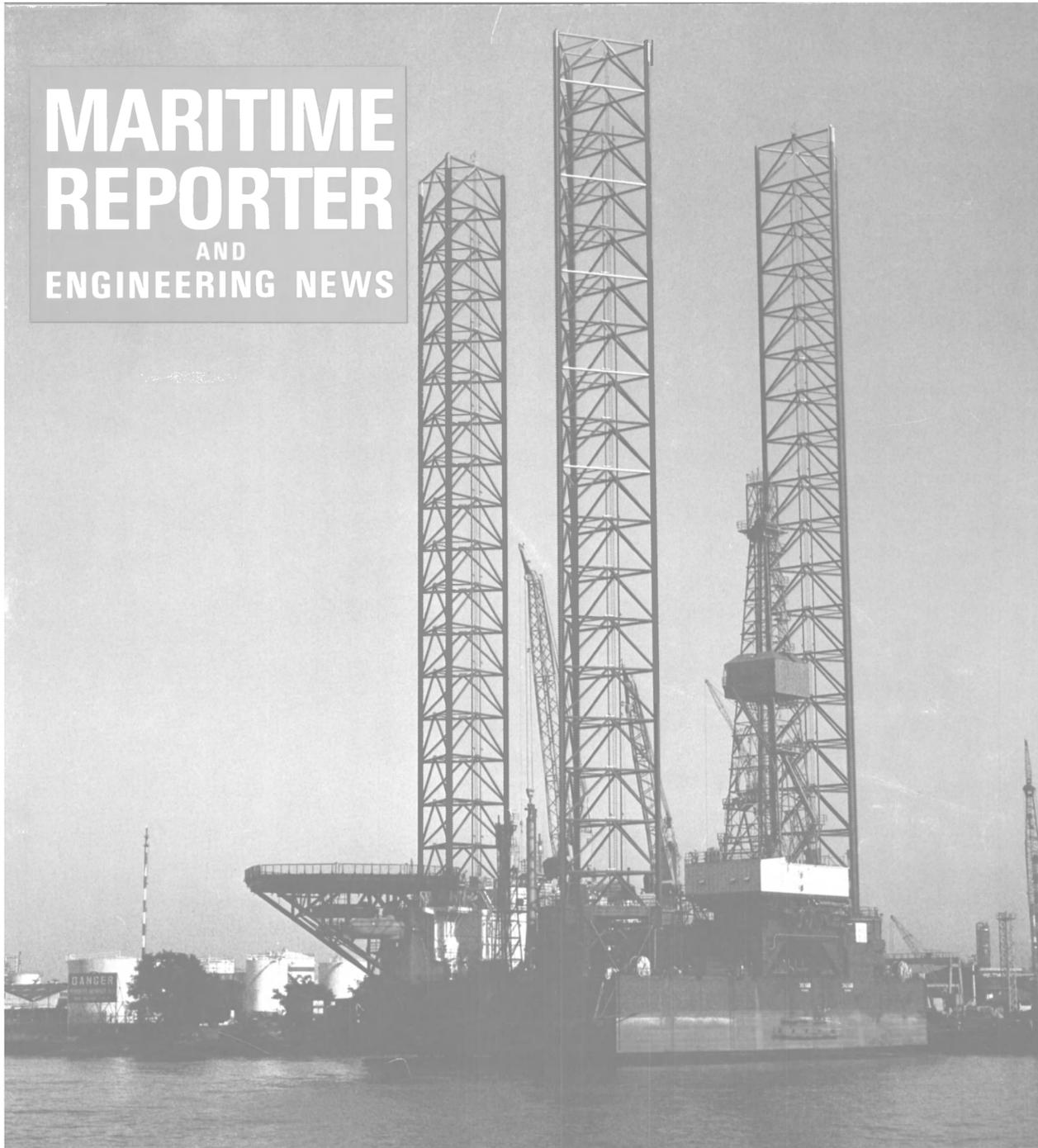


MARITIME REPORTER

AND
ENGINEERING NEWS



The jackup rig Ekhobi at Far East Levingston

**Double Naming
Ceremony Held At
Far East Levingston**

(SEE PAGE 4)

**Navigation/Communications
Review**

RTCM Assembly Preview

(SEE PAGE 4)

MAY 15, 1984



**Tailor-made marine coverage.
Imagining you have it
could leave you out in the cold.**

In the maritime world, your business is as individual as you are. So, doesn't it make sense that your insurance should be that way, too?

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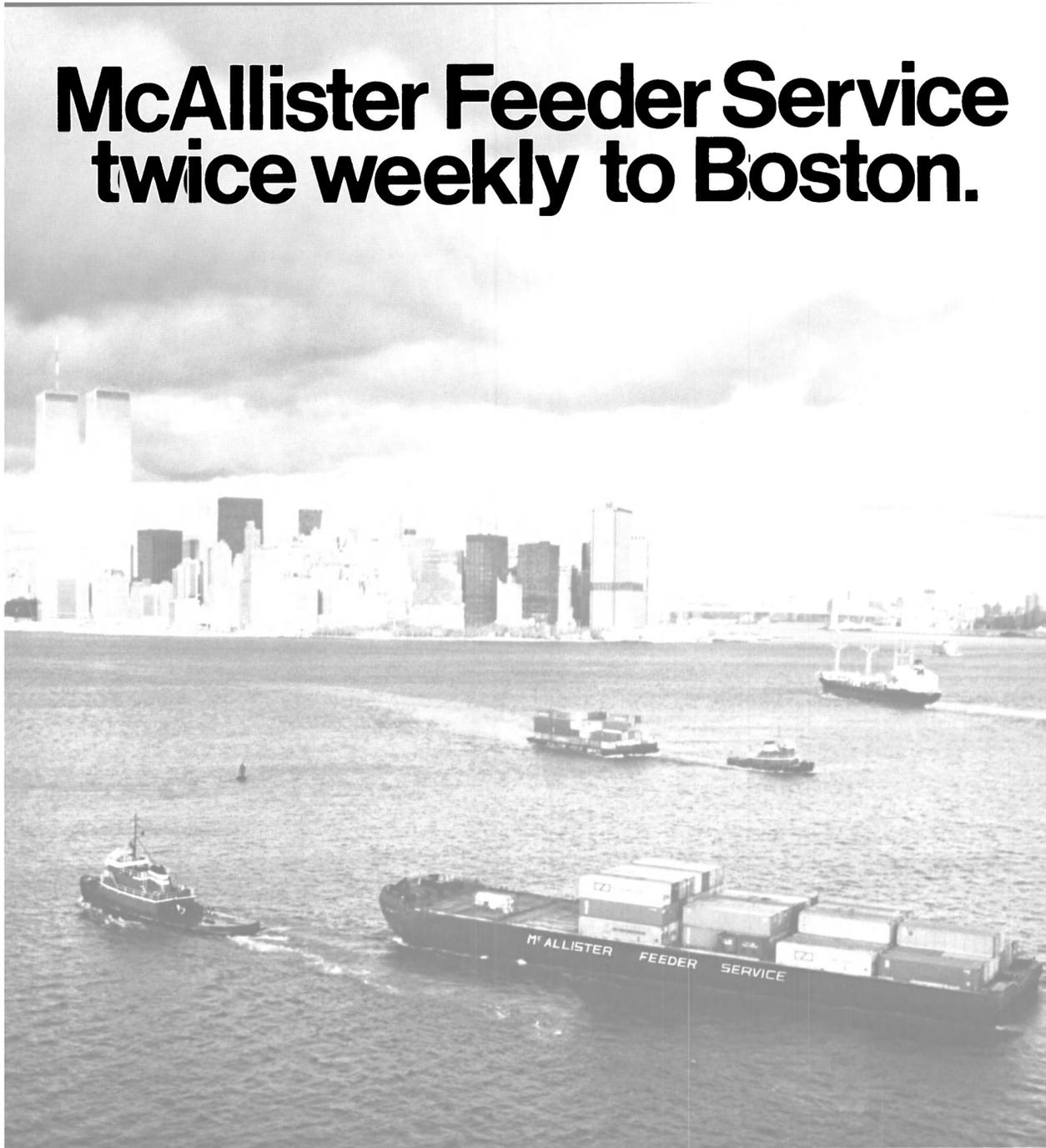
In short, when you choose Adams & Porter, you can be sure your company has truly tailor-made coverage that won't leave you out in the cold. Adams & Porter Associates, Inc., 510 Bering Drive, Houston, Texas 77057-1408, (713) 975-7500. Also in New York and Bermuda.

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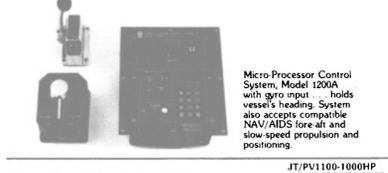


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ON THE COVER

**Ekhabi Delivered
By Far East
Livingston**
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RTCM Assembly
PAGE 16

**Navigation/
Communications
Review**
PAGE 22

Lykes Line Awarded Navy Charter Contracts Totaling \$68.9 Million

Lykes Bros. Steamship Company of New Orleans has been awarded two Navy contracts of \$34,453,059 each for the charter of the U.S.-flag breakbulk freighters Elizabeth Lykes and Louise Lykes that will deliver Department of Defense cargo worldwide. The charter period is four years. The Navy's Military Sealift Command, Washington, D.C., is the contracting activity.

Rauma Yard Gets Contract To Build STO-RO Paper Carrier For Finnish Owner

Rauma-Repola's Rauma Shipyard recently received another domestic order, the second within two months, to build an 8,000-dwt STO-RO paper carrier for Gustaf Erikson of Mariehamn, Finland, with delivery scheduled for May 1985. This contract fills in the present gaps in the yard's employment to a satisfactory level, and with the other orders expected in the near future the yard will be finally back to normal.

Previously, Rauma-Repola's Uusikaupunki Shipyard had built refrigerated cargo vessels for the same Mariehamn-based owner. The new vessel is intended for transportation of paper as well as RO/RO cargoes, and she is similar to the two STO-RO carriers under construction at the yard except for an increased length of 15 meters (49.2 feet) and some specialties such as wider range of operation.

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Editorial and Executive Offices
107 East 31st Street, New York, N.Y. 10016
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PUBLISHERS	John E. O'Malley Charles P. O'Malley
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SALES OFFICES	
New York, New York	Maritime Reporter & Engineering News 107 East 31st Street, New York, NY 10016 Telephone: (212) 689-3266
Houston, Texas	Robert Hawley Gary Lindenberger Mike Sullivan 11777 Katy Freeway, Suite 155, Houston, TX 77079 Telephone: (713) 870-0470
Italy	Mr. Vittorio F. Negrone Ediconsult Internazionale Piazza Fontane Marose, 3-16123 Genova, Italy Telex: 211197 EDINT I Telephone: (010) 543.659-268.334-268.513
Scandinavia	Mr. Stephan R G Orn Ab Stephan R G Orn Box 184, S-271 00 Ystad, Sweden Telex: 33335 ORN S, Telephone: 0411-184 00
West Germany	Wolf O. Storck Schiffahrtswerbung, Karl-Otto Storck Stahlwiete 7, 2000 Hamburg 50, Federal Republic of Germany Telephone: 040/850 0071

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ALL MATERIAL FOR EDITORIAL CONSIDERATION SHOULD BE ADDRESSED TO ROBERT WARE, EDITOR.

Ritter Joins NMS Shipyard Division As Sales Rep



R.J. Ritter

National Marine Service Incorporated, St. Louis, Mo., recently announced that **R.J. (Tex) Ritter** has joined its Shipyard Division as a sales representative in its Houston offices. From this base, he will represent National Marine's shipyard, diesel engine rebuild/repair, and parts services to the marine, drilling, construction, and utility industries in Texas and western Louisiana.

Mr. Ritter, after service in the Navy and the Coast Guard, held senior sales positions with Ingersoll-Rand and Sullair of Houston. Given his heavy experience with engines and accessories, he will concentrate on expanding diesel engine repair and parts sales.

National Marine Service, one of the NICOR basic energy companies, is a leading supplier of liquid bulk transportation services on the Mississippi River system and Gulf Coast. The company's shipyards at Hartford and Grafton, Ill.; Harvey, La.; and engine repair operations in Norfolk, offer full-service facilities for barge and towboat repairs. Its diesel engine repair services are widely recognized as among the most expert in the United States; its diesel engine repair crews service the needs of customers in all parts of the world.

Stearns Announces New Anti-Exposure 'Work Coverall'

Stearns Manufacturing Company of Saint Cloud, Minn., has announced a new and improved anti-exposure "Work Coverall," Stearns Model #IFS-580. This constant wear industrial flotation coverall is said to be ideal for commercial fishermen, offshore rig personnel, construction personnel and any other industrial employee who must work on, or near, cold water for extended periods.

Personnel using these suits are frequently in a kneeling or sitting position on rough decks and surfaces, thus causing premature wear on the knee and seat areas of the coverall. Stearns has added double layering of fabric to the knee and seat areas of their standard Model #IFS-580 "Work Suit" to extend the useful life of the suit.

For more information on Stearns industrial flotation products,

Circle 86 on Reader Service Card

Circle 310 on Reader Service Card ▶

Free Color Brochure Introduces New Stal Refrigeration Plant

Stal Refrigeration Corporation of Bensalem, Pa., has announced the availability of a new color brochure introducing the Stal Packaged Miniscrew™ Refrigeration Plant.

