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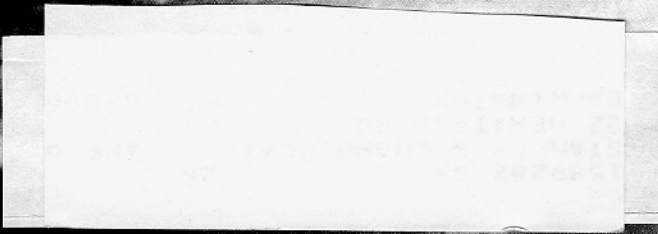
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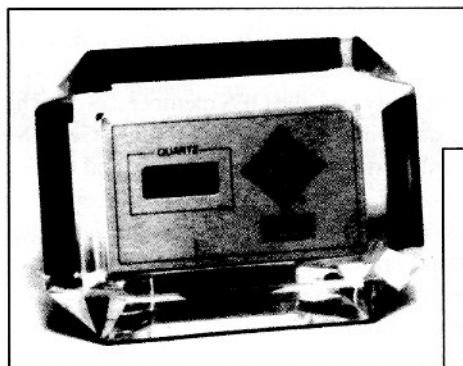
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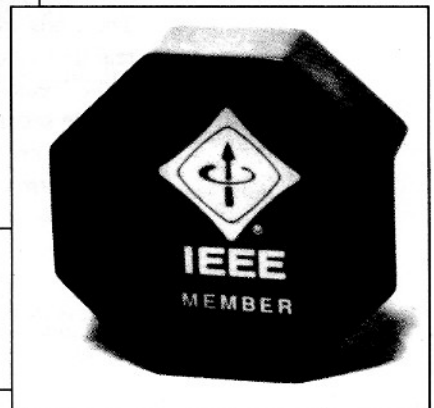
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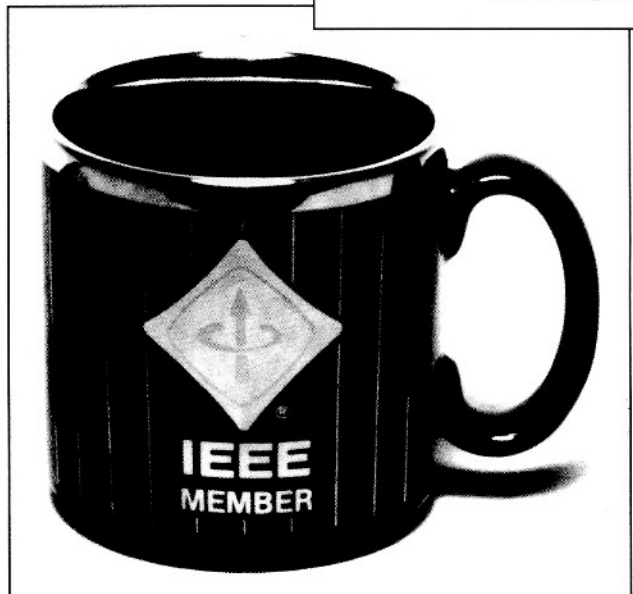


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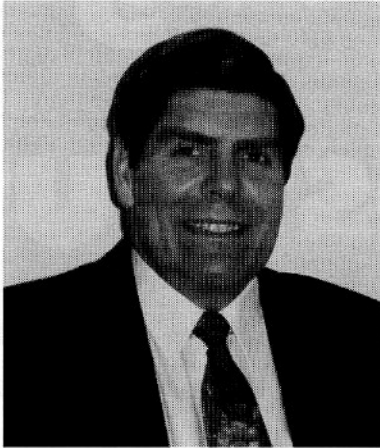
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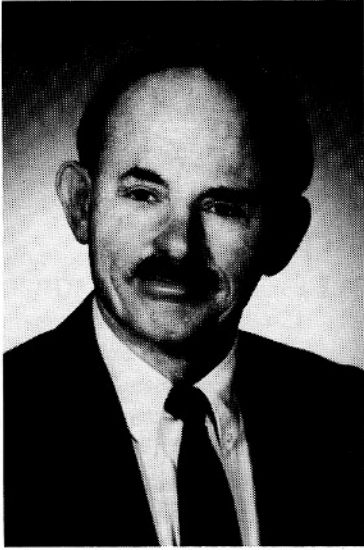
President's Message

In the winter issue of the newsletter, I identified some of the areas I will be working on to satisfy the needs of the Society's membership. The AdCom will meet in Houston on 1 May 1994 to define specific actions to address those needs. In future President's messages I will report on these actions and our approach to solving some of the more pressing issues facing OES. At the AdCom meeting we will also be initiating the development of a strategic plan. The plan, when completed will provide a basis for future policy and resource decisions. We will summarize that plan in a future newsletter.

