



March 1985

NEWSLETTER

WOODS HOLE OCEANOGRAPHIC INSTITUTION

HOI SCIENTISTS TEST SWATH VESSEL FOR OCEANOGRAPHIC RESEARCH SEAWORTHINESS

It's an ungainly-looking ship -- a cross between a catamaran and a floating dock -- but the SSP KAIMALINO (semi-submerged platform) is finally attracting the attention of shipbuilders and users. Built in 1973 as a prototype model SWATH (small waterplane area twin hull) vessel, KAIMALINO has outlived her original 200 hour intended life-span and is now one of nine operational SWATH vessels in the world (5 in Japan, 4 in the U.S.).

This type of vessel has been receiving increasing attention as a possible candidate for future replacement of aging UNOLS ships. To test her capabilities in the research role, the National Science Foundation (NSF) funded a series of science projects and the Office of Naval Research (ONR) funded shiptime to four groups of WHOI scientists (in addition to scientists from the University of Hawaii and the University of Rhode Island). The Navy owns KAIMALINO which is operated under contract by SEACO Inc.

The WHOI scientists, representing several departments, performed their experiments in two- and three-day legs February 2 - 13 out of Honolulu, Hawaii. Reports from all science groups have generally been quite enthusiastic," says George Grice, WHOI Associate Director for Scientific Operations, who along with Bob Dinsmore, consultant in marine operations and planning, and Jonathan Leiby, institution naval architect, continued on to Japan at the invitation of MITSUI Engineering and Shipbuilding Co. Ltd. to inspect their SWATH vessels. Although KAIMALINO was the first SWATH vessel ever built, the Japanese have employed the concept in more ships with both larger and smaller designs.

KAIMALINO is 88 feet long, weighs 228 tons, has a 46-foot beam, and a speed of approximately 22 knots when both engines

are employed. It is constructed with steel pontoons and struts and an aluminum upper hull. The working deck is 61.5 feet long by 45 feet wide with a 12.5 by 23 foot center well.

Rick Chandler, manager of ship scientific support, noted that the concept of the center well was an advantage in most experiments. "We were able to work all the way around the wire, grabbing it with a boat hook from any side whenever instruments had to be attached." Unfortunately, deployment of Peter Wiebe's MOCNESS system was not possible because of the SWATH's submerged cross strut (which would have interfered with the net), but Sus Honjo's large camera frame was successfully lowered through the well.

And George Grice was "most impressed by the fact that with 3200 meters of wire out and no steaming, there was virtually no wire angle." The ship, according to George, rides up into the wind; it heaves to rather than being blown sideways.

"This was just one more gateway to test the reality of a SWATH," says Bob Dinsmore, "and the enthusiasm continues." He noted that a chemistry lab had been set up on board and left unattended with no detrimental effects. "The SWATH-type

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The SSP KAIMALINO is a Navy-owned SWATH vessel (small waterplane area twin hull); its design is being considered for future oceanographic research vessels. Photo by Bob Dinsmore.

SWATH VESSEL *continued*

vessel is a very stable environment, with less roll, pitch, and heave than similar sized and even larger monohull ships," reports Bob. "Why, on the KAIMALINO they keep coffee cups on an unbolted picnic table on deck (a lipless table, no less)."

The movement of the KAIMALINO is very much like riding a train, according to Rick Chandler. "Back and forth rocking can quicken, but you just don't have any of the rolling motions. The acceleration due to pitching and heaving is quite light," he noted.