The brochure describes the scope of delivery and features, standard options, performance data and dimensions and includes easy-to-read graphs and diagrams.

The basic Stal Packaged Miniscrew Refrigeration Plant consists of a frame-mounted assembly containing a Stal Miniscrew compressor, oil separator, economizer heat

exchanger (where relevant) and low surge pressure drum designed for forced liquid refrigeration recirculation.

For complete information and a copy of the color brochure describing the Miniscrew Refrigeration Plant,

Circle 79 on Reader Service Card

THE JAMESBURY VALUE:

Highest performance valves afloat: Wafer-Sphere!



Time's gone when your only choices for the hazards of marine service were bulky and costly gate and globe valves. Or rubber-lined butterfly valves with their limited pressure/temperature capabilities, short cycle life, and tearing liners.

Jamesbury Wafer-Sphere® high performance valves are pushing all of them right overboard! These revolutionary valves suit practically every ship's 2½" and larger size valve requirement.

How good? Check these features:

- Flexible-lip TFE seat that gives tight shutoff up to 1480 psi, temperatures ranging from cryogenic (-320°F) to +500°F—there's no metal-to-metal contact.
- More compact, much lighter, easier and faster to install.
- Greater corrosion resistance, much longer cycle life, much easier and less expensive to service.
- Easier to operate.
- Optionally available with a wide choice of Jamesbury actuators for both automatic on-off and proportioning control.

Materials and designs include nickel aluminum bronze, 316 stainless steel, Alloy 20, Monel, plus carbon steel; ANSI Class 150, 300 and 600 wafer and lugged, standard and fire-tested configurations — to fill the widest possible range of shipboard services.

Approvals include Lloyd's Registry of Shipping, Germanischer Lloyd, American Bureau of Ships, and Dept. of Transportation-Marine Services-Canada. These valves have been accepted by the U.S. Coast Guard (Category A and positive shut-off valves), and have been tested and fully qualified by an independent laboratory to U.S. Navy shock (MIL-S-901) and vibration (MIL-STD-167-1) specifications.

For full details on Jamesbury Wafer-Sphere valves, ball valves, actuators and control devices, the most outstanding product line for the marine industry, write or call Jamesbury Corp., 640 Lincoln Street, Worcester, Massachusetts 01605 U.S.A. (617) 852-0200. International manufacturing/sales locations: Ottawa, Canada; Rustington, West Sussex, England; Wasserburg, Federal Republic of Germany; Tokyo, Japan; Singapore; Mexico City, Mexico.

Jamesbury
THE SURE ONES

**Valmet Forms Subsidiary
In Houston To Serve
U.S. Offshore Industry**

Valmet Corporation of Finland recently formed a new subsidiary, Intec Engineering, Inc. in Houston, with American and Dutch partners. The principal business of the new company is engineering, consulting, and selling its services to the offshore industry. Through

the experience of the other partners, Valmet will get into direct contact with leading companies and the latest technological developments in the offshore field.

"After putting in a lot of work on pipelayers, channels into direct engineering export opened for Valmet. During the autumn (1983) we got consulting tasks concerning arctic pipelayer projects from American oil companies. In order to make the most of these possibil-

ities, it was a natural step to form our own company," says **Kari Airaksinen**, managing director of Valmet's Helsinki Shipyard.

"Last year we invested several million Finnish marks in the pipelayer project developed for the Soviet Union. As this project was then postponed by the buyer, we started to search for new objects for the acquired know-how. With our new partners we got into contact with Exxon, Sohio, Shell, Mo-

bil, and Arco, for whom we planned equipment for pipelaying and maintenance. Through the new company our possibilities to take part in solid commercial ventures will increase considerably," Mr. **Airaksinen** states.

Intec Engineering currently employs only 10 personnel, but expects to expand to about 25 by the end of 1985. The firm will specialize in the design and construction of underwater pipelines, pipelaying equipment, floating production platforms and terminals, and underwater technology, particularly in arctic regions and deep waters.

For further information on Intec Engineering,

Circle 84 on Reader Service Card

Marine chemical science solves a big problem for vessel operators.

**"WE'VE DEVELOPED A
POWERFUL CLEANER
THAT WON'T HARM OILY
WATER SEPARATORS"**

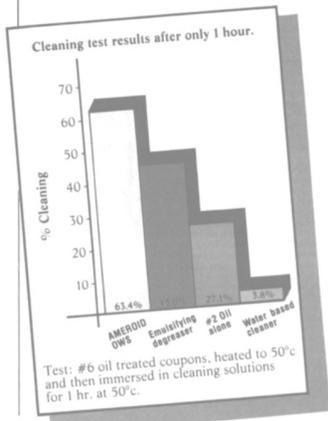


**Drew
Ameroid®
Marine**

It takes a powerful solvent-emulsifying cleaner to do all the degreasing jobs your ship requires. But a powerful degreaser can also be disastrous for the operations of the oily water separators required under international pollution control regulations. How? An effective marine degreaser dissolves oily deposits by forming an emulsion—a colloidal suspension of oil molecules in water. Cleaners perform this task because part of their molecules are attracted to oil, and the other part to water. That's how it lifts and holds soil and turns greasy deposits into an easily removed solution.

That's fine for cleaning, but just the opposite of your oily water separator's function, which is to separate the oil and water. Therefore, an effective marine degreaser that can be great for cleaning can be very harmful to the proper operation of your oily water separators. Fortunately, Drew Ameroid Marine has now solved this problem for the marine industry.

Drew Ameroid Marine has developed AMEROID® OWS quick separating degreaser, an outstanding cleaner that does everything the traditional cleaners do—except for one thing. AMEROID OWS doesn't harm the coalescing function of oily water separators.



AMEROID OWS can be used as an effective, heavy-duty degreaser in almost every area of the ship—in the engine room, on deck, for cleaning tools, painted and unpainted surfaces, bulkheads and machinery. It is also a dependable tank cleaner.

Bilge cleaning? Yes. AMEROID OWS is easy to use, employing the regular "rock and roll" method. In almost every area of the ship, this is a first class, top-to-bottom cleaner. Especially where the slop is pumped through oily water separators.

Leading manufacturers* of oily water separators have conducted their own tests with AMEROID OWS and confirm that this advanced cleaner when used as directed will allow the separator to perform at design parameters. These tests used various concentrations of AMEROID OWS—all of them strong enough to do an outstanding job. In each case, AMEROID OWS will not only do an outstanding cleaning job, but it will do it without harming the separating capabilities of the oily water separators.

When equipment manufacturers approve, recommend and list this cleaning product in the interests of their own machinery's performance and reputation you know that AMEROID OWS is the marine degreaser you should use!

AMEROID OWS is quick breaking—important in allowing oil to separate from water after the cleaning operation. Reduces slop disposal costs. It is a solvent-emulsifying cleaner, and therefore it reduces cleaning time, minimizes normal cleaning efforts and cost. It is highly concentrated and does its thorough job at low concentration levels. That's a cost saver.

And since AMEROID OWS does not harm oily water separator functions, it not only helps keep you clear of pollution violations, but spares you some costly problems.

AMEROID OWS is a product of Drew Ameroid Marine—chemical science dedicated to helping vessel owners and operators minimize costs while meeting required standards and regulations. And behind AMEROID OWS stands Drew technology and commitment. It is being introduced by Drew after extensive testing onboard vessels, and meets exacting standards that have kept Drew in its leadership position for more than 70 years.

AMEROID® OWS quick separating degreaser is available worldwide through Drew's network of service representatives in strategically located ports.

*Names on request.

One Drew Chemical Plaza
Boonton, New Jersey 07005 USA
Telephone: (201) 263-7600 Telex: 136444



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**Winthrop-Sears Award
Received By PRC's**

George Gregory

George Gregory, chairman of the board and C.E.O. of Products Research and Chemical Corporation (PRC), was the recipient of the Chemical Industry Association's Winthrop-Sears Award announced **Richard T. Ozimek**, chairman of the association's awards committee. Presentation of the prestigious medal was made at a special luncheon honoring Mr. **Gregory** recently at the Plaza Hotel in New York City.

The Winthrop-Sears medal was established in 1970 to recognize an individual who, by his entrepreneurial action, contributed to the vitality of the chemical industry and the betterment of mankind. Mr. **Gregory** has been chosen from a selective field of highly qualified candidates for his achievements in creating the direction and momentum of PRC's growth.

**SNAME Philadelphia Section
Annual Dinner-Dance
Scheduled For June 16**

The 34th Annual Spring Dinner-Dance sponsored by the Philadelphia Section of The Society of Naval Architects and Marine Engineers will be held on Saturday, June 16, at the Philadelphia Centre Hotel. The black tie event will begin with a social hour at 6:30 pm, followed by dinner at 8:00 and dancing until 1:00 am.

Honored guests at this year's function will be SNAME secretary and executive director **Robert Mende** and **Mrs. Mende**.

A block of rooms at special rates has been set aside by the hotel. Contact **Ms. Andrea Berger** at (215) 568-3300 by May 26.

For tickets (\$35 per person), table reservations, or additional information, contact one of the following: **Charles Lofft** at (215) 328-5200; **Bill Snell** at (609) 234-3880; or **John Bezak** at (215) 358-0600.

**Stewart & Stevenson Inc.
Appointed Distributors
For MWM Series 500 Engines**



Pictured from left to right—after concluding a marketing session on MWM Big Bore Diesels—are **Carsey Manning**, vice president and general manager of Stewart & Stevenson; **Benton Elliott**, senior vice president of MWM Large Bore Division; and **Joe Manning**, president of Stewart & Stevenson.

Stewart & Stevenson Services, Inc., of Houston has been appointed distributors for MWM Series 500 Diesel, Gas and Dual Fuel Engines, as well as MWM Series 400 Marine diesel, stationary Gas and Dual Fuel Engines for major North American and Latin American markets. The 500 Series, introduced in 1975, is unique in that it was specifically designed from the ground up to successfully operate when burning heavy, low-grade fuels. The responsibility for providing parts and service support for large bore MWM Engines sold in the aforementioned markets has also been accepted by Stewart & Stevenson Services, Inc.

In making the announcement, **Carsey Manning**, vice president and general manager of Stewart & Stevenson, said: "We were attracted to MWM because they have proven engines in the higher horsepower ranges, and this is a market where we are expanding our activities. The MWM engines have good flexibility as they burn #2 diesel fuel, heavy fuel up to 3,500 RI and natural gas. In addition, this line of equipment can be operated on dual fuels for even greater cost efficiencies. These benefits plus the more than 100 million hours of proven reliability made MWM Engines our choice to add to Stewart & Stevenson's worldwide manufacturing and marketing operations."

According to **Benton H. Elliott**, senior vice president of MWM Large Bore Division in North America, the first step in his marketing plan was to establish a Distribution and Services & Support Network. He stated, "The association with Stewart & Stevenson Services, Inc., completes this phase and places MWM in a very strong position to supply the needs of the high-horsepower, big-bore engine users."

For free literature on MWM's series 400 and 500 engines,

Circle 89 on Reader Service Card

Kone To Build Multi-Purpose Double-Boom Crane For Port Of Jacksonville

Kone Corporation of Finland will manufacture one of the world's largest multi-purpose double-boom cranes for harbor use under a contract awarded by the Jacksonville Port Authority in Florida. In addition to its record heavy-load lifting capacity of 100 long tons, Kone reports that the crane will be the first of its type to go into operation in an American harbor. Delivery is set for spring 1985.

The multi-purpose crane concept, as pi-

oneered and refined by Kone, increases the versatility and flexibility of ports' quays. One crane can handle a great variety of commodities, regardless of any specialized handling equipment they may require. The crane's capability covers not only general cargo, heavy loads and bulk materials, but all sizes of containers as well as continuous, high-speed operation. Idle time is reduced, while the amount of efficient usage increases.

For more information and free literature on Kone cranes,

Circle 68 on Reader Service Card

RCA Awarded \$129.6-Million Increase To Navy Contract For Aegis Systems

RCA Corporation, Government Systems Division, Moorestown, N.J., has been awarded a \$129,640,700 face value increase to a previously awarded cost-plus-fixed-fee contract for funding increments covering all Aegis cruisers and integration requirements through December 1986, and shipboard test of CG-51 through CG-56 ending June 1988. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Nickum & Spaulding Announces New Executive Appointments — Philip Spaulding Named Chairman

Nickum & Spaulding Associates, Inc., a prominent Pacific Northwest naval architect and marine engineering firm with offices in



Donald M. Surgenor

Edward C. Hagemann

Seattle and Portland, has voted new appointments in its corporate management structure.

Philip F. Spaulding, past president, has been elected chairman of the board, replacing **George C. Nickum**, who recently announced his retirement. Mr. Nickum remains a member of the board, and will serve as a consultant to the company.

Donald M. Surgenor, former executive vice president and general manager, was elected president and general manager, and **Edward C. Hagemann**, former vice president-engineering, was appointed executive vice president.

These management adjustments reflect the overall company plan for diversification and broadening, including expansion into international markets. The firm is well known for its efforts in preliminary and contract design of a wide range of vessels, and is now intensifying efforts in production engineering and project development, working with shipyards, shipowners, and financial institutions in structuring total project requirements.

