MARINE PHYSICAL LABORATORY
STAFF AND PROJECT PROFILE

September 28, 1981

Sponsored by the Marine Physical Laboratory

MPL-U-63/81

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ACADEMIC STAFF

ANDERSON, Victor C.

A. B., University of Redlands 1946; Ph.D. (Physics) UCLA 1953. Joined MPL in 1953 and has held the positions of Research Assistant, Research Associate, Associate Marine Physicist, Junior Research Physicist, Associate Research Physicist, Professor of Applied Physics and Information Science, Research Physicist, Associate Director of MPL, and Deputy Director of MPL. Major fields of interest: Ocean Technology, Acoustic Signal Processing.

FISHER, Frederick H.

B. S., University of Washington 1949; Ph.D., University of Washington 1957. University Fellowship 1949-1954. Joined MPL in 1955 and has held the positions of Graduate Research Physicist, Assistant Research Physicist, Associate Research Physicist, Lecturer, Research Oceanographer, and Associate Director of MPL. Major fields of interest: Underwater Sound Propagation, High Pressure Physical Chemistry.

HODGKISS, William S.

B. S. E. E., Bucknell University 1972; and M. S. and Ph.D., Duke University 1973 and 1975, respectively. Joined MPL in 1978 and has held the position of Assistant Professor. Major fields of interest: Adaptive Signal Processing, and Adaptive Array Processing.

LONSDALE, Peter F.

B. A., Trinity College 1969; Ph.D. UCSD/SIO 1974, M. A. Trinity College 1976. Joined MPL in 1972 and has held the positions of Research Assistant, Postgraduate Research Geologist, Assistant Research Geologist, and Associate Research Geologist. Major fields of interest: Marine Geophysics and Geology.

LOWENSTEIN, Carl D.

B. A., Kent State University 1953; M. S. 1956; Ph.D. Harvard University 1963. Joined MPL in 1964 and has held the positions of Assistant Research Physicist, Associate Research Physicist, and Associate Specialist in Marine Physicist. Major fields of interest: Sonar, Signal Processing, and Applications of Small Computers.

PINKEL, Robert

B. A., University of Michigan 1968; M. S. UCSD 1969; Ph.D., UCSD/SIO 1974. Joined MPL in 1969 and has held the positions of Research Assistant, Postgraduate Research Oceanographer, and Assistant Research Oceanographer. Major fields of interest: Air/Sea Interaction Processes and Internal Waves.

SHOR, GEORGE G.

B. S., California Institute of Technology 1944; M. S., Cal Tech 1948; Ph.D. (Seismology) Cal Tech 1954. Joined MPL/SIO in 1953 and has held the positions of Assistant Research Physicist, Assistant Research Geophysicist, Associate Research Geophysicist, Geophysicist, Manager of University of California's Sea Grant Program, Professor of Geophysics, Associate Director of SIO, Associate Director of IMR, and Associate Director of MPL. Major fields of interest: Geophysical Exploration of the Sea Floor and Structural Geology.

SPIESS, F. N.

A. B., University of California, Berkeley 1941; M. S. Harvard 1946; Ph.D. (Physics) UCB 1951. Joined MPL in 1952 and has held the positions of Associate Research Geophysicist, Director of MPL, Acting Director of SIO, Professor of Oceanographer, Associate Director of SIO, Chairman of Graduate Office, and present Director of IMR. Major fields of interest: Acoustics and Marine Geophysics.

TYCE, Robert C.

B. A., University of California, San Diego 1969; Ph.D. UCSD 1977. Joined MPL in 1978 and has held the positions of Postgraduate Research Physicist, Assistant Research Engineer, and Lecturer. Major fields of interest: Low Frequency Acoustic Noise and Sound Propagation, Investigation of Acoustic Properties of the Seafloor (Reflectivity, Attenuation, and Backscatter), and Ocean Engineering.

WATSON, Kenneth M.

B. S., Iowa State University 1943; Ph.D. University of Iowa 1948. Joined MPL in 1981 and has held the positions of Research Associate (Univ. Calif), Assistant Professor (Univ. of Indiana), Associate Professor and Professor (Univ. of Wisconsin), Professor (Univ. Calif., Berkeley), and now present Director of MPL. Major fields of interest: Scattering Theory, Statistical Mechanics, and Atomic and Molecular Physics.

WILLIAMS, Robert B.

B. S., San Diego State University 1964; M. S., Scripps Institution of Oceanography 1968; Ph.D. University of California, San Diego 1973. First association with MPL was in 1960 and has held the positions of Lab Assistant, Lab Technician, Associate Development Engineer, Senior Development Engineer, Principal Development Engineer, and Lecturer. Major fields of interest: Underwater acoustics and computer science.