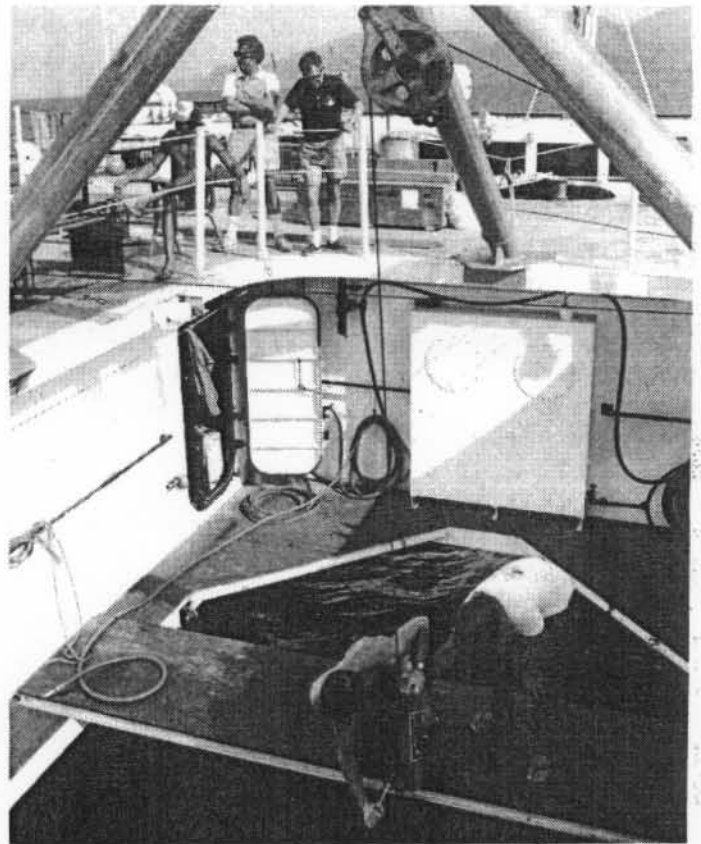
In addition, the KAIMALINO's bubble chamber on the port buoyancy tube proved a fascinating place to spend time viewing passing underwater plankton and larger marine life, including a group of porpoises. "It was a very comfortable place to sit because of the reduced pitching, heaving, and rolling," reports Peter Wiebe, who took advantage of the bench-lined viewing chamber. "It sharply contrasts to the bow chamber on the KNORR where vertical accelerations make the place very uncomfortable and render the view nearly unseeable because of the turbulence."

"There's a growing interest in the SWATH design," noted Bob Dinsmore, "and WHOI is at the forefront in developing this technology. We had more requests to go out on these test cruises than we could handle."

According to Bob, WHOI is working closely with the Navy. Initiative #12 of Navy Secretary John Lehman's 15 Point Initiative Plan is to build a SWATH vessel which would be assigned to the UNOLS fleet after Navy testing. "We want to make sure it includes all the research features we need," he added.

While the Navy is considering SWATH for high-speed future warships, a research design would probably necessitate relatively larger hulls and greater payload capabilities, giving slower speeds (about 15 knots) and lessened weight sensitivity by riding lower in the water.

This weight and balance sensitivity was a concern for some, but in Peter Wiebe's cruise "the tendency for the ship to heel over a bit with the weight (of the MOCNESS) over the side worked to our advantage. On other vessels rolling often made it difficult to prevent over-the-side instrumenta-



Rick Chandler (lower platform, left) attaches equipment to the trawl wire in the center well as Charley Hollister and John Steele (center and right, top) supervise operations from the main deck of the KAIMALINO during a February test cruise. Photo by Bob Dinsmore.

tion from swinging into the vessel. Under the conditions experienced on this cruise, we had little swinging of the gear and more clearance with the side of the craft," he reported.

Scientific groups out on the February tests are now submitting their observations of the ship's effectiveness, and the Institution will be holding informal discussions of SWATHS in the near future, according to George. The groups that performed experiments were:

Wiebe/Harbison/Madin/Lobell Feb. 2-4

The first leg was subjected to the worst weather (or best if one is looking to test the ship's seaworthiness in high winds and seas!), experiencing seas of six to eight feet on two occasions. Peter Wiebe reports that "there was never enough motion to make the gear move around on the deck or on the countertops in the laboratory. In the bunk area, there was not enough motion to make us roll in bed. The KAIMALINO thus

performed like a ship two to two-and-a-half times her size." Even in 40- to 60-knot winds the ship was incredibly stable, notes Rich Harbison, although the open deck space, which was spacious enough, was dangerous in the high winds. Wind breaks were recommended for future SWATHS.