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SIMRAD

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Color Brochure Offered Free From HITCO

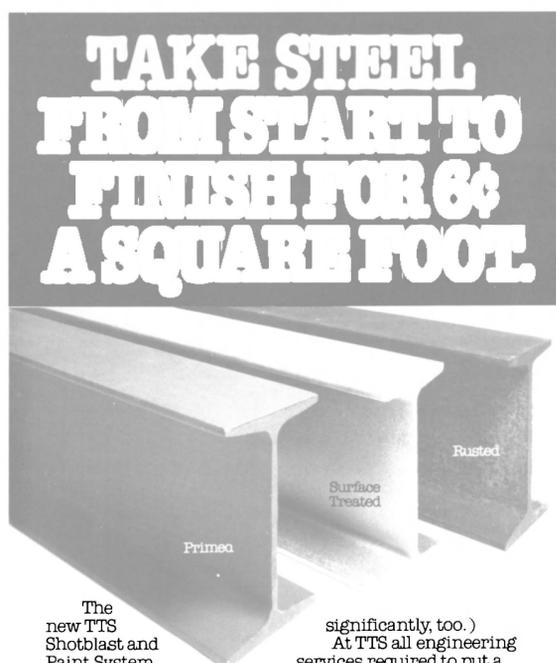
HITCO Insulation Systems, Middletown, Ohio, is offering a 12-page color booklet showing HITCO's ability to handle extreme performance problems for aerospace, marine, off-highway, and stand-by power markets.

Some of HITCO's areas of expertise covered in the brochure are systems-engineering of insulation, molded and formed insulation sys-

tems designed to save space, flexible insulation blankets for moderate temperatures, insulation blankets to tame the exhaust heat of engines, metal-clad insulation systems for demanding jobs and precision tubing. The brochure outlines these areas with pictures and explanations of various applications.

For a free copy of HITCO's brochure,

Circle 75 on Reader Service Card



The new TTS Shotblast and Paint System can reduce your surface treatment costs to only 6¢ a square foot. (That compares with 19¢ or more for conventional manual methods, and 65¢ - \$1.10 for contract work*)

TTS doesn't just provide components, but a complete system tailored to your needs based on our long experience in steel mechanical handling and production processing. (In most cases, our expertise and engineered equipment can improve your other plant operations

significantly, too.)

At TTS all engineering services required to put a system into operation are performed at our facility including project management and spare parts recommendations.

Our methods have resulted in fully integrated systems that are now operating successfully around the world. And many of our customers are using their excess capacity to process steel for others at a profit.

For more information, contact TTS at (804) 595-5153.

TTS TOTAL TRANSPORTATION SYSTEMS INC.

813 Forrest Drive, P.O. Box 6127, Newport News, Virginia 23606

*Figures based on 1981 Houston, Texas, cost survey. Costs may vary due to local labor and annual steel throughput.



Shipyard president Edward J. Campbell (left) looks on as Nickey Adkins authenticates the keel of the attack submarine Newport News, with help from shipyard welder Harry D. Griffith.

Newport News Lays Keel For USS Newport News (SSN 750)

Newport News Shipbuilding has laid the keel for its 17th Los Angeles class attack submarine, the Newport News (SSN 750). In a ceremony held recently at the shipyard, the keel was authenticated by Mrs. Nickey Adkins, assisted by Matron of Honor Mrs. Mildred Duncan and Maid of Honor Diane Campbell.

The ship, whose name honors the rich Navy shipbuilding tradition of the Virginia city, is scheduled to be launched in 1986, coinciding with the shipyard's 100th anniversary.

Newport News Shipbuilding designed the Los Angeles class submarine, and also built the lead ship of the class. The Los Angeles class submarine has the most advanced anti-submarine warfare capabilities, and is an effective deterrent against both enemy submarines and surface ships. When Newport News is delivered

to the Navy in 1987, it will be 360 feet long, with a 33-foot beam and an underwater displacement of 6,900 tons.

Speakers for the keel ceremony included Edward J. Campbell, president and chief executive officer of the shipyard, Commodore Malcolm MacKinnon, the Navy's Supervisor of Shipbuilding at the yard, Newport News Mayor Joseph C. Ritchie, and U.S. Congressman Herbert H. Bateman.

Among the distinguished guests were Adm. Wesley L. McDonald, Commander in Chief Atlantic Fleet and Commander, Supreme Allied Command Atlantic; Vice Adm. Kenneth M. Carr, Deputy and Chief of Staff, Commander in Chief Atlantic Fleet; and Commodore Guy H. Curtis III, Director, Attack Submarine Acquisition Program, Naval Sea Systems Command.

The shipyard currently has con-



Speakers and guests at Newport News Shipbuilding gather for the keel-laying ceremony for the attack submarine Newport News. Speakers included shipyard president Edward J. Campbell; Navy Supervisor of Shipbuilding at Newport News Malcolm M. MacKinnon III; Newport News Mayor Joseph C. Ritchie; and U.S. Congressman Herbert H. Bateman.

tracts to build eight attack submarines, and is building three Nimitz-class aircraft carriers. Newport News Shipbuilding is the only yard capable of constructing the giant Nimitz-class carriers, three of which already are part of the Navy fleet.

For additional information on Newport News facilities, capabilities and services,

Circle 80 on Reader Service Card

**Clark Painting
Appoints Talbot
Marine Manager**



David R. Talbot

Fred Cagle, president and CEO of Clark Painting Company, recently announced that David R. Talbot has been appointed marine manager for the company. He will coordinate all marine estimating and contracting from their Concord, Calif., office. Clark Painting Company has long been involved in industrial and specialty coatings contracting and is now aggressively pursuing the marine market. Formerly West Coast manager for Sline Marine, Mr. Talbot brings many years' experience managing major marine coating projects to Clark's Marine Division.

**Free 16-Page
Technical Brochure
Offered By Indikon**

Indikon Corporation of Cambridge, Mass., is offering a new 500 Series brochure which provides complete specifications and application data for its broad range of Vibration Monitoring Systems and Turbine Supervisory Instrumentation. Five rack configurations and over 20 plug-in modules are described in detail.

The brochure summarizes and provides technical data on input devices including eddy current proximity probes, seismic vibration amplitude pickups, absolute shaft vibration transducers and piezo-electric accelerometers. The Indikon 500 Series System can be supplied with RTDs, thermocouples, strain gage pressure cells and LVDTs.

For a copy of the free brochure and complete information,

Circle 74 on Reader Service Card

May 15, 1984

**New Bulletin Makes Small
Standard Heat Exchangers
Easy To Select**

Revised Bulletin 104-23, just published by American Standard Inc.'s Heat Transfer Division, Buffalo, N.Y., gives details of small pre-engineered, fixed-tubesheet heat exchangers used for heaters

or oil coolers in a wide variety of industrial applications.

The bulletin includes details of 57 BCF* heat exchanger models, many that are available on local American-Standard Distributor stock. Also included is information about HCF* models, which can be quickly assembled using standard, pre-engineered components to accommodate special shell and tube

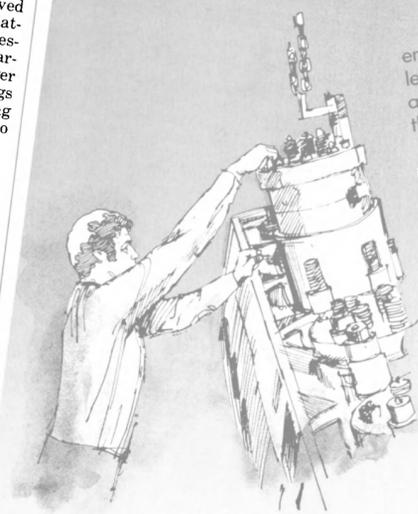
materials, special tube sizes, nozzle configurations and orientations, special gaskets and mountings.

Model HFF units, also included in the bulletin, feature SAE flanged, shell-side connections for quick bolt-in place installation. For a free copy of Bulletin 104-23,

Circle 71 on Reader Service Card

SKILL

When we overhaul, repair and rebuild, we do it right.



Skills like block welding, line boring, engine overhauling and rebuilding are not learned overnight. They take time to develop... and National Marine has been developing these skills for over fifty years.

Whether at our convenient shipyard locations or on board your vessels anywhere in the world, our diesel engine mechanics provide the skills you need to keep your engines operating.

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Marco Seattle Signs Contract To Build All-Steel Workboat

Marco Seattle has signed a contract for the construction of a 64-foot twin-screw all-steel workboat to be built for Uaukewai Diving, Salvage and Fishing, Inc. of Honolulu, Hawaii.

The vessel will be used primarily in assisting petroleum tankers at offshore mooring terminals and as a diving support vessel. The operator of the new workboat is a principal in Mid-Pacific Towing, Ltd., also of Honolulu, for whom Marco recently built the 75-foot twin-screw tug Naupaka.

The 64-foot workboat is a new Marco design, with a beam of 21 feet and a depth of 8 feet. She will be powered by a pair of GM 12V71 diesels with a combined horsepower of 800 driving 42-inch-diameter four-blade propellers. Interior arrangements will include a

complete galley, dinette area, and accommodations for a crew of three. Marco plans to deliver the vessel on the Fourth of July.

Nicor Signs Contract With Moss Point Marine For Two New Vessels

Nicor Marine, Inc. of New Orleans, La., recently signed contracts with Moss Point Marine for the construction of an 82-foot Line Launch Vessel and a 97-foot Triple Screw Tug.

Both vessels will be outfitted with Detroit Diesel 12V-149N engines and will have cruising speeds of approximately 10 knots.

Certified by ABS, both vessels will feature detachable dispersant boom spraying equipment to combat oil spills along with special water foam fire-fighting equipment.

Scheduled for late spring delivery, the vessels will work overseas.

ON THE COVER

Double Naming Ceremony Held At Far East Livingston Shipbuilding

Far East Livingston Shipbuilding Ltd. (FELS) held a double naming ceremony recently for the jackup rig Ekhabi and the crane vessel Ispolin being built for V/O Sudoimport of the U.S.S.R. Mrs. F.I. Potapenko, wife of the U.S.S.R. Ambassador to Singapore, named the Ispolin, and Mrs. Loh Wing Siew, wife of the managing director (Ship Repair Division) of Keppel Shipyard and former managing director of FELS, named the Ekhabi.

The Ispolin is a propulsion-assisted crane vessel designed by FELS to the owner's requirements. She has dimensions of 410 by 118 by 26.2 feet, and will be equipped with a 1,200 600-ton (fixed fully revolving) crane, and will have provisions for future installation of pipe-laying equipment. She will have accommodations for 120 personnel.

The 1,200-ton crane is the product of Kone and FELS cooperation, with the main boom and steelwork fabricated by the shipyard and machinery components supplied by Kone. All assembly, erecting, and testing is being done by FELS.

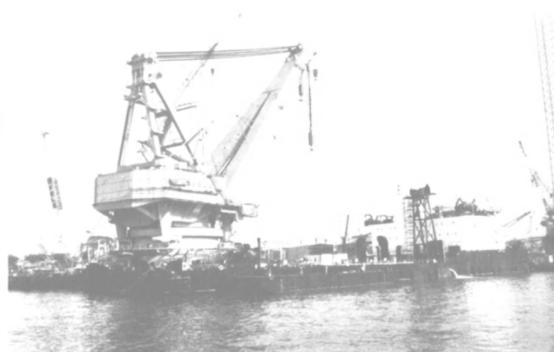
With the delivery of the Ekhabi, FELS will have delivered its 16th jackup rig and its 32nd mobile offshore unit. The rig has been built to the MSC CJ-50 design, and has capability to operate in areas with severe environmental conditions. She is a cantilever, self-elevating unit, and has a triangular hull with three triangular, open-truss legs, each fitted with a spud can at the lower end. The hull is 210.6 feet long, 223 feet wide, and 26.2 feet deep. The total length of each leg with its spud can is 441 feet.



Jackup rig Ekhabi.

Jacking system is of the rack and pinion type. Accommodations are provided for 80 offshore personnel.

Both of these vessels have been built to comply with the relevant rules and regulations of the U.S.S.R. Register of Shipping and international maritime Conventions.



Crane vessel Ispolin.

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We're developing the latest technology in the business of cleaning ships, barges, tanks and process equipment and we'd like to show you how we can save you **time and money**.

Recently we cleaned four feet of solidified asphalt from the bottom of a ship's tanks, and we didn't use one mop, broom, hammer or chisel. If you want third party validation, call us and we'll refer you to our customers. Call us anyway, we want to save you **time and money**.

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**Faye Sandoz Appointed
Traffic Coordinator For
Mechling's River Forwarders**

Dravo Mechling Corporation of New Orleans, the barge line operation of Dravo Corporation, has named **Faye M. Sandoz** traffic coordinator for its River Forwarders subsidiary. River Forwarders specializes in the consolidation of less than full bargeloads of regulated commodities for movement from New Orleans to destinations along the inland waterways system.

Ms. **Sandoz** will be responsible for scheduling all River Forwarders operations and maintaining status reports on movements once they are under way. A graduate of Phillips College in New Orleans, she held a variety of administrative and sales positions prior to being named traffic coordinator.