While the AdCom and your officers are busy working, there are two critical items to be done that only you, the OES member can do. The first critical item is membership growth. By now you have seen the Member-Get-a-Member ads in IEEE publications. These ads will certainly help the Institute and the Society grow. But, let's face it, the real motivator for growth is you, the OES member. Your enthusiasm for the Society is the greatest selling point. Let your enthusiasm work to grow our numbers.

The second critical item is participation. Most importantly, we, the AdCom and officers, need to hear from you. Any comments, especially critical ones, are welcome in the form of a phone call, e-mail message, letter, or a conversation at an Oceans or AUV meeting. What do you want the Society to do for you? What are we doing right or wrong? Who do you want to run for AdCom? Who should the Society nominate for IEEE fellow? Where should oceanic engineering technology be going? Our success as your officers will be better if we have something to aim for.

Joe Czika



Editor's Comments

Last spring I featured an article by Stan Chamberlain covering the scope and function of the OES Technology Committees, as suggested by our past president, Glen Williams. In subsequent issues I plan on running a regular column on OES Technology Committee activities with inputs from the chairmen starting with the summer issue.

We hope to carry forward the initiatives of our past president, and expand the scope of OES activity reporting under the leadership of our new president, Joe Czika. The newsletter will have a new format which will include rotating editorials from the new vice-presidents (Jim Collins, Norman Miller, and Ferial El-Hawary), special feature articles beginning with this issue's article, *Fort Trumbull and the Submarine* by John Merrill as submitted by Roger Dwyer, a regular column on Chapter and Technology Committee activities, membership development, conference reporting, and book reviews. Inputs are encouraged from you, the membership, on items of interest and importance to the society. We will do our best to keep you informed, and welcome feedback from you using the newsletter as a channel of two way communication.

The following candidates have been elected to serve on the IEEE OES AdCom for the term ending December 31, 1995:

Lloyd R. Breslau
Melbourne G. Briscoe
Edward W. Early
Norman D. Miller
Joseph R. Vadus
Glen N. Williams

Dr. Breslau has formerly served as an elected member of the IEEE Council on Oceanic Engineering, which was the predecessor organization to the IEEE OES. Dr. Briscoe has been the editor of the *Journal of Physical Oceanography*.

It has been a pleasure working with our former president, Glen Williams these past four years. I am looking forward to working with our new president, Joe Czika, and supporting him as OES newsletter editor.

Fred Maltz

Fort Trumbull and the Submarine

The Submarine Brings New Purpose to a Mid-19th Century Fort

by John Merrill*

Fort Trumbull and the Submarine is a brief history of some events occurring at the New London fort in Connecticut from colonial times to the end of the nineteen sixties. The Fort is located on a promontory overlooking the New London harbor and the Thames River's exit to Long Island Sound and out to the Atlantic about a mile and a half to the south of the Fort. From 1775 onward until the early part of this century, it was an Army fort. The Revenue Cutter Service (U.S. Coast Guard in 1915) moved to Fort Trumbull in 1910. World War I brought Navy antisubmarine research and development effort to the acreage surrounding the Fort. The Navy withdrew in late 1918 with the end of the war. The Navy returned in mid-1941 with a steadily growing submarine-related research and development program in the following decades directed at both prosubmarine and antisubmarine challenges.

In April 1941, as a result of efforts by the Navy and the National Defense Research Committee headed by Vannevar Bush (formerly of MIT), three laboratories sponsored by universities (Columbia, Harvard and California) were started. Harvard's Underwater Sound Laboratory was in Cambridge, Massachusetts. California's in San Diego, California. The goal of each was to respond to research and development challenges presented by submarines and antisubmarine warfare.

The book is primarily about work at Fort Trumbull during the World War II years and beyond. Because of the common goals of the three university laboratories, appendices on the Harvard and University of California underwater sound research during World War II are included in the book. The appendices from the book on the University of California and Harvard laboratories are presented here.

*Merrill is presently an emeritus electronic engineer at the Naval Undersea Warfare Center, New London Laboratory. He was first at the New London Laboratory during August 1942. Since 1950 he has had an almost continuous affiliation with the Laboratory. Publication of *Fort Trumbull and the Submarine* is anticipated in October 1994.

University of California Division of War Research at San Diego

Responding to the submarine problem, the OSRD*/NDRC contracted with the University of California on 21 April 1941 to organize a laboratory responsible for "a broad research program covering the fundamentals of every aspect of the problem."¹ With many other additional assignments, the University of California division of War Research (UCDWR) continued until 30 June 1946. The Laboratory location at the U. S. Navy Radio and Sound Laboratory (NRSL), Point Loma, San Diego, California, was chosen because of its proximity to deep water and because of the number of days per year that would be favorable to research at sea. The oceanography of the California coast had already been studied extensively by the nearby Scripps Institute of Oceanography in La Jolla just to the north of San Diego. The Navy had also established a sound school in San Diego in 1939 for the training of sound detection equipment operators (later sonar operators). The school eventually was equipped to handle as many as 1,200 students. During the war years, the combined laboratories were informally known by the Navy and others as the San Diego Laboratory.