The objectives of the cruise were met by finding a meso-scale eddy feature in the lee of Molokai, surveying it with XBTs and sampling with a MOCNESS. Larry Madin, Gregg Dietzmann, and Phil Lobell tested the vessel for its capabilities as a diving platform, and found that instead of sea state limiting the launch of the Zodiac as it does on monohulls, the major limiting factor was actual diving conditions, although there was a long climb down to the water.

Hollister Feb. 7-8

Twenty bottom camera stations, each consisting of about twenty pictures of the seafloor, were done to confirm hypotheses concerning seafloor processes caused by high surface energy produced by hurricanes in the Hawaii area, particularly Hurricane Iwa during November 1982.

Honjo Feb. 9-10

Sus Honjo tested the suitability of the SWATH ship for deployment of highly delicate state-of-the-art marine optical instrumentation. Using the center well, which is located on the most stable part of the ship, the scientific party and crew were able to successfully launch a 8'x5'x5', 300-lb. camera tripod. In addition to testing the ship, the cruise provided the first data set on the distribution of LAA (Large Amorphous Aggregates) in the Pacific Ocean environment where there are relatively low nutrient levels. Assessment of LAA abundance and distribution helps to understand recycling of oceanic particles. Recent research indicates that large aggregates sink through the deep water layer scavenging and agglutinating fine particles and probably adsorbing some dissolved matter.

Agrawal/Terray/Williams Feb. 12-13

Yogi Agrawal and Gene Terray used a forward scatter laser Doppler velocimeter to make observations of the small-scale velocity field in the surface layer. Use of the

KAIMALINO produced valuable data due to the superior stability of the SWATH ship. Sandy Williams' project was to 1) evaluate the problems of a high deck and excess heave stability when recovering free vehicles, and 2) test a prototype floating platform with an access ladder and gangway as a possible solution to the problem. As a result of the cruise Sandy recommends a floating platform with a single pivot on the deck of any upwardly-scaled SWATH-type ship (proposed designs suggest ships sizes of about 200 feet in length).

OCEANOGRAPHIC SHIP NOTES

OCEANUS returned to Woods Hole on March 3 from Voyage #163 which departed Woods Hole on February 13. University of Maryland scientists were looking at the influence of water motions on the coupling of nutrients, nitrogen uptake and production of phytoplankton, and production and nutrient regeneration by heterotrophic populations of plankton in the low salinity plume of the Chesapeake. During March OCEANUS will undertake a one-week cruise to the western North Atlantic to study time and space variability of oceanic carbon dioxide and will commence a month-long voyage into the northern Sargasso Sea for biological studies of gelatinous zooplankton.

KNORR remains in Woods Hole undergoing routine maintenance.

On February 26 ATLANTIS II and ALVIN departed Puntarenas, Costa Rica, for a month-long cruise (Leg XXII, extended Voyage #112) that will take the ship and submersible to the hydrothermal vent communities on the Galapagos Rift as part of a multi-ship expedition with R/V MELVILLE. A total of 20 dives will be made for biological sampling and observation. ANGUS camera tows will be made at night. A-II and ALVIN are due to arrive in Balboa, Panama, on March 23.

CAD FACILITY REMINDER

The computer aided design facility (CAD) is now operational in Smith 201J. In addition, the large drafting plotter has been delivered and is now on-line. For more information on use of this system call ext. 2287.

MARCH EVENTS

INTERNATIONAL CUISINE DAYS AT WHOI

Endeavor House in the village and the Buttery at Fenno House will be hosting International Cuisine Days every Thursday lunch. A successful "Chinese Day" kicked off the program on February 28. For the month of March the Thursday specials will be: French (March 7), American Junk Food (March 14), Italian (March 21), and Russian (March 28). Menus for the Thursday meals will be posted on Monday of each week.