**AT&T Technologies
Awarded \$5.6-Million Navy
Contract For Sonar Parts**

AT&T Technologies Incorporated, Greensboro, N.C., has been awarded a \$5,602,000 cost-plus-fixed fee contract for AN/BQR-15 sonar receiving set parts to include three array modular sets, one connector set and one installation material set for U.S. submarine hulls. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

**Herbert Berry Appointed
Vice President-Engineering
At Electric Boat Division**

Herbert E. Berry has been appointed division vice president-engineering at the General Dynamics Electric Boat Division. He will report to **Fritz G. Tovar**, vice president-general manager of Electric Boat.

Mr. **Berry**, with more than 31 years' experience at Electric Boat, began in 1952 as a junior engineer on the design of USS Seawolf, the U.S. Navy's second nuclear submarine. He has subsequently held a number of major engineering management assignments and, since February 1983, has been assistant general manager-engineering. Prior to that he was director of nuclear engineering.

A 1951 graduate of the United States Merchant Marine Academy with a bachelor of science degree in marine engineering, Mr. **Berry** earned a master's degree in mechanical engineering from the University of Connecticut in 1963. He is a registered professional engineer in the state of Connecticut.

**Volvo Penta Duoprop
Now Available For
Workboat Applications**

Following a successful launch into the marine pleasure markets world wide last year, with good operation experiences and after further extensive field trials, Volvo Penta Duoprop drive system with its contra-rotating propellers are now released for use in marine

commercial applications.

The simple and effective design of the Duoprop drive unit remains unmodified. Only minor changes to lubrication and servicing periodicity are recommended when the units are for use in a "hard working" environment.

The Volvo Penta Duoprop drive provides 10 to 15 percent more thrust and up to 30 percent better acceleration, at the same time saving 10 to 15 percent on fuel. When

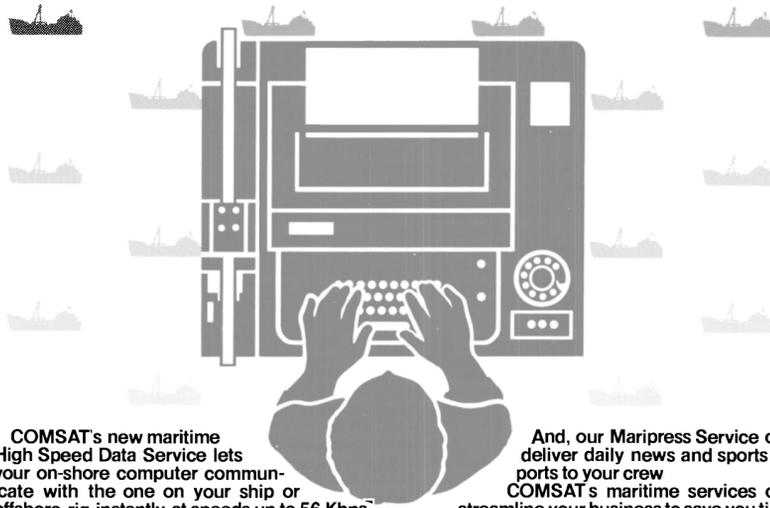
running flat out, the grip of the two contra-rotating propellers allows for high-speed turns with no fear of cavitation.

Volvo Penta offers its Duoprop drive with both the four cylinder D30 and six cylinder D40 series turbocharged and aftercooled marine diesel engines.

For more complete information,

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Photo: Port Allen Marine Service
The riverboat SS President in drydock at PAMS



PAMS's main plant located on the Gulf Intracoastal Waterway Canal.

Diversified Capabilities Offered By Port Allen Marine Service

— Literature Available

The S/S President, one of two old-fashioned riverboats recently brought to Port Allen Marine Service, Inc. (PAMS) for repairs, makes regular sightseeing runs along the Mississippi River. The last side-wheel packet boat to be built in this country, the 60-year-old President measures 290 feet long by 83 feet wide and is operated by the New Orleans Steamboat Company, a subsidiary of the Lake George Steamboat Company.

The repair work included replacing bottom plating, sandblasting and painting the hull, and

working on the rudder, shaft, bearings and other underwater gear. The project cost approximately \$140,000.

Although PAMS normally works on more modern boats, repairing historic vessels is well within the capabilities of the shipyard.

Walter Rodv, president of PAMS, said: "We at Port Allen Marine take real pride in the fact that we are a 'total service' shipyard and have earned a reputation for quality work and a quick turnaround."

With modern and efficient facil-

ities on the Gulf Intracoastal Waterway and in the Port of Baton Rouge, PAMS is among the most diverse shipyards on the lower Mississippi.

PAMS's main plant is located on 750 acres with 7,500-foot frontage on the Gulf Intracoastal Waterway Canal. Also at this site is the new construction facility with the capability of producing over 200 barges per year. During the past year, in addition to constructing open hopper coal barges and covered grain barges, this facility constructed and delivered two sulfuric acid barges to Stauffer Chemical Company of Dobbs Ferry, N.Y.

Also at this location is the main yard repair department featuring five drydocks ranging in size from 500-tons to 2,500-tons lifting capacity. Over the past three years the repair department has dry-docked and repaired an average of

765 vessels (boats and barges) per year, replacing some two and one-quarter million pounds of steel per year. These departments, supported by a fully equipped machine shop, electric shop, and paint/sandblast facility, allow PAMS to have a multitude of projects underway at the same time.

PAMS's River Plant, located on the Mississippi River three miles south of Baton Rouge, houses a top side repair facility with over 600 feet of repair dock space as well as capabilities of performing mid-stream repairs to deep draft ocean-going vessels. Also at this location is PAMS's gas freeing and cleaning plant which is equipped to handle 100 barges per month, treating and disposing of all wastes, including acids, alkalis, chemical residues, halogenated organics, and oil sludge with strict adherence to all regulations established by the Louisiana Department of Natural Resources as well as the U.S. Environmental Protection Agency.

For free information on Port Allen Marine Service facilities, and services,

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In these days of fuel scarcity, leaky oil lubricated bearings waste energy and pollute our waterways. With Cutless water lubricated rubber bearings designed by Lucian Q. Moffitt, Inc., there's no oil seal to fail. No lube oil to leak out and pollute the waterways. Any water will lubricate the Cutless bearing... fresh water, salt or sand-filled.

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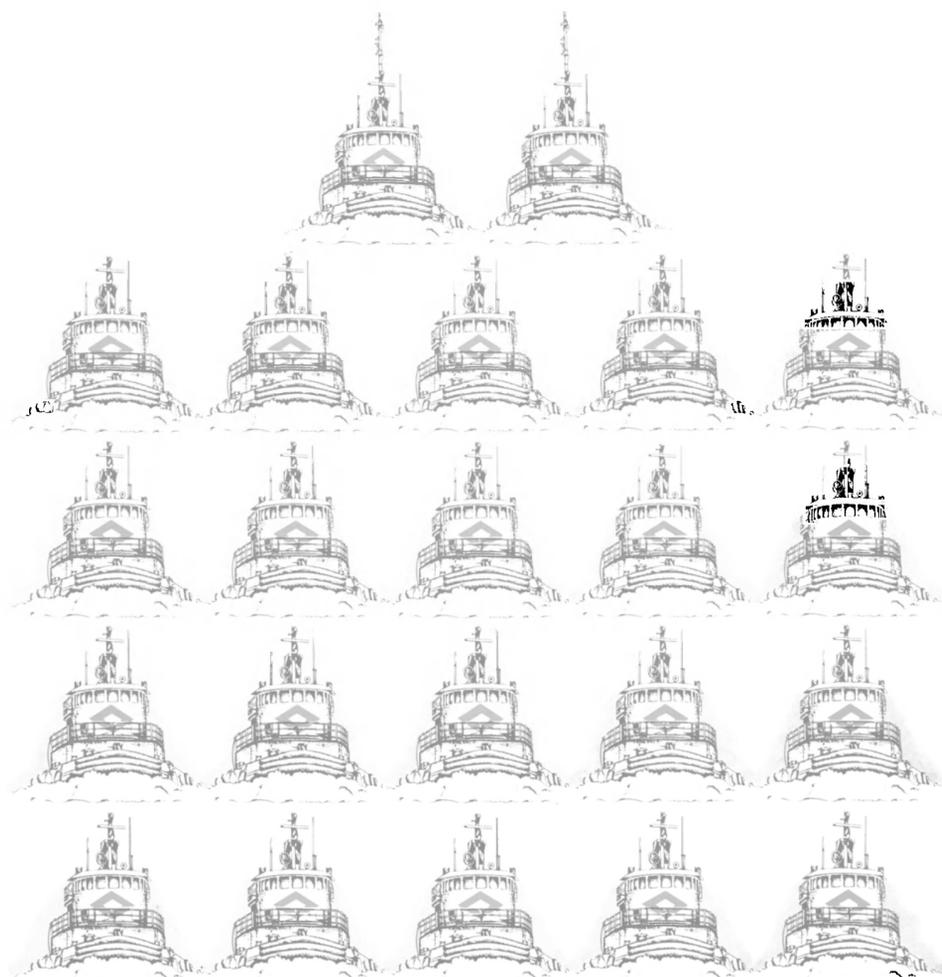
Cutless bearings are available worldwide from yards and marine stores in a full range of shaft diameters and load capacities. Write us for engineering data.

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Rauma-Repola To Build Hydrographic Vessels For Soviet Ownership

Rauma-Repola's Savonlinna Shipyard recently signed its first export contract for two hydrographic echo-sweeping vessels for Soviet owners. The contract was signed after a long international competition for the most effective specialized vessels with computer-controlled positioning, echo-sweeping, and navigation equipment of the latest technology. Together with shore stations, the vessels are scheduled to be delivered by the end of 1985.

Each of the sister vessels will have an overall length of 107.94 feet, beam of 29.85 feet, and draft of 7.22 feet. Propulsion will be by twin diesel engines, each with an output of 295 bhp. Sweeping speed will be 1-4½ miles per hour.



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SNAME San Diego Section Hears Paper On Sheathing Hulls With Copper-Nickel

The San Diego Section of The Society of Naval Architects and Marine Engineers gathered recently at the Harbor House to hear a paper by **D.W. Czimmek** and **L.W. Sandor** titled, "Eco-

nomical and Technical Feasibility of Copper-Nickel Sheathing of Ship Hulls."

Mr. Czimmek is a research project engineer at Newport News Shipbuilding and Dry Dock Company in Virginia; Dr. Sandor is manager of materials technology at the Franklin Research Center in Philadelphia. Both authors are members of the SNAME Technical and Research Panel HS-9. In 1979,

this panel became interested in copper-nickel sheathing as a bio-fouling protection of ship hulls.

Mr. Czimmek investigated the economic feasibility of copper-nickel sheathing for two ship types on a life-cycle basis. The ship types chosen were an 18,000-dwt RO/RO vessel and a 280,000-dwt tanker. Three different antifouling systems were traded off in his studies—conventional antifouling paint,

self-polishing copolymer (SPC), and copper-nickel sheathing.

Dr. Sandor addressed the technical feasibility of copper-nickel sheathing. Four methods of attachment were discussed. Test results were presented of the in-service performance over a period of two years for four groups of sheathing panels attached by the various methods to the 90,000-dwt tanker Arco Texas. New, cost-effective welding techniques for copper-nickel sheathing were also introduced.

The results of the analysis indicate that there is an economic advantage to ship operators by sheathing their vessels with copper-nickel. Some of these advantages are: low hull surface friction for the ship's life, resulting in fuel savings, reduced maintenance cost, and reduced drydocking time. Environmental problems due to toxic waste associated with the removal of conventional antifouling paint and SPC during recoating of ship hulls are eliminated as well.

Marine Safe Electronics Offers Free Literature On 'Fail-Safe' Line



Interesting literature that discusses the minimizing of overall operational costs in the shipping industry by judicious expenditure on maintenance is available without charge from Marine Safe Electronics, Concord, Ontario.

Titled "Preventive Maintenance of Electric Machines Assures Lower Operating Costs," and written by **Arie Lapsker**, vice president of engineering, Marine Safe Electronics, the nine-page discussion concludes that a policy of cost reduction by avoiding unnecessary and expensive electrical machine re-winds should be an indispensable component in achieving profitable operation of vessels in today's highly competitive business environment.

The author points out that the most serious insulation breakdowns occur during the starting period and until a few years ago an effective warning device that could monitor a machine while it is idle was not available commercially, but that a comprehensive range of insulation-monitoring relays for marine motors and generators is now offered by Marine Safe Electronics of Canada Ltd. under the name of "Fail-Safe".

For a free copy of the "Fail-Safe" literature,

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See us at AFCEA, June 19-21, Booth A240.



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**Electric Boat Awarded
\$13.7-Million Navy Contract
For Engineering Services**

General Dynamics Corporation, Electric Boat Division, Groton, Conn., has been awarded a \$13,704,708 cost-plus-fixed-fee contract for providing FY-84 engineering and design efforts to support Ohio Class submarine planning yard and design functions. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

**Prock Appointed Vice
President/General Manager
For Foss Alaska Line**



W. Lael Prock

W. Lael Prock has been named vice president/general manager of Foss Alaska Line (FAL), the Seattle-based subsidiary of Dillingham Corporation's Maritime Group.