At its wartime peak, NRSL had a staff of about 150 civilians; UCDWR'S staff was approximately 575. The NRSL staff was expanded by radar and radio experts from the Naval Research Laboratory (NRL) in Anacostia, Maryland. The staff at NRSL was further supplemented by Navy officers and petty officers called back from retirement.

Like the staff of both Columbia and Harvard sound laboratories, that at UCDWR had wide scientific, technical and industrial backgrounds. In San Di-

ego, proximity to the Scripps Institute provided an excellent source of consultants and personnel. As in the case of New London's staffing, several research personnel from the electrical recording and projecting of sound were recruited from the movie industry in Hollywood, California.

In addition to personnel coming from Scripps, the University of California at Los Angeles and Berkeley, California Institute of Technology, Brigham Young University, and other academic institutions were represented on the staff at the Point Loma Laboratory.

The first director of UCDWR was Dr. Vern Knudsen from the University of California at Los Angeles. Dr. H. U. Sverdrup, Director of Scripps, in 1941 organized the Oceanographic Section at Point Loma. The new laboratory was divided into three major parts: sonar training, sonar devices, and sonar data, each division addressing a particular aspect of the sound and the submarine problem.

In late 1941, under OSRD contract, the Navy started construction of various structures designed to be temporary. Construction continued during the next several years in which facilities for laboratories, machine shops, library, drafting, and publications were brought to fruition.

Specialized facilities, for UCDWR-designed transducers and acoustic homing torpedoes, used a barge anchored in San Diego Bay. Later in 1943, the Navy began using Sweetwater Lake, 17 miles southeast of Point Loma.

At the San Diego Laboratory, important areas of effort included sonar research, basic research in oceanography, and field engineering support to U.S. submarines.

The Sonar Data Division accumulated scientific data on underwater

sound for nearly five years. The information collected provided data on background noise in the sea, the propagation of underwater sound, and its attenuation. This led to effective use of existing underwater sound equipment and an ability to predict how the equipment would perform in varying situations. In addition, the new knowledge about underwater sound was made available to both sonar schools and the Fleet, to teach personnel how to use sonar more effectively to detect and attack submarines. Further, the same knowledge was also used to teach U.S. submarines how to evade enemy sonar.

The development of scanning sonar (continuous display of all underwater objects within acoustical detection range) was pursued at San Diego as well as at the Harvard Underwater Sound Laboratory. A scanning sonar developed at the Laboratory was tested early in 1944 in the Mediterranean and was successful in detecting the presence of mines. This was the first sonar to provide a plot display of multiple targets and to offer a capability as a moored-mine detector. By the summer of 1945, forty-eight sonars of this type were with the submarine fleet. In the final months of the war, U.S. submarines equipped with this sonar effectively severed communications between the five main islands of Japan.

Similarly to the case at the New London Laboratory, the efforts at San Diego included both antisubmarine and pro-submarine programs, the latter beginning in early 1943. The pro-submarine program involved over half of the Laboratory's staff. Field engineering was emphasized, with UCDWR representatives in the Pacific area being attached to the Submarine Command almost continuously.

In 1945, NRSL at San Diego was

*Office of Scientific Research and Development

renamed the U.S. Naval Electronics Laboratory (NEL) on 29 November. The following year, on 30 June 1946 UCDWR's remaining projects and contracts were absorbed and continued by NEL. Many UCDWR employees transferred to NEL. A certain portion of work also came to NEL from incomplete work being done at

the Massachusetts Institute of Technology and, as previously mentioned, some of the residual efforts from the Harvard Laboratory.

Placed under the Bureau of Ships, NEL was tasked "to effectuate the solution of any problem in the field of electronics, in connection with the design, procurement, testing, installation and

maintenance of electronic equipment for the U.S. Navy."²

1. National Research Council, *Principles of Underwater Sound*, Washington D.C., 1968, preface.

2. Naval Ocean Systems Center, *Fifty Years of Research and Development on Point Loma 1940-1990*. San Diego, CA, 1990, p. 24

Harvard Underwater Sound Laboratory

The Harvard Underwater Sound Laboratory (HUSL) operated under the auspices of NDRC from 5 June 1941 to 31 January 1946. Frederick V. Hunt, a professor of physics and communications engineering at Harvard, served as the laboratory's director during the entire period. Hunt started with a small staff; by the end of July 1942, the total number of employees was about 125. A peak of about 462 was reached in August 1944. The number of college-trained research associates exceeded 50 by 1 August 1942 and peaked at 125 by 1 March 1944. More than half of the research associates held advanced degrees in physics and electrical engineering. There were 39 research associates from Massachusetts with 116 coming from all other states. The facilities grew to accommodate the needs. In addition to locations away from Massachusetts such as the testing field station in Fort Lauderdale, Florida, where opportunities for sea tests on more days per year were possible, there were others in the Boston area. A barge calibration station was established in the Charles River Basin. In nearby Arlington, Massachusetts, a calibration station was established on Spy Pond.

