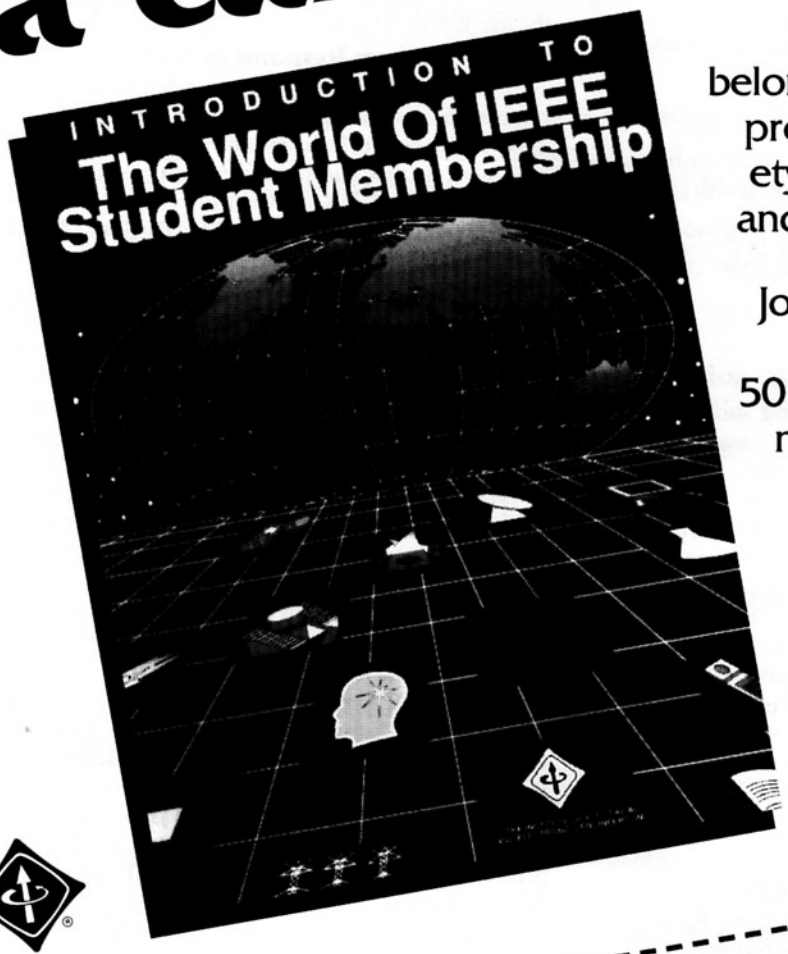

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