Previously operations manager for FAL, Mr. Prock has full responsibility for all FAL activities, including operations, marketing, sales, maintenance, and administration. He reports to Bruce Robeson, president of Foss Launch & Tug Company.

Mr. Prock has been with Dillingham Maritime companies for 18 years in a variety of positions in finance, sales, and operations both in Hawaii and with FAL in Seattle.

Replacing him as FAL operations manager is Les Candee, who is responsible for all operations and maintenance activities, both in Puget Sound and Alaska. An FAL employee since 1979, he previously was maintenance manager.

Bob Slate has been named to the new position of director of marketing. He is responsible for all sales, marketing, and market development activities for all FAL services. With Dillingham since 1975, he was formerly FAL's market development manager.

**Moss Point Marine
Launches First Of Two
Utility Boats For Argosy**

Moss Point Marine recently launched the first of two 140-foot by 32-foot by 11-foot utility boats for Argosy Offshore, Ltd., of Lafayette, La. The Argosy Mate will be joined in the very near future by the Argosy Chief. These two

vessels will complete a five-boat package for Argosy by Moss Point Marine, of Escatawpa, Miss., which included three 181-foot supply vessels already on the job in the Gulf of Mexico.

Both the Mate and the Chief will be outfitted with two GM 16V92 diesel engines rated at 600 shaft horsepower each supplied by George Engine Co., along with twin disc reduction gears on a 5:1 ratio. The package includes a Har-

bor-master BT-200 150 horsepower bowthruster and 75-kw generators.

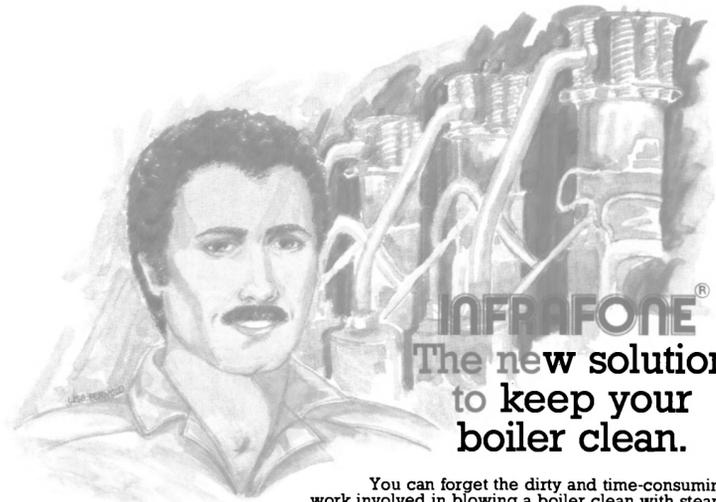
The propulsion system is completed with 4-1/2 inch shafts, Cutlass main shaft bearings, B.F. Goodrich Cutlass stern bearings, and two stainless-steel Coolidge (60 by 53) four-bladed propellers from Donovan Boat.

The USCG certified vessels will each have 92 feet by 25 feet of clear deck space. Capacities for both the Mate and Chief include:

33,400 gallons fuel; 1,160 barrels of liquid mud and 65,200 gallons of fresh water.

The ultra modern electronics gear furnished by Frank L. Beier Radio features: A Furuno FR-711 radar, Raytheon VHF, Motorola D80SSB, Furuno LC-80 Loran, SSI monitor and alarm system, and a Ritchie 8-inch magnetic compass.

Upon delivery, the Argosy Mate and the Argosy Chief are slated for duty in the Gulf.



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Artist's conception of the Creole Queen riverboat berthed at the 1984 Louisiana World's Fair. The new "old" boat built by Halter Marine, Inc., for New Orleans Paddlewheels, Inc., will operate in conjunction with the Fair.

1984 RTCM ASSEMBLY

New Orleans, Louisiana — May 29–June 1

The Radio Technical Commission for Maritime Services (RTCM) will hold its 1984 Annual Assembly Meeting May 29–June 1 at the Monteleone Hotel in New Orleans, La. The meeting, hosted by the American Waterways Operators, Inc., is being held during the Louisiana World's Fair which opens in New Orleans on May 12.

The RTCM was established in 1947 as a government/industry organization under the aegis of the Department of State. In 1972, after passage of the Federal Advisory Committee Act, it became a Federal Advisory Committee chartered by the Federal Communications Commission. Today, it is structured as a nonprofit, tax-exempt organization.

Today's RTCM is a streamlined version of the original RTCM and has inherited its mantle. All segments of the marine field—government, private industry, labor, en-

vironmentalists, consumers—are partners in providing a broad-based overview of the industry. In the interest of Federal economies, government agencies no longer provide funding; however, as a privately supported organization, RTCM's goals remain the same: "... to advance the technical quality and professional application of maritime telecommunications for the benefit of all concerned ..."

"Telecommunications" as used by RTCM means any transmission, emission or reception of signs, signals, writing, images, and sounds or intelligence of any nature by wire, radio, optical, and other electromagnetic or visual systems.

Membership in RTCM is open to all United States citizens and organizations having an interest in furthering the objectives of RTCM. Associate membership is open to foreign citizens and organizations.

During the 1984 Assembly Meeting some 28 technical papers will be read covering a wide range of topics of interest to communications people. The papers will be presented each day, May 30, 31, and June 1, in five sessions.

The keynote luncheon is scheduled for May 30, and the luncheon address "Telecommunications Needs of the Offshore Industry" will be presented by **Robert T. Lober**, president, State Boat Corporation, Houston, Texas. A buffet luncheon for all meeting registrants, sponsored by Magnavox Advanced Products and Systems Company, will be held on May 31, after which the electronic equipment manufacturer's display areas will be open. On the final day, June 1, there will be an international luncheon with the address "Inmarsat: Quo Vadis?" by Dr. **Ahmad F. Ghais**, director, Technical and Operations Division, In-

ternational Maritime Satellite Organization.

The four-day affair will have several social events scheduled starting with a welcoming reception on the evening of May 29, sponsored by the 1984 RTCM Booster Club. A Mississippi River dinner cruise on the diesel-electric sternwheeler "Creole Queen" has been set for May 30, and special tour programs in and around New Orleans include a visit to the Vieux Carre (French Quarter), and a bus trip "up river" for a visit to some of the famous antebellum plantation homes in the lower Mississippi Valley.

Technical Papers

The technical papers to be presented during the meeting are:
"Rulemaking in the Maritime

(continued on page 18)



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Total fuel savings? One vessel owner reports a 27% reduction in fuel consumption. With a speed reduction of only a tenth of a knot. This TI8000 paid for itself in a matter of weeks.

For more information, write Texas Instruments Incorporated, Marine Products, P.O. Box 405, M/S 3438, Lewisville, Texas 75067. Or call (214) 462-5220.


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RTCM Assembly

(continued from page 16)

Mobile Services," by **Raymond A. Kowalski**, U.S. Federal Communications Commission.
"The NOAA Ocean Services Program," by **Dr. John G. Hayes**,

U.S. Department of Commerce, NOAA, National Ocean Service.

"Selecting the Optimum Mix of Federally Provided Radionavigation Systems," by **David C. Scull**, U.S. Department of Transportation, Research and Special Programs Administration.

"Marine Weather Observation Programs of the National Weather

Service, NOAA," by **Jerome W. Nickerson**, U.S. Department of Commerce, NOAA, National Weather Service.

"The Shipboard Environmental Data Acquisition System (SEAS): An Inexpensive, Rapid and Accurate System for Marine Data Transfer from Deployed Ships to Shore-Based Users," by **Vince Ze-**

gowitz, U.S. Department of Commerce, NOAA, National Ocean Service.

"Maritime Applications of Space Remote Sensing—A Perspective for the 80's," by **Samuel W. McCandless Jr.**, User Systems, Inc.

"Satellite Communications and Its Application to Ship Weather Routing," by **Ed Bender** and **Larry Moore**, Comsat Tele-

systems.
"Shipboard Personnel Information Systems," by **V. Frank Colangelo**, Lykes Brothers Steamship Company, Inc.

"The Role of the Radio Electronics Officer: Present and Future," by **Barry V. Hamilton**, consultant.

"Advanced Technology in the Coast Radiotelephone Station," by **Edward B. Robinson**, AT&T Communications.

"Communications Services Provided by the United States Public Coast Stations," by **John Klemm**, Mobile Marine Radio, Inc.

"Computer Assisted Operation of a High Frequency Communications Station," by **Heinz H. Blankenhagen**, Rockwell International Corporation.

"Mechanized Vessel Access—A Human Factor to be Considered," by **George P. Schleicher**, Illinois Bell Telephone Company.

"The Geostar Navigation, Position Determination and Message System," by **Gerard K. O'Neill** and **Leslie O. Snively**, Geostar Corporation.

"Mobile Communications by Satellite—A Commercial Reality," by **Roy E. Anderson**, Mobile Satellite Corporation.

"Cellular Radio Telephone Communications Area Wide Gulf of Mexico System," by **J. Arthur Petranek**, Petroleum Communications, Inc.

QUALITY-BUILT

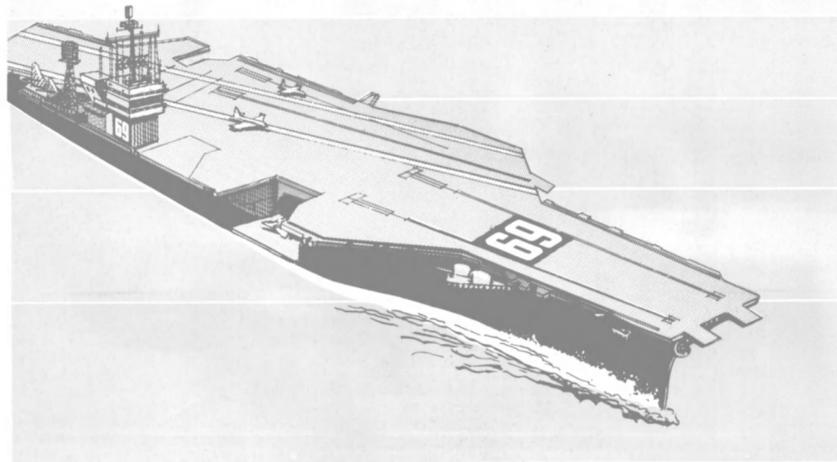
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Rugged, top-performing JOY axial, centrifugal and propeller fans are specially built for shipboard ventilation applications.

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PROGRAM 1984 RTCM Assembly New Orleans, La.

May 29

4-8 pm—Registration
7-9 pm—"Welcome Reception" sponsored by 1984 RTCM Booster Club

May 30

8 am-8 pm—Registration desk open
9-10:30 am—Annual Business Meeting
10:45-12 noon—Technical Session I
12:15-2:15 pm—Luncheon with keynote address
2:30-5:15 pm—Technical Session II
7:15-10:30 pm—Mississippi River Dinner Cruise on the "Creole Queen"

May 31

8:30 am—Registration
9 am-12:10 pm—Technical Session III
12:30-2:00 pm—Buffet Luncheon for all Meeting Registrants
2:15 pm—Meeting of Special Committee No. 103 on Ship Radar Specifications
2:15-6 pm—Electronic Equipment Manufacturer's Display areas open

June 1

8:30 am—Registration
9-11:45 am—Technical Session IV
12:15-2:15 pm—International Luncheon and Luncheon Address
2:30-5:15 pm—Technical Session V
5:15-5:30 pm—Closing Remarks

"Use and Benefits of GPS for the Civil/Commercial Communities," by **Brad Montgomery**, Texas Instruments.

"NAVSAT: A Global Civil Navigation Satellite System," by **C. Rosetti**, European Space Agency.

"Inmarsat: Clearing the Air," by **J.C. Bell**, International Maritime Satellite Organization.

"The Evolution of Inmarsat Ship Terminal Technology," by **A. Clifford Barker**, Navidyne Corporation.

"Message Preparation Capability of an Inmarsat Satellite Communications Terminal," by **Donald V. Anderson**, Magnavox Advanced Products and Systems Company.

"The Acceleration Displaceable Mass: Generation Three for Inmarsat Above-Deck Systems," by **Monroe McDonald**, Tracor, BEI, Inc.

"Coast Guard Telecommunications and the Future Global Maritime Distress and Safety System," by **Capt. M.E. Gilbert**, U.S. Department of Transportation, U.S. Coast Guard.

"A New Generation of Lifeboat Radios (Part of the FRG Project 'Ship of the Future'," by **Udo von Stebut**, DEBEG GmbH, Federal Republic of Germany.

"COSPAS/SARSAT—An Operating International System Looking Towards an International Operating Framework," by **Thomas E. McGunigal**, et. al., U.S. National Aeronautics and Space Administration.

"Implementation of a Global Search and Rescue Satellite System," by **George Kadar** and **Bruce Burlington**, Telesat Canada.

"Future Maritime Position Location System Economics and Markets," by **Robert Tanenhaus**, consultant.

"Radiolocation Range Nulls and Antenna Separations," **Thomas A. Moore**, U.S. Department of Commerce, NOAA, National Ocean Service.

The National Ocean Industries Association (NOIA) Telecommunications meetings on Navigation and Positioning, Communications, and Ocean Sensing have been scheduled to overlap with the RTCM Assembly. The meetings are to be held on May 31 and June 1 at the De La Poste Motor Hotel, 316 Rue Chartres, New Orleans, and have been so arranged as to minimize conflict with the RTCM sessions in order to enable members to attend both functions.