The Laboratory made use of a fleet of seven test craft, including yachts, motor sailers, a launch, and two barges. Other ship facilities provided by the Navy included submarine chasers, destroyer escorts, destroyers, and various naval aircraft.

As cited in the Harvard Laboratory final report¹, the first phase of the work was to pursue developments which would increase the effectiveness of existing submarine detection equipment already installed in the ships of the fleet. Further, the program was to include investigation and experimentation with new forms of submarine detection equipment which would offer the possibility of improved submarine detection and location. The program was broadened in the fall of 1941 by the start of work which might lead to the antisubmarine torpedo or mine which would steer itself automatically toward the sound produced by a target submarine.

It is interesting to note that Hunt is attributed with originating the term "sonar" in February 1942 during the time he was visiting at the University of California sound laboratory in San Diego, California. Eventually the term was defined as "Sound Navigation and Ranging" to make it the acoustic equivalent of radar. Shortly after the term had been coined, Hunt and Lt. Commander C. L. Engleman of the Bureau of Ships proposed that the term designate ratings trained as sound operators as "sonar men". The word "sonar" was approved for general use and given its modern meaning in the U.S. Fleet A/S Bulletin for November 1943. The term refers to both passive sonar (meaning listening) and to active sonar (meaning echo-ranging techniques). A 1970 discussion of acoustics during the 1941-1945 period

by Hunt at a national convocation of acousticians identified many of the areas of research and development which were in the purview of the Harvard Laboratory². The areas included the design of directional listening arrays, establishing and demonstrating the advantages of scanning sonar, and the development of the acoustic torpedo, the first homing missile of any type to become operational. In the aggregate, during the four and one-half years it operated, the Laboratory investigated and reported on about sixty studies and projects.

The significant increase in enemy submarine activity on the United States East coast during the first six months of 1942 provided additional impetus to the development of improvements immediately applicable to sonar equipment already installed on convoy escort vessels. The Laboratory also assisted the manufacturers in the production of new devices needed for the improvements. In addition, Harvard provided support to the Navy in the installations of the new devices and in the training of Naval personnel in the implementation of the changes made in the submarine detection equipments.

An important example of the various projects assigned to the Harvard Laboratory comes from one requested by the Bureau of Ordnance in November 1941. The Laboratory was asked to consider the problem of developing an air-launched acoustic antisubmarine mine

(torpedo). As early as 1933, the Germans had shown interest in the development of the tactical innovation of an acoustic torpedo. By the spring of 1943, the Laboratory developed and tested a mine that was then operationally deployed. The concept was to have this air-launched and self-propelled weapon capable of homing on the noise produced by a submerged submarine target. In addition to the Laboratory, other Naval and industrial organizations were involved in the development. In particular, collaboration with the Bell Telephone Laboratories was significant.

The first U-boat sinking using the newly-developed mine (designated MK24) took place on 14 May 1943 in the Atlantic. Two U-boats were sunk, one by a MK24 from a Liberator (B-24) and one from a U.S. Navy Catalina (PBY).

Another example of extensive work undertaken by the Harvard Laboratory is the development of a torpedo for use by submarines against enemy warships and merchant vessels. The task, stemming from the Bureau of Ordnance, was for development of a full-size submarine-launched electric torpedo adapted for acoustic homing on the noise generated by the target vessel. The scale of this effort is seen by noting that submarine torpedo is a 21-foot cylinder weighing 1.5 tons. Some of the collaboration was with Bell Telephone Laboratories and the Westinghouse Corporation. Intense efforts included investigation and reduction of the self noise of the torpedo

and the development of unique hydrophones. By 10-11 October 1945, successful acoustic steering of a full-size high-speed torpedo was obtained in tests conducted off Nahant, Massachusetts. The hundreds of bibliographic reports and internal memoranda on the acoustic torpedo are dated from July 1943 to January 1946.