MASS MARINE EDUCATORS COME TO WOODS HOLE

The Massachusetts Marine Educators will hold their annual meeting in Woods Hole on Saturday, March 23, at Redfield Auditorium. The meeting will include tours of WHOI and other Woods Hole institution facilities; speakers will be from the MBL/BUMP program. The event is cosponsored by the WHOI Public Information Office and the Sea Grant Program.

MONIZ PROMOTED TO PURCHASING MANAGER, HENDERSON RETIREMENT PARTY SET FOR MARCH 22

Mo Moniz has been promoted to Purchasing Manager, replacing Arthur Henderson who retired from the position after 25 years of service to the Institution. Mo has been at WHOI for 11 years, most recently as the Assistant Purchasing Manager. A farewell party for Art will be held on March 22, 3:30 pm, at the Carriage House. Contact Valerie Jonas, ext. 2371, for more information.

MASS SHELLFISH OFFICERS TO MEET MARCH 21

The annual winter conference of the Massachusetts Shellfish Officers Association will be held in Woods Hole on Thursday, March 21, in Redfield Auditorium. Speakers for the event will include Commissioner of the Massachusetts Division of Fisheries, Wildlife, and Recreational Vehicles Thomas Bickford; Director of the Division of Marine Fisheries Phillip Coates, and others discussing shellfish issues, problems of

enforcement, legislation, and policy.

Cosponsors of the meeting are the WHOI Sea Grant Program and the Massachusetts Shellfish Officers Association. The agenda will be posted at the Sea Grant Office as soon as it is available; all WHOI personnel are welcome to attend the presentations.

CAPE COD PLANNING SERIES BEGINS MARCH 21

The Marine Policy and Ocean Management Center and the Sea Grant Program at WHOI are jointly sponsoring a discussion series entitled "Planning on Cape Cod." The six-week Tuesday afternoon series, to be held in various locations at 1:30 pm, will bring area planning practitioners to the Institution. The first meeting (at Redfield Auditorium) will cover "General Planning Issues Affecting Cape Cod and the Islands," lead speaker Philip B. Herr, Professor of Urban Studies and Planning at MIT. Other topics scheduled for April will cover urban planning on the Cape (the case of Hyannis), planning for rapid growth in rural areas (the case of Mashpee), State-Federal issues in coastal zone planning, technical issues in planning (the case of water quality), and planning and conservation commissions. For more information contact Mark Meo, ext. 2496.

REP. RAUSCHENBACH TO SPEAK AT CAPE COD MUSEUM OF NATURAL HISTORY ON MARCH 9

Henri Rauschenbach, 1st Barnstable State Representative, will report on the 1985-1986 Natural Resources Legislative Agenda at the Cape Cod Museum of Natural History, Route 6A, Brewster, on March 9 from 1 to 2 pm. Rep. Rauschenbach is a new member of the Natural Resources Committee and the only one from Cape Cod. The Committee's bills will be in the hearing stage during March and April in preparation for their second reading on the floor of the House and it is during this stage that citizen contributions are most vital. The Association for the Preservation of Cape Cod, the Lower Cape Compact of Conservation Trusts, the Cape Cod Coalition of Conservation Commissions, and the Museum are cosponsoring this free event.

NICHOLS SELECTED AS NEXT BOARD CHAIRMAN

Guy W. Nichols, retired President and Chief Executive Officer of the New England Electric System, will be proposed for election as Chairman of the Board of the Woods Hole Oceanographic Institution at the Annual Meeting of the Trustees in June. Mr. Nichols is Vice Chairman of the Board and will succeed Charles F. Adams, former Chairman of the Board of Raytheon Company, who has served as Chairman of the Board at the Institution since 1973.

Mr. Nichols was elected a Member of the Corporation in 1976 and has taken an active role in Institution affairs. In 1983 he helped organize a workshop at WHOI on the research needs of utility companies and was instrumental in providing support for studies of the environmental effects of the siting and operation of power plants in coastal areas. He was elected Vice Chairman of the Board in June 1984 and as Chairman will lead the Institution's Executive Committee, comprised of Trustees and Institution Director John Steele, which meets monthly to discuss and act upon all major Institution appointments and activities.