CURRENT MAJOR PROJECTS AT THE MARINE PHYSICAL LABORATORY

Introduction

The Marine Physical Laboratory is one of the oldest divisions of Scripps. For over thirty years it has supported the work of a group of physicists challenged by a desire to understand the oceans and the earth's crust beneath them and interested in the ways in which man can best work on and within the sea. Staff members carry out their research with the intent that the results will be relevant in many applied contexts as well as to marine research in other disciplines. Primary support has come from the Office of Naval Research with supplemental funding from other Navy sources, Defense Advanced Research Projects Agency, the National Science Foundation, and the State of California.

The program of the laboratory is generated within the staff, giving due consideration to the relevance of the work to basic marine science and to the national interest. In particular this includes concern for the deep ocean problems of the Navy and the basic understanding of the environment needed for it to operate intelligently. The resulting program falls into four broad interrelated categories - underwater acoustics, marine geophysics, signal processing, and ocean technology. All aspects of the work are covered in the SIO Annual Reports.

In the first category there are active programs studying the ways in which sound travels through the ocean, the nature of the background noise generated in it, the characteristics of sound scattered by biological materials, and the physical-chemical properties of the water itself.

The second area includes studies of the seafloor using acoustic and magnetic techniques. Some of this is directed toward understanding large-scale, deep-seated aspects of the earth's crust while the remainder is concerned with very fine-scale, detailed observations close to the ocean bottom. Both approaches have yielded far reaching discoveries about the structure of the earth and the geological history of the ocean basin, as well as advancing our capabilities for seafloor search.

Work in the area of signal processing provides basic understanding of ways in which acoustic energy can be used to examine the interior of the ocean and the seafloor. This activity has been heavily oriented toward experimental sonar equipment which can find the extent to which theoretical concepts are valid when applied in the real oceanic world.

In the field of ocean technology our activities encompass the construction and operation of unique tools to facilitate conduct of our other research activities. Our manned spar buoy laboratory, FLIP, the remote, bottom-crawling manipulator (RUM) and its surface support platform ORB, the submersible Advanced Detection Array (ADA), the Doppler sonar system, and our deeply towed instrument system all have opened new areas of research activity in the sea.

Research results and applications are published in a wide variety of reports and journals. Most are available for general distribution with the exception of a few of those which have particular Navy relevance. Much of the work is carried on at Point Loma where there are adequate space, shop support,

and access to ships -- all required to develop and build the kind of hardware needed for seagoing research. As has been our policy throughout the existence of the Laboratory, we also carry out at the Point Loma facility any classified aspects of research. These aspects fall into two categories -- production of occasional reports, and contact with the extensive classified literature and workers in this field. This contact makes it possible for staff members to choose their research activities with awareness of the Navy impact which they may have, and helps them to produce informed, concerned and independent comments on Navy programs.

Most data reduction and expedition planning are done on the La Jolla campus and it is here (as well as at sea) that students are primarily involved. This involvement has brought over 50 students (undergraduate and graduates) into contact with marine research in the past three years and has included production of 6 Ph.D. theses in that same period. Of the total staff of 80 people about one-quarter, including all of the senior staff, have offices on the La Jolla campus.

Projects

I. Underwater Acoustics

Long Wave Length Temperature Structure (F. H. Fisher/R. B. Williams)
Residual Noise Field (R. C. Tyce)
Fluctuations (F. H. Fisher/R. B. Williams)
Coherence of Shallow Water Background Noise (V. C. Anderson)
Coherent Recombination of Sediment Borne
and Water Path Acoustic Signals (R. C. Tyce/W. S. Hodgkiss)
Studies of Deep-Sea Epibenthic Megafauna (F. N. Spiess)
Seafloor Acoustic Backscattering (F. N. Spiess)
Anomalous Absorption (V. C. Anderson)
Freely Drifting Infrasonic Measurement System (W. S. Hodgkiss/V. C. Anderson)
Shallow Water Duct Modelling (V. C. Anderson/F. H. Fisher/R. B. Williams)
Ion Association in Seawater (F. H. Fisher)

II. Marine Physics

Dynamics of Mixed Layers (R. P. Pinkel)
Studies of Bedforms and the Benthic Boundary (P. F. Lonsdale/F. N. Spiess)
Studies of High Energy Internal Waves (K. M. Watson)

III. Signal Processing

Applications of Dynamic Beamforming to
Towed Line Arrays (W. S. Hodgkiss)
Study of Reverberation Rejection Capability
of Adaptive Array Processors (W. S. Hodgkiss)

IV. Ocean Technology

Development and Evaluation of a New Isolation Module (V. C. Anderson)
Deep Tow Thruster (F. N. Spiess/V. C. Anderson)
Design of a Sea Floor Work System (V. C. Anderson)
TV/Sonar Imaging System (V. C. Anderson)

FY '81 PROGRAM SUPPORT