Scanning sonar was one of the Harvard Laboratory's major development projects. Studies and related projects for advancing this concept occurred as early as 1942 and continued until mid-1945. The object of this work was to provide a form of sonar equipment that would be continuously alert in all directions and furnish a continuous indication of the position of all underwater sound-reflecting objects within detection range. Systems suitable for both submarines and surface craft application were studied and developed.

The work progressed, but scanning sonar did not reach the production stage to permit installation of commercially-built equipment in the fleet during the war. One experimental scanning sonar installation was operational on the USS Semmes (AG24), part of the Surface Antisubmarine Detachment. Just prior to the end of the war in Europe, the Semmes participated with several other antisubmarine vessels in a successful attack on a German submarine off Cape Cod, Massachusetts.

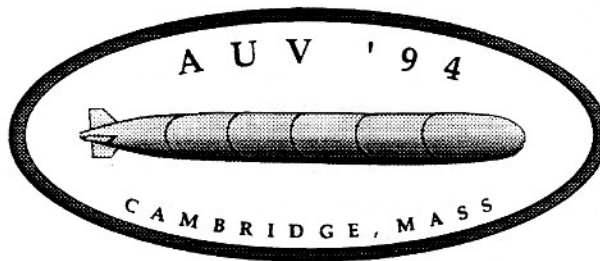
About the time of the end of World War II, the Harvard Laboratory torpedo development program was transferred to

Pennsylvania State College, State College, Pennsylvania, where the Navy at that time established an Ordnance Research Laboratory (later known as the Applied Research Laboratory). The transfer of this effort from Cambridge to Pennsylvania occurred between August and October 1945. Many of the persons who had been engaged at the Harvard Laboratory in the torpedo development program moved to the new laboratory.

During this period, the Harvard Laboratory programs on training and on certain items of test equipment were transferred to the U.S. Navy Radio and Sound Laboratory at San Diego, California. With the Laboratory's surface ship sonar development program transferred to the Navy Underwater Sound Laboratory at New London, Connecticut, and the torpedo development program at the Ordnance Research Laboratory at Pennsylvania State College, in January 1946 the final NDRC contract with Harvard University was completed.

1. Hunt, F. V. *Final Report for Contract OEMsr-58 and Contract OEMsr-287, 1941-1946, Applied Acoustic and Subsurface Warfare*. OSRD Div. 6, prepared by the Underwater Sound Library Harvard University, Cambridge, MA, January 31, 1946.

2. Hunt, F. V. "The Past Twenty Years in Underwater Acoustics; Introductory Retrospection." *Journal of the Acoustical Society of America*, Vol. 51, No. 3 (Part 2), 1972.



Symposium on Autonomous Underwater Vehicle Technology

July 19-20, 1994

The IEEE Oceanic Engineering Society is sponsoring a Symposium on Autonomous Underwater Vehicle Technology to be held in the Boston, MA. area at the Cambridge Center Marriott Hotel on July 19-20, 1994. The objective of the Symposium is to disseminate knowledge of recent technological advances in the field, to be a focus for the current state of the art including identification of technology shortfalls and to provide a forum for discussion of new relevant ideas.

TOPICS

The Symposium will focus on topics that are related to the AUTONOMOUS OPERATION OF UNDERWATER VEHICLES. These include:

- Sensors and Multi-Sensor Fusion
- Navigation
- Modeling and Simulation Methods
- Energy Systems
- Vehicle Design and Control
- Communications and Telemetry
- Imaging Techniques and Systems
- Mission Control and Software Architectures
- Autonomous Manipulation
- Multiple Cooperating Vehicles

The Symposium will include a VIDEO PROCEEDINGS Session and visits to area technical attractions including the C.S. Draper Laboratories.

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USAB Chairman Urges Congressional Action

United States Activities Board Chairman Charles K. Alexander recently wrote Congress on behalf of IEEE-USA's Technology Policy Council. The letters expressed IEEE-USA's views on environmental electronics issues and technology funding.

In a letter to the Senate Appropriations Committee and the 1994 Department of Defense (DOD) Authorization Conference Committee, Alexander urged support of a DOD Appropriations bill provision allocating \$20 million to an **Environmentally Conscious Electronic Systems Manufacturing Technology Initiative**. Recommended in a comprehensive Government-industry study of environmental issues confronting the electronics industry, the initiative should enhance U.S. competitiveness, improve manufacturing energy efficiency, and significantly reduce environmental pollution.

Alexander also wrote to the House Appropriations Committee commending provisions in H.R. 2519 for funding of advanced technology, manufacturing extension, and standard programs at the National Institute of Standards and Technology. He asked for support of H.R. 2519's technology funding levels and urged quick passage.