The NOIA offices are located at 1050 Seventeenth Street, N.W., Suite 700, Washington, D.C. 20036. The telephone number is (202) 785-5116.

For complete details on the RTCM annual assembly including registration contact RTCM's offices at 655 Fifteenth Street, N.W., Suite 300, Washington, D.C. 20005. The telephone number is (202) 639-4006.

OTC Begins Study Of TLP's Response To Wave Forces

Offshore Technology Corporation of Escondido, Calif., invited the offshore industry to participate in a study and test program to determine the response of Tension Leg Platforms (TLP) to wave forces.

Rod Edwards, president, OTC, said that the program consisted of wave basin testing of a representative TLP design model at OTC's Escondido, Calif., facility. The results defined the responses of TLP's to both linear and non-linear wave forces and established a data base for engineering design standards for these platforms.

OTC called a recent meeting in Houston, Texas, of offshore firms

to participate in this important program.

OTC has deep and shallow water test facilities as well as an outdoor coastal modeling basin. All are fully instrumented and complemented by modern computerized data acquisition systems.

For complete information on the testing program,

Circle 76 on Reader Service Card

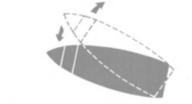
Michigan-Jastram bow thrusters: The state of the art.

Maximum maneuverability and operational efficiency translates directly into increased profitability. That's why—especially in today's economic and fuel conscious times—it's important for you to rely on the proven performance and dependability of Michigan-Jastram Bow Thrusters.



Photo, courtesy of Peterson Builders Inc.

Whether your ship is running at slow speed, with minimal rudder response; being handled by a tug-boat; or maintaining its station, generating transverse thrust helps to attain maximum maneuverability. Therefore, for optimum safety and handling capability, Michigan-Jastram Bow Thrusters are a sound, logical investment.



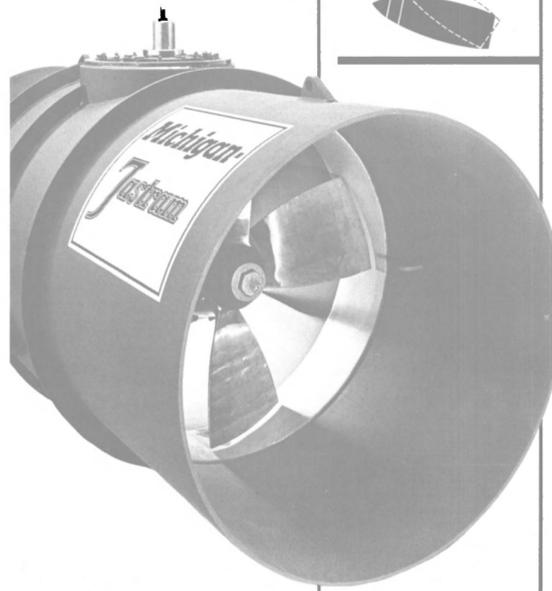
Michigan-Jastram Thrusters are delivered with the gearcase and propeller completely installed. To further ease installation, Michigan-Jastram Bow Thrusters can be delivered with full length tunnels. Once installed in the hull, elemental connections to the thruster's prime mover completes installation. The bow thruster gear and propeller can be removed for service within the tunnel.

Because few companies can offer the expertise of our technical and manufacturing staff, or a more efficient distribution and service network, shouldn't your most logical choice for the ultimate in maneuverability systems be a Michigan-Jastram Bow Thruster? We think so, too.



For information regarding Michigan-Jastram systems, please call: 1 616 452-6941, Telex: 6877077 MIMOT UW, or write: Michigan-Jastram, 1501 Buchanan Ave., S.W., Grand Rapids, MI 49507.

Michigan Wheel Corporation



Hagglunds Cranes Ordered For Rapid Deployment Force MSC Vessels

A major commitment to hydraulic deck cranes is among the interesting features of the current program to reinforce the Rapid Deployment Force (RDF) of the U.S. Navy's Military Sealift Command. All 21 of the RO/RO-LO/LO vessels in the program will be fit-

ted with hydraulic cranes, a total of 99 units, all of Hagglunds manufacture.

The program comprises 13 Maritime Prepositioning Ships (MPS) and eight Fast Logistic Ships (T-AKRX), the latter being the 33-knot containerhips purchased by the Navy from Sea-Land and now being converted at Avondale Shipyards, National Steel and Shipbuilding, and PennShip. Each of the T-AKRX ships will have one

twin 35-ton crane mounting and one twin 50-ton mounting.

Of the MPS ships, three are being converted for Waterman Steamship Corporation by National Steel; five for Maersk Line by Bethlehem Steel's Sparrows Point and Beaumont yards; and five are newbuildings for General Dynamics at its own Quincy shipyard. The Waterman ships will each have one twin 50-ton crane and one twin 35-ton; the Maersk

installations will be one twin 36-ton and two twin 30-ton cranes per ship; and the new General Dynamics ships will each have two twin 39-ton and one single 39-ton cranes per ship.

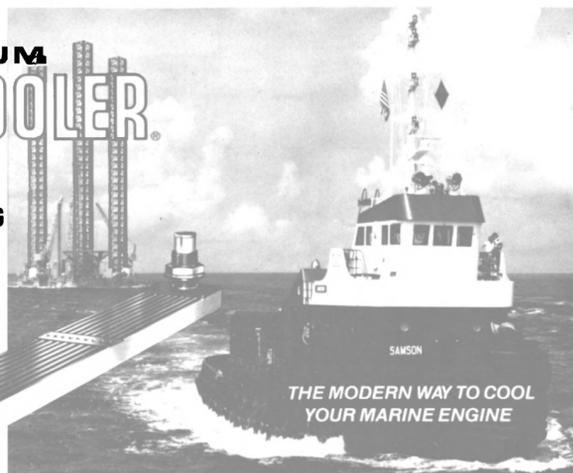
The Hagglunds cranes feature high-torque, low-speed hydraulic drives of the maker's unique design, with combination facilities enabling the smooth handling of loads up to 100 tons under a single, coordinated control. The requirement to be able to work cargo safely under open-sea conditions was a special feature of these contracts.

Hagglunds' concept of totally enclosed crane machinery permits easy maintenance and service, and insures that the cranes' performance will match the user's requirements in all environments.

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Henschel Promotes Accardi To V.P.-Finance



Michael V. Accardi

Henschel Corporation of Amesbury, Mass., a unit of General Signal, announced recently the promotion of **Michael V. Accardi** to vice president-finance.

Mr. Accardi joined Henschel as controller in July 1978. Prior to that time he was an internal auditor for General Signal Corporation and later served as a financial analyst at General Signal Appliances, Welland, Ontario.

EXPERIENCE THE EXPERIENCE OF TAYLOR DIVING

For nearly 30 years, Taylor Diving has been doing underwater work — some of it unbelievably complex — for the offshore oil industry.

Now, this formidable experience is available to ship owners/operators who are looking for fast, dependable, thorough hull cleaning service.

Hydraulic Brush Subs used by Taylor divers are employed worldwide. These

units make 50-inch swarths at speeds of 80 to 130-feet per minute, returning cleaned vessels to design hull speeds in minimum down time with significant reductions in fuel consumption. Furthermore, Taylor's prices are competitive.

Contact Taylor Diving now and discover how we earned our reputation for doing tough jobs right the first time around.



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Water Transport Announces Retirement Of President John A. Creedy

John A. Creedy, president of Water Transport Association, recently retired according to **John D. Geary**, chairman of WTA.

In announcing the retirement, Mr. Geary said: "It is with the deepest personal regret that I acknowledge **John Creedy's** retirement. Without question, the work he has done in furthering the interests of water transportation, especially with regard to the competitive relationship between railroads and water carriers, will always be remembered as a perfect example of what can be accomplished with wit, intelligence, and hard work. The whole industry will sorely miss his talents."

Mr. Creedy has been president of the Water Transport Association since 1967.

FURUNO

The Marine SSB you'd give a lot to Own.

But don't have to.

There's simply nothing on the market today as cost effective as the Furuno/skanti TRP 8258 S radio-telephone.

Full microprocessor control of all functions, continuous tuning over 1.6 to 30MHz with a powerful 250W output, universal 11 to 41VDC power supply, and superbly compact design make this radio the only logical choice for any pilothouse.

Frequency selection? Just enter directly from the sealed membrane keyboard or "punch-in" up to 76 stored simplex or semiduplex frequency pairs. If you want to listen to services other than marine SSB, the receiver operates all the way down to 100kHz. The two bright yellow-LED displays show receive and transmit frequencies selected, plus time. You can even set the built-in clock for wake-up calls or to switch on the unit for prearranged traffic schedules. A full 5W audio system and high quality receiver provide superb sound—right across the AM broadcast band.

Performance? The computer controlled coupler automatically tunes 7 to 18 meter antennas anywhere over the full frequency range in just about one-half second. Plus the fast switching synthesizer enables even single-antenna ARQ-Telex operation.

Interested? For complete information on the Furuno/skanti TRP 8258 S, just stop in at any of the more than 200 authorized Furuno dealer outlets, or write

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Navigation & Communications Equipment

— A Review —

MR/EN's editors asked the major manufacturers and distributors of marine navigation and communication equipment to tell us about their latest products and their marketing plans; the following review is based on their replies.

FOR MORE INFORMATION

If you wish to receive additional information on any particular

products in the following review, write the corresponding reader service card number(s) on the reader service card in the back of this issue.

If you wish to receive information from all the manufacturers and suppliers of navigation and communications equipment included in this review,

Circle 30 on Reader Service Card

ALDEN

Circle 31 on Reader Service Card

Alden Electronics, Inc. of Westboro, Mass., recently introduced the Marinefax V weather chart recorder, said to be unique in that it incorporates two separate memories within its built-in radio. One memory is used to store all worldwide radio frequencies, while the other is used as a local memory to store up to 10 frequencies for single-button recall.

The radio used in the Marinefax V is solid state, and features an LED frequency display with push-button selection to provide easy tuning of all worldwide frequencies from 80 kHz to 29.999 MHz. The unit is designed to meet international World Meteorological Organization recording speeds of 60, 90, and 120 scans per minute. It operates at 12, 24, or 32 volts dc or 110 or 240 volts ac. An optional 4-foot wave antenna completes the package.

The Marinefax V complements

Alden's existing line of Marinefax recorders, which are among the most compact recorders of their type on the market.

Also introduced recently is the Alden/Metz Marinefax HF antenna, a compact, passive antenna designed specifically for the reception of radiofacsimile transmissions. It provides an alternative to long wire and large passive whip antennas. Reception range tests performed by Alden have verified that the new antenna's performance is equal to existing long wire and active antennas. It is also ideally suited for use as an SWL antenna.

ANSCHUETZ

Circle 32 on Reader Service Card

Anschuetz, a well-known name in marine circles, is not only a leading manufacturer of gyrocompasses for all classes and sizes of ships, but also produces gyro re-

peater compasses, bearing sights, automatic pilot systems for seagoing ships as well as riverboats, course and rudder position recorders, electrical steering systems, computer-controlled navigation systems, combined steering stands, gyrocompass horizon systems, heave meter equipment, rate-of-turn indicators, and electronic servo systems.

The newest Anschuetz products are the low-cost Gyrostar and Standard 14. These products have only recently been added to the company's family of gyrocompasses. In addition, Anschuetz now offers a new low-cost Pilotstar autopilot in conjunction with the Gyrostar.

Also new is the low-cost, easy-to-install Compilot 9 steering console—of special interest to owners of workboats, fishing vessels, and yachts. Also of interest is the new SEACOM satellite communications terminal, now marketed by Anschuetz worldwide.

Anschuetz products are now used

on more than 7,000 ships. With the exception of the SEACOM, all the products mentioned above are manufactured in Kiel, West Germany.

In order to support the sales of its products worldwide, Anschuetz has developed a network of service stations, 87 of them in Europe, 44 in North and South America, 28 in Africa and the Near East, and 25 in Australia and the Far East.

In 1975, Anschuetz of America Instrument Corporation was founded to insure the quality of service in the U.S. Incorporated in New York, this firm works with more than 100 American service agents strategically located in major U.S. ports. These independent companies are staffed with trained engineers, and maintain an inventory of original Anschuetz parts to perform repairs and maintenance.

In addition to its main office in Thornwood, N.Y., Anschuetz of America has offices in New Orleans and Houston to sell and service Anschuetz equipment and train local service agents. Anschuetz is part of the worldwide Carl Zeiss Group, a leading name in precision mechanical, optical, and electronic instruments and equipment.

BOWDITCH

Circle 33 on Reader Service Card

Bowditch Navigation Systems of Portsmouth, N.H., offers the MK-I Automatic Visual Positioning Aid (AVPA), a unique, integrated navigation with a viewing screen that gives the navigator a real-time display of current position projected onto a standard navigational chart.

The AVPA accepts inputs from all sources, including Loran C, SatNav, Decca Navigator, and Omega, plus gyro or magnetic compass, visual bearings, radar ranges, and speed log. An integral Loran receiver is available as an option. Loran readings may be corrected for ASF errors to give extremely high position-fixing accuracy.