A registered professional engineer, Mr. Nichols received a B.S. in Civil Engineering from the University of Vermont in 1947 and a M.S. in Business Administration from MIT in 1961. He serves as President and Director of the New England Power Service Company and is a director of the Nashua Corporation, Massachusetts Electric Company, First National Bank of Boston, State Mutual Life Assurance Company of America, and Narragansett Electric Company. He is also Chairman and Director of Yankee Atomic Electric Company, a member of the Executive Committee of New England Power Pool and the New England Power Coordinating Council, and serves as a Trustee of the Thomas Alva Edison Foundation.

EMISSION SPECTROMETER AVAILABLE

A 1.5-meter modified Paschen-Runge grating spectrometer "1965 Jarrel-Ash Atomcounter" with 30,000 line/inch grating, Jarrel-Ash varisource (ac spark, dc arc, dc spark), 42-element exit slits, 42 photomultiplier tubes, teletypewriter/paper tape punch out recording, and digital visual readout of any 22 from 48 channels is

available to any college or school that can use it. Contact Geoff Thompson, ext. 2397, if you know of a possible new home for this equipment. The unit has not been used much in the past five years, but Geoff reports it is still set up and functioning and has been maintained in a controlled environment ($\pm 0.5^{\circ}\text{C}$; less than 50% humidity).

IN MEMORIAM

The Institution announces with great sorrow the death of Scientist Emeritus Earl Ewing Hays on Saturday, February 23, at the age of 67.

Earl joined the Institution staff in 1957 as a physicist in the acoustics program working for Brackett Hersey. In 1962 he was appointed Chairman of the newly-formed Department of Applied Oceanography which, among other projects, was involved in the design, construction, testing, and use of the DSRV ALVIN. In 1963 he was appointed Senior Scientist, in 1967 Chairman of the Geophysics Department, and in 1971 Chairman of the Ocean Engineering Department. Earl had the distinction to have served as Chairman of four scientific departments.

He received his undergraduate degree from Allegheny College and his doctorate from Northwestern University, both in physics. Prior to joining WHOI, he taught physics at the University of Toledo from 1951 to 1957, worked as a physicist at the Brookhaven National Laboratory from 1948 to 1951 and at the Los Alamos Scientific Laboratory during summers in 1953 and 1954. His early work at Woods Hole was primarily on the development of a penetrating echo sounder, although his research interests encompassed in addition to underwater acoustics, seismic profiling, marine geophysics, sound velocity in seawater, and underwater vehicles.

As a qualified scuba diver, Earl served for many years as chairman of WHOI's Diving Board, and was often called upon to check and install transducers and other instruments on Institution ships.

In February 1983, two hundred and forty of Earl's friends and fellow workers joined with him at the Sea Crest in North Falmouth to celebrate his retirement. He leaves his wife, Charlotte, and three children.

PROMOTIONS AND OTHER PERSONNEL CHANGES

Recent promotions include:

PAMELA R. BARROWS - G&G - from Secretary II to Secretary III.
THOMAS A. BOUCHE - Facilities - from Electrician to Sr. Electrician.
LOIS C. BURGESS - Library - from Secretary II to Secretary III.
CATHERINE CETTA - Biology - from Research Assist. III to Sr. Research Assist.
JOHN A. CROBAR - Services - from Warehouse Worker to Sr. Warehouse Worker.
LAURA M. DOYLE - Biology - from Laboratory Assist. I to Laboratory Assist. II.
CHRISTOPHER E. DUNN - O.E. - from Research Assist. I to Research Assistant II.
DANIEL B. DWYER - Facilities - from Sr. Machinist to Experimental Machinist.
PAMELA V. FOSTER - G&G - from Secretary II to Secretary III.
MARGARET M. FRANCIS - P.O. - from Research Assist. II to Research Assist. III.
PORTER HOAGLAND III - MPOM - from Research Assistant II to Research Associate.
NELSON G. HOGG - P.O. - from Associate Scientist to Senior Scientist.
ABBIE JACKSON - Education - from Secretary II to Secretary III.
CYNTHIA H. LANYON - P.O. - from Research Assist. III to Sr. Research Assist.
ELLEN LEVY - P.O. - from Research Assistant II to Research Assistant III.
DEMPSEY LOTT III - Chemistry - from Research Associate to Research Specialist.
ANNE-MARIE MICHAEL - P.O. - from Secretary III to Secretary IV.
MOZART P. MONIZ - Purchasing - from Assist. Purchasing Manager to Purchasing Mgr.
KAREN E. MOORE - Biology - from Research Assistant III to Sr. Research Assist.
JOHN R. MURPHY - Facilities - from Assist. Plant Mechanic to Plant Mechanic.
WILLIAM F. SADLER - O.E. - from Research Assistant II to Ocean Engineer.
DAVID M. SANDERS - ALVIN Operations - from Research Asst. I to Research Asst. II.
RUDOLPH S. SCHELTEMA - Biology - from Associate Scientist to Sr. Scientist.
N. JOYE WIRSEN - Controller - from Sr. Accountin Clerk to Accounting Assist.

Recent transfers include:

DONALD H. COOK, JR. - from Electrician, R/V ATLANTIS II, to Dockworker, R/V KNORR
ROBERT E. GALLAGHER - from 2nd Asst. Eng. R/V KNORR to 3rd A/E R/V ATLANTIS II.

Recent appointments include:

SARAH D. ALLEN - P.O. - Visiting Invest.
NEIL V. BLOUGH - Chem. - Assist. Scientist.
CABELL S. DAVIS III - Biology - Assist. Sci.
JOHN R. ERTEL - Chem. - Postdoctoral Invest.
STEPHEN D. HARDING - P.O. - Visiting Invest.
KIMITAKA KAWAMURA - Chem. - Visiting Invest.
SUSAN H. LOHMANN - Chem. - Adjunct Sci.
MIREILLE POLVE - Chem. - Visiting Invest.
WILLIAM E. SCHEVILLE - Biology - Scientist Emeritus.

Recent retirements include:

RODERIGUE A. LAROCHELLE - O.E. - Sr. Research Assistant.
EBEN A. SAGE - Services - Mail Clerk.

BENEFIT BRIEFS

TIAA/CREF announced that the interest rate for new monies effective March 1, 1985 rose from 11.5% to 11.75%.

The CREF value rose to \$72.01 per unit on January 31st from \$67.04 per unit on December 31st.

NEWSLETTER NOTICES -- Please send items of interest to the oceanographic community to Anne Rabushka, editor, Co-op, ext. 2271.



Stephan Masse won third prize in a computer slide contest sponsored by ISSCO, the company that provides the Disspla and Telagraf software for the VAX. There were over 400 entries in the "Battle of the Graphic Artists Contest."

NEW FACES

March 1985



Neil V. Blough
Assistant Scientist
Chemistry
Redfield 3-40/x2754
R. Gagosian



Kimberly S. Coble
Research Assistant
Physical Oceanography
Smith 310/x2280
R. McDevitt



David E. Hawes
Sr. Machinist
Facilities
Smith S-123/x2245
D. LeBlanc



Kimitaka Kawamura
Visiting Investigator
Chemistry
Fye/x2322
R. Gagosian



Steven P. Longworth
Research Assistant
Ocean Engineering
Smith 301K/x2204
R. Walden



Brian Palenik
J. P. Student
Education
Redfield 3-16/x2339
O. Zafiriou

NEED FOR COLOR XEROXING?

With the closing of For Art's Sake in Falmouth, there is no longer a color Xerox machine available in the immediate area. If there is sufficient demand for color copying, a machine can be rented for about \$600 per month, which means a copying load of 1,000 pages each month at 60¢ each (or fewer copies for a higher price). Those anticipating a need for color Xeroxing should contact Vicky Cullen, Manager of Graphic Services, ext. 2719, to indicate potential use.