Intellectual Property Committee Supports Tech Transfer Bill

Senator John D. Rockefeller (D-West Virginia) recently introduced S. 1537, a bill to stimulate the commercialization of Government-supported research and development. This legislation directs Federal laboratories to assign intellectual property rights resulting from joint research ventures to their private sector partners. David M. Ostfeld, 1993 Vice Chairman of IEEE-USA's Intellectual Property Committee (IPC) testified before the Senate Commerce Committee in support of S. 1537, in late October 1993.

By providing for assignment of intellectual property rights to Government contractors, Ostfeld noted that S. 1537 will promote participation in Cooperative Research and Development Agreements. He commended the bill's provision to protect domestic production by reserving "march in" rights for Government labs, should the assignee not commercialize the technology or complete production in the United States.

In addition, Ostfeld offered suggestions to enhance the bill's goals and objectives. He recommended that laboratory directors have implicit authority to negotiate the laboratory's "reasonable compensation" paid by the private partner in exchange for intellectual property rights. He also urged that the laboratories continue basic research.

Competitiveness Committee Proposes Legislation

IEEE United States Activities' (IEEE-USA) Committee on U.S. Competitiveness recently submitted a statement to the House

Subcommittee on the *Economic Growth and Credit Formation on the Business, Commercial, and Community Development Secondary Market Development Act*, H.R. 2600. The Committee emphasized the link between increasing U.S. competitiveness in global markets and boosting private sector investments in U.S. manufacturing facilities.

According to the Committee, a lack of investment in manufacturing facilities--due to low rates of return on these long-term investments--contributes to decreasing industrial competitiveness, job loss, and negative trade balances. The testimony asked Congress to consider IEEE-USA drafted legislation that would create a National Manufacturing Technology Finance Corporation.

The Corporation would guarantee, grant, and purchase loans specifically for manufacturing capital investments. These loans would be financed by issued securities, not Government funds, to minimize the impact on the Federal budget.

IEEE-USA Expands Electronic Mail Services

IEEE-USA is continuing to expand its distribution of information by electronic mail. Three new electronic "autoresponse" files have been established with Internet and Comppmail addresses to provide information on subjects of interest to IEEE's U.S. members. Several files already exist with such subjects as pensions, employment assistance, and lobbying. The new autoresponse files provide information on IEEE-USA Congressional Fellowships, Washington Internships For Students Of Engineering (WISE), and Student Professional Awareness Conferences (S-PACs).

In response to messages sent to these addresses, the corresponding IEEE-USA text file is sent automatically by e-mail. Information on IEEE-USA's Congressional Fellowship program, including qualifications, application procedures, and a listing of past Fellows is available at info.ieeeusa.congfel@ieee.org (Internet) or info.ieeeusa.congfel (Comppmail). For WISE program information and application procedures, the address is info.ieeeusa.wise@ieee.org (Internet) or info.ieeeusa.wise (Comppmail). To learn about S-PACs and how they're organized, contact info.spac@ieee.org (Internet).

To use electronic autoresponse files, just send an e-mail message to the address indicated. No subject line or text message is necessary. Your message will trigger the autoresponse mechanism, which will return an e-mail file containing the requested information to your electronic address.

These autoresponse files are just a few of the many information files being developed by IEEE as a member service. For a complete listing of current files and their addresses, send your e-mail request to info.info@ieee.org (Internet) or info.info (Comppmail).



Oceans 94 Osates
13-16 Sept. 94 Brest France

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Ocean engineering for
today's technology and
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Parc de PENFELD, BREST, FRANCE
13 -16 September 1994

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Locating OCEANS 94 in France, for its first venue outside North America, is a major move in the long and successful series of OCEANS annual conferences. Sponsored by IEEE/OES, SEE (Société des Electriciens et des Electroniciens) & CUB (Communauté Urbaine de Brest) OCEANS 94 OSATES will increase international cooperation and expand our contributions to worldwide ocean monitoring programs.

The TECHNICAL PROGRAM will include 8 parallel sessions of over 300 technical papers with additional poster sessions, along the following topics:

- | | |
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| 3 - Boundary Effects & Propagation | 17 - Neural Networks & Fuzzy Systems |
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| 13 - Autonomous Benthic Stations | 27 - Intelligent Control |
| 14 - Satellite Oceanography & Meteorology | 28 - Power Sources |

IEEE/OES is also sponsoring a special STUDENT POSTER SESSION for graduate and undergraduate students.

TUTORIAL SESSIONS, sponsored by SEE, will cover topics selected from the Technical Program. They will take place on Monday 12 September from 9 a.m. to 5 p.m. at Faculté des Lettres, Bd Clémenceau, Brest.

A large BUSINESS EXHIBITION will be held in conjunction with the Conference, and a NAVAL EXHIBITION of Ocean Research Vessels will take place in Brest Harbor. Thousands of people working in Industry, Government and Academia in areas relating to Ocean Science and Technology will be attending OCEANS 94 OSATES in order to promote their activities and, through the TECHNOMER Business Convention, establish effective business links worldwide.