The navigational chart display is derived from a projection of an official Government nautical chart. This permits the navigator to view *all* of the information contained on the chart, including depth contours, soundings, shoreline, topographical features, and other essential information not typically available on "electronic charts."

CAI

Circle 64 on Reader Service Card

Communications Associates, Inc. (CAI) of Huntington Station, N.Y., has introduced a new computer-controlled, error-correcting, direct-printing teletype system. Utilizing

CAI's Digiscan transceiver, the Zitor system covers a range of 1.6 to 30 MHz, with an output of 150 watts. Other features include 100 user-programmable channels, channel scanning, and computer control.

CAI Zitor systems, in addition to controlling voice and telex communications, offer users the flexibility of microcomputer capability for use in management tasks.

Word-processing software enables reports, payroll information, material requisitions, and other data to be composed and stored on convenient diskettes for later transmission via radiotelex.

The Zitor-100 modem furnished with the system is a signal-processing unit that isolates errors in printing characters due to fading and noise disturbances in the radio transmission path.

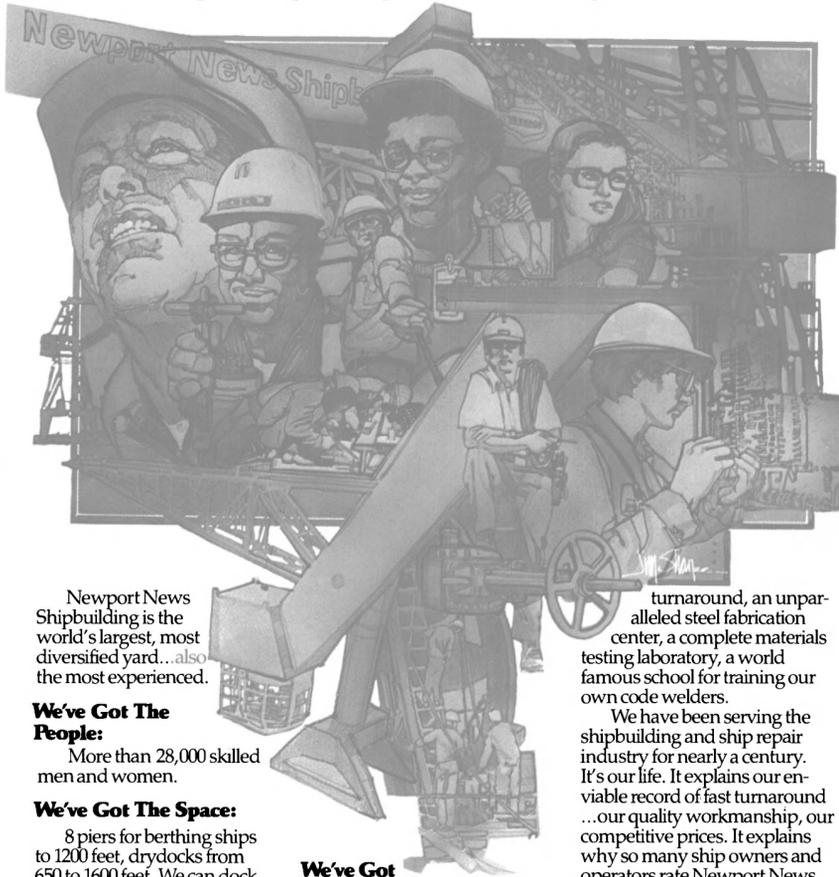
CMC COMMUNICATIONS (NAVAL SYSTEMS AB)

Circle 34 on Reader Service Card

CMC Communications Inc. of Tampa, Fla., is the U.S. distributor for Naval Systems AB, a Swedish company located in Malmo that has many years of experience in manufacturing equipment for

(continued on page 25)

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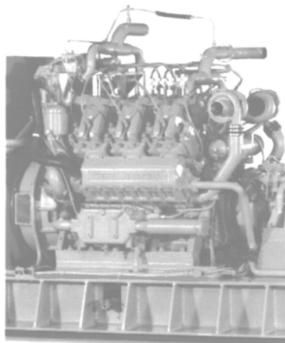
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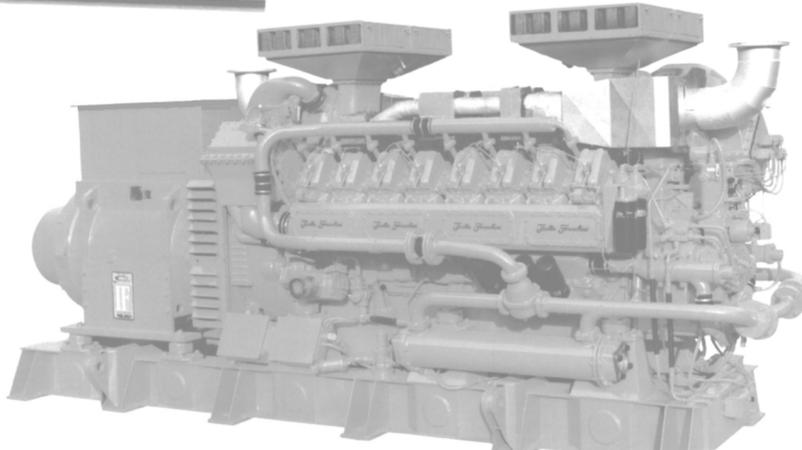


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CMC

(continued from page 23)

broadcast reception at sea. More than 15,000 Naval aeriels and some 1,200 shipboard distribution systems have been installed worldwide. With a well-established network of representatives in 30 countries with 300 depots, the Swedish company can provide fast delivery and reliable service in most ports throughout the world.

The equipment manufactured by Naval Systems, including omni-directional antenna systems that are best for TV reception at sea, is designed strictly for marine applications, and will withstand high winds, iceloading, salt water spray, and the shock and vibration that are present in the marine environment.

Naval Systems antennas are made of ABS plastic with circuitry and headamplifiers built into polyurethane foam. Mounting bases of seawater-proof special alloy, and bolts of acid-proof stainless steel insure long operational life. Special wavetraps and arresters protect the amplifiers from HF overloading and breakdown due to static charge. The aeriels are tested by Det norske Veritas for the same approval as for radar equipment, and by FFA for severe wind loads.

COMSAT

Circle 35 on Reader Service Card

COMSAT Maritime Services of Washington, D.C., provides telephone, telex, and data services to the international maritime market through the INMARSAT system. The firm's services are listed below.

Telephone. High-quality telephone service is fully interconnected with the worldwide telephone network. Service is fast, reliable, and private. Service features include direct-dial calling with one-minute minimum, station-to-station and person-to-person calls, collect calls, credit card calls, and conference calls.

Telex. Standard telex services (66 words per minute or 50 baud) are interconnected with the worldwide network through COMSAT's Telex Switching Center in Washington. Any office telex machine in the U.S. or abroad has a direct link to ships and offshore facilities with ship earth stations. Service features include store and forward, multiple address, departmental billing, and other options.

Facsimile. Using a telephone circuit, both analog and digital facsimiles of manifests, drawings, daily reports, weather maps, well logs, and other graphic materials can be exchanged between compatible telecopier machines on ship and ashore.

Voiceband Data Services. Using

voice channels, data communications are available typically at data speeds of 300, 1,200, and 2,400 bits per second.

High-speed Data. Data at 56 kilobits per second is available in the ship-to-shore direction. A voice channel can be used for coordination purposes. Service is provided to COMSAT coast earth stations for interconnection with customer-arranged U.S. domestic links.

DANMAR

Circle 36 on Reader Service Card

Danish Marine Communications A/S (DANMAR) of Denmark recently introduced its RT-210 series, a new generation of HF/SSB radiotelephones that breaks away from many traditional operating and technical concepts.

One feature of the RT-210 is that all operations and adjust-

ments are carried out from a small control unit that can be up to 160 feet from the rest of the radiotelephone station.

The RT-210 is a solid-state, 400-watt PEP, full duplex transceiver based on digital frequency synthesis. The transmitter part covers the frequency band from 1.6 to 30 MHz in 400 programmable channels, or free frequency selection in

(continued on page 26)

HIGH SEAS COMMUNICATIONS

You can build a little or a lot.

When it comes right down to the most communications for your dollar, it becomes very hard to beat a system from Radio-Holland.

One reason is that we are exclusive distributors for the Sailor line of high quality communications equipment and Philips SITOR systems.

Another is that we can deliver this gear at prices you just can't ignore. Like, for example, a full 400 watt SSB radiotelephone for about as much as you'd expect to pay for half the power.

Another reason is modularity. With our extensive equipment line, you can go from a basic radiotelephone to virtually any level of communications systems desired. Add telegraphy; telex, even fully automatic; go to a full Solas main ship station. And, of course, all of this equipment is FCC type accepted/approved.

Virtually any high seas communication need can be met by Radio-Holland.

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<p>JULY 1 Advertising Closing Date June 11</p> <p>• DIESEL POWER REVIEW Update on recent developments in fuel efficient engines for marine propulsion and auxiliary power</p> <p>• PLUS — A wealth of current marine business and technical information first — weeks before the slower months</p>	<p>JULY 15 Advertising Closing Date June 22</p> <p>• SCANDINAVIAN SHIPBUILDING Overview of the latest developments, improvements, ship repair and new construction services offered by major shipbuilding firms in Scandinavia</p> <p>* NOR-FISHING '84 Trondheim, Norway — August 6 - 12</p> <p>* OFFSHORE NORTHERN SEAS Stavanger, Norway — August 21 - 24</p> <p>• PLUS — A wealth of current marine business and technical information first — weeks before the slower months</p>
<p>AUGUST 1 Advertising Closing Date July 11</p> <p>* ANNUAL INLAND WATERWAYS SHOW ISSUE</p> <p>• SPECIAL AWO LEGISLATIVE REPORT</p> <p>• PLUS — A wealth of current marine business and technical information first — weeks before the slower months</p>	<p>AUGUST 15 Advertising Closing Date July 25</p> <p>• DISTINCTIVE WARSHIPS A portfolio of the world's most advanced warships</p> <p>• PRIVATE U.S. SHIPYARDS Builders of the 600-ship Navy. A study of the vital role played by private commercial shipbuilding/boatbuilding yards in the construction and maintenance of the world's most powerful Navy</p> <p>• PLUS — A wealth of current marine business and technical information first — weeks before the slower months</p>
<p>SEPTEMBER 1 Advertising Closing Date August 10</p> <p>* HAMBURG SHOW International Ship Machinery, Marine Technology (SMM) Exhibition and Congress Hamburg, Germany</p> <p>• GERMAN SHIPBUILDING Special feature on the West German shipbuilding industry</p> <p>• PLUS — A wealth of current marine business and technical information first — weeks before the slower months</p>	<p>SEPTEMBER 15 Advertising Closing Date August 24</p> <p>• NORTH AMERICAN OFFSHORE OUTLOOK United States and Canada</p> <p>* CORE '84 (Canadian Offshore Resources Exposition) Halifax, Nova Scotia — October 16 - 18</p> <p>• PLUS — A wealth of current marine business and technical information first — weeks before the slower months</p>

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Danmar

(continued from page 25)

100-Hz steps. The receiver covers from 100 KHz to 30 MHz, tuning in 10-Hz steps.

Switch time from transmit to receive mode is 0.9 seconds (1 second maximum). Frequency selection and antenna tuning can be controlled automatically. The RT-210 is prepared for automatic radiotelex systems.

The set consists of the RT-210 control unit and the T210 compact transceiver unit with fully automatic all-band antenna tuner. The system is controlled by microprocessor. The control unit has a built-in loudspeaker, and connection possibilities for micro-telephone, ARQ radiotelex system, and others. Operation is by a keyboard and dial controls. The operator can select transmit and receive frequencies directly by the numerical keyboard.

Exclusive distributor for DANMAR in the U.S. and Canada is Dantronics/MEMAC Company of Boca Raton, Fla.

ELECTRO-NAV

Circle 37 on Reader Service Card

Electro-Nav, Inc. of Elizabeth, N.J., has introduced the Commcenter, a total shipboard communications system with satellite, simplex/duplex telex, all-mode HF transmitter, continuous tuning receiver, VHF, keyboard terminal with full data-processing capability, and an integrated failsafe power supply, all in one standard 19-inch console rack, with space remaining for additional equipment as required or desired.

"Commcenter was designed in recognition of current and pending changes by national and international regulatory agencies in accordance with proposed new radio officer manning procedures and consequence changes in marine electronic communications standards," said Electro-Nav executive vice president John M. Saez, "so it has everything a ship needs for complete, ship-to-shore, ship-to-ship, and internal ship communications."

The center's HF and VHF transmitters have been approved by the Federal Communications Commission, and the Saturn 3 comsat has Inmarsat approval. Connections are designed to make installation simple and inexpensive. Electro-Nav considers the Commcenter so rugged and reliable that it offers a very reasonable service/maintenance arrangement.

Commcenter is equipped with Elektrisk Bureau's miniaturized Saturn 3 satcom, with its antenna autosearch, lock remote call initiation, and thorough self-diagnostics; the T204, 1,000-watt, solid state all-band SSB/AM/CW/SITOR

transmitter, and synthesized T205 exciter; the new EN-R2 microprocessor-controlled marine receiver; ENTOR telex; the 2001 synthesized, fully duplexed VHF; a 24K RAM computer which, with associated keyboard terminal and VDU, uses available standard ship's business software to handle all ship and company data processing as well as text editing. With the addition of a facsimile unit, the ship will also be able to receive and transmit documents, charts, and other graphic materials without any additional interface.