UNITED WAY CONTRIBUTIONS FOR 1984

Nat Corwin reports that United Way contributions from WHOI employees totalled \$8,787 in 1984. This is \$1,800 less than in 1983.

CHILD CARE STUDY UNDERWAY

The Graded and Marine Personnel Committee (GMPC) and Staff Committee are jointly conducting a study on the needs for day care at the Institution and in the Woods Hole community. All persons interested in contributing to this survey should contact Cathy Cetta, ext. 2314, Redfield 2-30, for more information or survey forms.



John F. Salzig
Research Assistant
ALVIN Operations
Smith 301/x2579
B. Walden

St. Patrick's Day

TELEPHONE NOTES

Using a credit card for long distance calls is less expensive than going the third party route, reports Linda Benway, switchboard supervisor. The process is also quicker for the WHOI operators since they only have to dial in the numbers instead of going through a telephone company operator.

The 809 area code (Bermuda, etc.) is not accessible through the Institution's WATS line. Call the WHOI operator if you wish to make a call to this region.

The telecopier located in the Smith Lobby is not getting much use, according to Linda. It is an excellent resource for transmitting copies that have to get signatures (i.e., legal documents) and diagrams and sketches. Reproductions of these documents through telemail or telex would be impossible. The Xerox 485 is compatible with almost all other telecopiers. Anyone wishing to telecopy a document to WHOI should use the regular WHOI phone number (617-548-1400) and ask for the telecopier extension (x2600). Anyone wishing to send a document should bring the document to the Smith Lobby (Quissett Campus personnel can send the document down to Smith through the WHOI mail service).

FORMER MILITARY OFFICERS/DoD CIVILIAN EMPLOYEES AT WHOI MUST FILE DD FORM 1787

Section 2397 of title 10, United States Code (formerly Section 410, Public Law 91-121) requires individual reports to be submitted by certain former military and civilian officers (Major/Lt. Commander and above) or employees of the Department of Defense (GS-13 and above), employed by, or representing in certain capacities, defense contractors who have been awarded negotiated contracts totaling \$10 million or more during the last fiscal year. Since WHOI's DoD funding has topped this amount, the regulations apply here. A report may be required of any present or civilian officers or employees separated from the service of the Department of Defense on or after October 1, 1980, and employed by WHOI during Fiscal Year 1984 (October 1, 1983 - September 30, 1984). Personnel in these

categories whose extended active duty or employment with DoD terminated prior to October 1, 1980, are not required to file a report. Additionally, reservists entering on active duty for training only are exempted from reporting.

The responsibility for submitting such reports rests with the employee or representative. Failure to comply with the filing requirement constitutes a misdemeanor, punishable by a maximum of six months imprisonment or a fine of not more than \$1,000 or both.

Reports should be filed with the agency of the DoD by whom the individual filing was employed. Those agencies are: Army, Navy, Air Force, DoD agencies for Communications, Mapping, Nuclear, Advanced Research Projects, Contract Audit, Logistics, Intelligence, the Defense Investigative Service, Health Services, Audit Service, Central Security Service, and Comptroller's Office.

Copies of the Department of Defense Directive 7700.15 detailing reporting procedures and the report form can be obtained from the Personnel Office. Contact Sam Long, ext. 2704, for forms or more information.

MELLON FOUNDATION AWARDS WHOI \$20,000 GRANT

A \$20,000 grant from the R.K. Mellon Family Foundation of Pittsburgh, Pennsylvania, will provide unrestricted support for research activities at the Institution. The unrestricted nature of the grant will "allow us to tackle those problems in marine research which we, as practitioners, consider to be most important," said Director John Steele in announcing the award.

The Mellon Foundation was incorporated in 1978 through the consolidation of the Loyalhanna, Cassandra Mellon Henderson, Rachelwood and Landfall Foundations. It award grants largely for educational, social, medical and conservation programs.

Four other unrestricted awards have been made to WHOI by the Foundation since 1982. Those funds have been used toward the construction of the Fye Laboratory and in support of the Center for Analysis of Marine Systems (CAMS).