BREST is France's foremost site for oceanographic R&D and marine technology, employing more than 60% of French scientists, engineers and technicians in the field.

To receive the Advance Program in May or for further information, please contact:
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James A. Watson, Editor—Georgia C. Stelluto, Associate Editor

IEEE-USA Announces New Job Referral Service

In conjunction with one of the nation's premier employment data base companies, IEEE United States Activities (IEEE-USA) is introducing a new, inexpensive job referral service for members and their families. JOB BANK USA's Career Advancement Service combines a state-of-the-art computerized data base with a large, national client base of employers.

To join, members submit a one-page enrollment form and up to two current resumes, creating a personalized electronic career record. When JOB BANK USA receives employment openings, its computer identifies qualified applicants; then the Service telephones to inform them of the available position. If applicants are interested in the opening, their resumes are forwarded directly to the employer.

The Career Advancement Service includes maintenance of the personalized career record for one year, a newsletter, a toll-free telephone number for updates and changes to the record, and unlimited referrals to JOB BANK USA clients. For more information and costs, call (800) 296-1872 and indicate IEEE affiliation.

Kinko's Discount Available

Through the efforts of IEEE-USA's Employment Assistance Committee, IEEE members are eligible for a 10% discount on most Kinko's copying services, such as resume creation and printing. To receive the discount, members must show their IEEE membership card. Telephone (800) 743-COPY for Kinko's locations.

IEEE-USA Endorses Advanced Civilian Technology Strategy

In a letter to Secretary of Commerce Ronald H. Brown, USAB Chairman Charles K. Alexander signalled IEEE-USA's support for the Department of Commerce's (DOC) draft Advanced Civilian Technology Strategy (ACTS). The Strategy outlines DOC's proposed role in supporting research and development of advanced technology in partnership with the private sector; rapid commercialization and deployment of new technologies; and building a national technological infrastructure, including the information superhighway, for the 21st century. ACTS also pursues public-private partnerships in electronics, developing a new generation of vehicles, increasing quality, developing industry roadmaps, and benchmarking U.S. technology and work force skills against foreign competitors.

Although cautioning that industry must play the lead role and noting that other Federal departments and agencies can and must make important contributions, Alexander endorsed these efforts and urged a further strengthening of DOC's technology organization and programs. In addition, he urged the Department to examine means of encouraging more effective

industry-university collaboration, facilitating government access to private-sector advice, and improving professional education for technology commercialization.

IEEE-USA's support for a strong Commerce mission reflects that DOC is the only Federal agency with a directive to promote U.S. industrial competitiveness in world markets.

USAB Approves Position Statements

IEEE's United States Activities Board (USAB) recently approved these position statements. Copies are available from the IEEE-USA Office in Washington, D.C. To receive position statements by electronic mail, the address is info.ieeeusa.pos@ieee.org (Internet) or info.ieeeusa.pos (Comppmail).

- **What the United States Must Do To Realize the Economic Promise of Space**--IEEE-USA believes that Federal space research and development activities must focus on enhancing domestic economic well-being, in order to achieve continued public support of the Federal space program. Further, IEEE-USA's Aerospace Research and Development (R&D) Policy Committee believes that space will evolve into an area of large economic value for the United States. IEEE-USA recommends that the Federal Government begin improving the basic space infrastructure to reduce costs, develop safer, more reliable space vehicles, and establish Phase II of the Freedom Space Station.
- **Computer Industry Patents**--To prevent improperly granted computer technology patents that hinder the advancement of technology, IEEE-USA's Intellectual Property Committee offers the U.S. Patent and Trademark Office measures to safeguard against this problem. The Committee advises that the U.S. Patent and Trademark Office improve its collection of prior art used by Patent Examiners for computer-related inventions, as well as raise the level of accessibility and search methodology in computer-related examining.
- **Reverse Engineering**--IEEE-USA acknowledges that lawful reverse engineering of computer programs is fundamental to the development of programs and software-related technology. Further, IEEE-USA believes that an engineer having the right to use a copy of a computer program should be entitled, without the author's authorization, to observe, study, and test the program, in order to determine its underlying ideas.
- **Tripartite Use of Government Laboratories**--IEEE-USA's Defense R&D Policy Committee encourages Congress and the Administration to expand multiple use by government at all levels, industry, and academia, in order to improve the quantity and quality of research and development. IEEE-USA offers specific recommendations to facilitate cooperative R&D in joint facilities and provides guidelines for budgeting, laboratory evaluation, and payment procedures.

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IEEE-USA Supports Competitiveness Legislation

IEEE United States Activities (IEEE-USA) recently joined two broad-based coalitions to support legislation aimed at boosting U.S. competitiveness. In a letter to Representative Lee H. Hamilton (D-Indiana), chairman of the House Foreign Affairs Committee, IEEE-USA joined the Digital Privacy and Security Working Group (DPSWG) in endorsing H.R. 3627.

Introduced by Representative Maria Cantwell (D-Washington) in the Economic Policy, Trade, and Environment Subcommittee, H.R. 3627 would amend the **Export Administration Act of 1979** by easing barriers for U.S. computer companies seeking to export hardware and software incorporating security features. The main impact of export controls on cryptography is limiting U.S. citizens' and corporations' access to high-quality privacy protection.

DPSWG's letter explains that encryption technology is necessary to protect the privacy of U.S. citizens and businesses communicating on the National Information Infrastructure. U.S. businesses also lose sales due to the current policy, since today's customers demand encryption technology to protect information security and privacy.

IEEE-USA also joined the Advanced Technology Coalition in a letter to the Senate supporting the **National Competitiveness Act**, S.4. IEEE-USA believes that S.4 will contribute to economic growth, promote American competitiveness, and enhance the private sector's ability to create jobs.

IEEE-USA Opposes GATT R&D Provisions

In a letter to Michael Kantor of the Office of the United States Trade Representative, United States Activities Board Chairman Charles K. Alexander expressed IEEE-USA's concerns about provisions on research and development in the draft Dunkel amendments to the General Agreement on Tariffs and Trade (GATT). Alexander urged removal of those draft R&D provisions from the final GATT agreement, calling them inconsistent with national technology policy and contradictory to national competitiveness challenges and defense conversion efforts.

These provisions, which would characterize certain levels of Federal funding support as subsidies subject to duties under GATT, would place U.S. companies utilizing such technologies at a competitive disadvantage, according to Alexander. He also warned that pre-notification requirements could discourage industries from pursuing technology transfer opportunities. Modifications to the proposed rules made during the final rounds of negotiation addressed many of IEEE-USA's concerns.

1994 Government Fellows Begin Assignments

IEEE-USA 1994 Government Fellows Paul B. Crilly, Albert D. Rosenheck, and Henry Simon have begun their

terms. IEEE-USA's Government Fellowships are designed to contribute engineering expertise to the formulation of science and technology policy. Participants can later share their policymaking experiences with colleagues in the private sector.

Rosenheck and Crilly are participating in IEEE-USA's Congressional Fellowship Program, a one-year term on a Congressional staff or committee. Simon is an IEEE-USA Executive Fellow with the U.S. Department of Commerce's (DOC) Technology Administration.

Crilly will be working as an adviser on science and technology to Representative Dana Rohrabacher (R-California), a member of the House Committee on Science, Space, and Technology. Rosenheck's Fellowship is with Representative Martin O. Sabo (D-Minneapolis), chairman of the House Budget Committee and member of the Defense Appropriations Subcommittee.

Simon will work with Dr. Mary L. Good, DOC's under secretary for technology. He will be analyzing civilian industrial technology in electronics. For more information on IEEE-USA's Government Fellows programs, contact the IEEE-USA Office in Washington, D.C.

USAB Approves AICNCC

A new USAB Committee will help private practitioners establish a forum for their issues and accomplish their career objectives. USAB recently approved the establishment of the Alliance of IEEE Consultants' Networks (AICN), and the AICN Coordinating Committee (AICNCC), to guide the development of the growing numbers of local consultants' networks.

AICNCC will coordinate independent consultants' networks and provide educational materials to individual members. By establishing a client referral network, the Committee also hopes to encourage industry to employ engineering consultants. In addition, AICNCC will assist IEEE in developing insurance and other programs unique to the self-employed as well as disseminate legal information and general contract guidelines.

AICNCC will provide guidance for IEEE members choosing consulting work as a career now or in the future. This important service should attract new and former members to IEEE and enhance IEEE's relationship with industry. For more information, contact the IEEE-USA Office in Washington, D.C.

Further information about IEEE-USA, engineering career and technology policy issues, and copies of testimony, IEEE-USA Position Statements, and complimentary publications are available from the IEEE-USA Office. Write or phone IEEE-USA, 1828 L Street, N.W., Suite 1202, Washington, DC 20036-5104; (202) 785-0017 (office); (202) 785-0835 (fax); ieeeusa@ieee.org (electronic mail via Internet).

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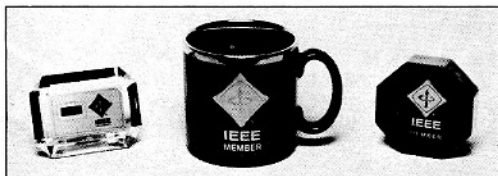
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