Commcenter operates on ac and dc, and requires only one line from a ship's generator. A battery backup takes over in the event of a power failure.

FURUNO

Circle 38 on Reader Service Card

To solve the difficult problem of precision navigation in narrow waters, harbors, and coastal sailing, Furuno U.S.A. Inc. of South San Francisco introduces the RS-1000 Navguide System. This is said to be the shipowner's "system of the future," as it presents complete navigation data on a single 20-inch raster-scan CRT, displayed in eight user-selectable colors.

All critical information from conventional navigation charts is digitized and stored in system memory. Data such as coastlines, lighthouses, buoys, sea depths, summits, restricted areas, safety zones, etc., are shown. Overlaid on this is raw video from the ship's radar. A position plot that shows ship's current position and track is also seen. Route planning information may be stored, or entered manually at sailing time and displayed on the CRT. In this way, the captain has all data for safe, efficient navigation shown on a single CRT display for easier decision-making.

The RS-1000 provides instant, accurate radar position fixing, and an alarm sounds if the ship deviates from planned route or approaches a known dangerous situation. Track data is supplied from gyrocompass and doppler sonar inputs, as well as from Loran or SatNav. The unit also provides steering output for interfacing with the vessel's autopilot system.

Furuno also introduces the FR-1262S, a 60-kw S-band radar with digitized electronic circuitry that is part of the well-known FR-1200 family of 12-inch CRT radars. This system is designed to interswitch with Furuno's X-band radars to provide shipowners with true all-weather capability.

Furuno has also introduced the Furuno/Skanti premium quality SSB marine radiotelephones in the U.S. The first model, the TRP 8258 S, is a 250-watt, full-featured radio with microprocessor control of all functions, a universal 10.8- to 41-volt dc power supply, and all ITU channel designations built in.

Frequency selection is by either direct keyboard entry or by "punching in" the channel number of up to 76 operator-selected frequency pairs (simplex or semiduplex). The transmitter range is 1.6 to 30 MHz, while the receiver also provides continuous tuning down to 100 kHz. This completely independent tuning system offers two significant user benefits: easy clarifier operation in 10, 100, or 1,000 Hz steps; plus general reception of services other than marine SSB,

such as LSB amateur service below 10 MHz.

All TRP 8258 S functions are accessed via a sealed membrane keyboard on the compact control unit. Two bright yellow LED displays show receive frequency and transmit frequency/time. A built-in real-time clock can be set for wakeup calls or to turn the radio on automatically for prearranged schedules. A full 5-watt audio system and high-quality AM envelope detector provide superb sound.

The exceptionally fast-switching, microprocessor-controlled antenna coupler is a key feature of the TRP 8258 S. It automatically tunes antennas from 7 to 18 meters over the full 1.6- to 30-MHz frequency range in about one-half second. This, plus the fast-switching synthesizer, enables the radio to be used for single-antenna ARQ-Telex operation.

(continued on page 32)



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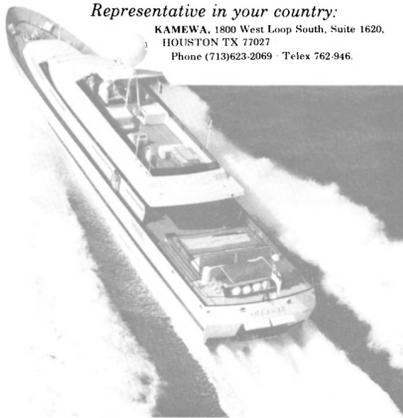
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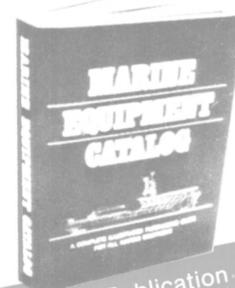
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May 15, 1984

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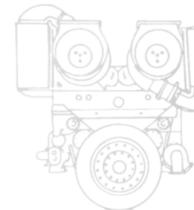
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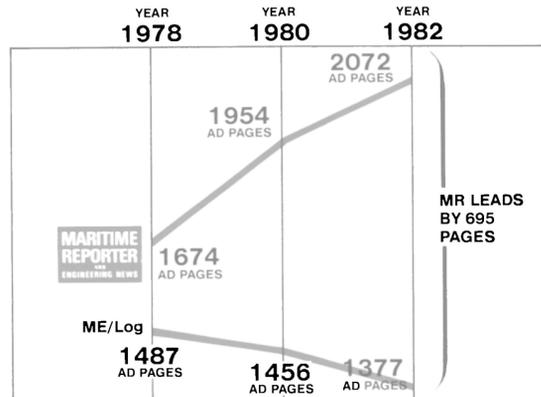
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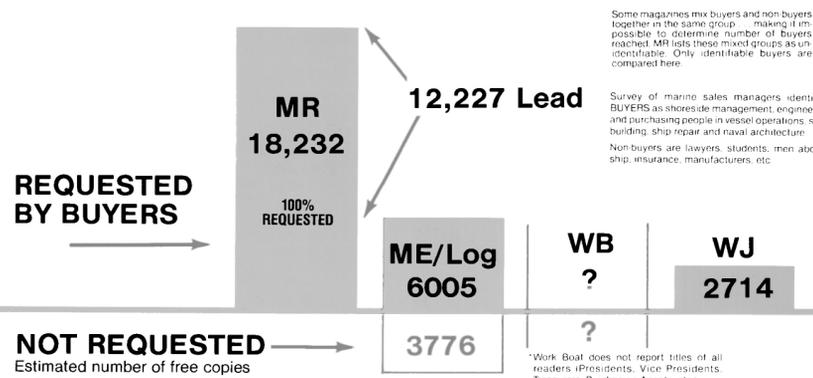
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June 1983

WANTED MARINE MAGAZINE



Circle 20 on Reader Service Card

Navigation/Communications Review —

(continued from page 27)

GRIFFITH MARINE (MARCONI)

Circle 43 on Reader Service Card

Griffith Marine Navigation, Inc. of New Rochelle, N.Y., is continuing its efforts to provide the mer-

chant shipping companies with the finest electronics available. It supports these products through proper installation and round-the-clock service.

One such new product is Marconi International Marine's NAVTEX receiver. NAVTEX is a system to provide ships with printed navigation warnings via telex. Marconi has produced the NAVTEX unit in order to provide ship-

owners with the means of receiving these warnings. Within the small unit is contained a fixed-tuned 518-KHz receiver, a micro-processor-controlled message decoder, and a 40 character per line printer. The receiver can operate from a wire or whip antenna, from any 50-ohm antenna distribution unit, or from an active receiving antenna that can be supplied with the equipment.

The NAVTEX receiver complies fully with the requirements of

IMO, CCIR, and CEPT, and has the flexibility to allow for program changes to meet future developments in the NAVTEX service. The U.S. Coast Guard began broadcasting NAVTEX warnings from its station in Sandwich, Mass., in October 1983. Ships within 200 to 300 nautical miles of this transmitter are able to receive these broadcasts.

Griffith Marine also has available the new Marconi 1,500-watt PEP SSB ship's main radio station that meets all IMO/CEPT/MPT requirements. This unit is presently only available for non-U.S.-flag installations.

Griffith is continuing its efforts to provide all ships with the finest radars and ARPA systems available. In this effort, it continues to supply Raytheon equipment to shipowners requiring radar and/or ARPA systems. To meet IMO specifications, Griffith is now promoting the Raytheon/JRC model JLN doppler speed log to be integrated with both existing and proposed ARPA installations.

Griffith Marine handles a full line of navigation and communications equipment, and has a full staff of technical personnel that can service all types of nav/com systems, including steering systems and ship's gyro system repairs.

KRUPP ATLAS

Circle 39 on Reader Service Card

New, advanced navigational aids available from Krupp Atlas Elektronik GmbH of Bremen, West Germany, include the Atlas 7600-8600 rasterscan series of big-ship radars that were shown in public for the first time at the recent Ex-ship North America Exhibition in New York City.

Comprising realtive motion, true motion, and two automatic radar plotting aids models, the series represents a major advance over conventional radial-scan radars by being the first to offer continuous true daylight rasterscan display on a 16-inch screen.

Each model conforms to or exceeds IMO and U.S. Coast Guard specifications. Nine ranges are available for display, from 0.3 to 72 miles. Four pulse lengths and three pulse-repetition frequencies are switched automatically, with the possibility of manual over-ride on pulse lengths. All use a CRT with more than 700 lines to obtain necessary discrimination and resolution. The 16-inch-diameter picture has adjacent data areas where a range of navigational target and set operating data can be displayed.

A new type of target history has been incorporated. Adjustable lengths of afterglow trails can be generated to give the navigator a direct impression of the overall traffic situation. Another feature of particular significance for coastal navigation is a centered true motion display mode in which after-

Hose-McCann Telephone Co., Inc., originators and pioneers of Sound Powered telephones for marine use, has expanded their product line to include a wide variety of U.S. Navy Electrical and Mechanical products. An assortment of these products are shown here. All Hose-McCann Navy Products are manufactured, tested, and qualified in accordance with the latest Military specifications.

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Krupp Atlas

(continued from page 32)
glow trails of other traffic correspond to their true motion.

Both RM and TM models provide for the manual acquisition of up to 10 targets as well as semi-automatic plotting with target data readout, including CPA and TCPA, while the 7600 ARPA version also provides fully automatic tracking

facilities. The 8600 ARPA unit provides for manual acquisition of up to 20 targets as well as automatic tracking and data readout inclusive of CPA and TCPA. The system which may also be configured for use with integrated navigation systems, also permits selection of 40 navigation lines as well as storage of up to 80 video maps of 40 elements each. Fifteen of the new radar series

have already been ordered by Finnish, Norwegian, and West German shipowners.

Krupp Atlas Elektronik's U.S. operations are based in Rahway, N.J.

MAGNAVOX

Circle 40 on Reader Service Card

Since Inmarsat took over the global maritime communications

satellite system from Marisat, the trend has been for manufacturers to concentrate on applications far beyond the straightforward use of telephone and telex. Magnavox Advanced Products and Systems Company of Torrance, Calif., is a leader in this trend.

Current examples of the technology now available as options of the Magnavox MX 211A SatCom involve several types of vessel monitoring systems (VMS). The most common VMS is the shore polling type, which allows the sensor data of a vessel to be monitored from shore without ship-board assistance. The ship's position, heading, speed, and fuel status can be retrieved from multiple off-site locations.

Other types of VMS available from the Magnavox SatCom system include automatic vessel monitoring, which uses predetermined schedules for frequent updates of sensor data transmission by telex or voice channels, and multiple vessel sensor monitoring. The latter option can, for example, receive both navigation data and engine status independently, using a dual-port VMS system with separate polling and buffers capable of storing up to 2,000 characters each.

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The Horizon Hand-Phone is a commercial grade VHF radio with advanced technical features never before offered on a marine handheld.

The Hand-Phone offers 71 microprocessor-controlled digitally synthesized frequencies: 55 programmed transmit/receive channels, 6 weather channels, 10 optional programmable channels for updating the unit to new FCC frequencies as issued, 10-channel scanner and Channel 16 override. A push-button keyboard permits direct selection of channel and function, both shown in the back-lighted liquid crystal display.

The compact case measures 7 1/16" x 2 1/8" x 1 1/2" and weighs less than 22 ounces with twist-off, rechargeable Ni-Cad battery pack.

Power output is 3 watts with automatic power reduction to 1 watt on certain frequencies.

The Horizon Hand-Phone comes complete with flexible antenna, rechargeable battery, charger and carrying case.

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MICROLOGIC

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Micrologic of Chatsworth, Calif., has introduced the ML-5500 submersion-proof Loran C Navigator to its product line. Submersible and compact, the unit can be installed where it is needed—even on the smallest vessel. It can be made portable with one option, so it can be used without a permanent installation.

The ML-5500 features a dual 8-digit, 1/2-inch LCD display. A color-coded, snap-action keyboard with embossed borders simplifies input entries. The display and keyboard are lighted for night operation.

Standard features include eight automatic functions: chain and secondary selection; acquisition of master and up to five secondaries; magnetic variation; ASF (land mass) correction; sequencing for 59 waypoints; route following for 50 legs, nine routes; envelope calibration; and computer memory test.

In addition, the ML-5500 has TD to LL and LL to TD conversion; a yacht racing timer; waypoint arrival, anchor watch, and cross track error alarms; four notch filters; range/bearing for 59 waypoints; cross track error/time-to-go; speed over the bottom/course made good; elapsed distance; two-point range and bearing, and much more.

Made portable with an optional rechargeable battery pack, the ML-5500 can be used with a permanently fixed antenna or optional telescopic antenna.

NEWMAR

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NEWMAR of Newport Beach.

Navigation/Communication Review

the traditional parabolic dish. The result is a small, lightweight antenna unit that meets all INMARSAT

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(continued from page 32)
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MODAR

Circle 42 on Reader Service Card

Modar Electronics, Inc. of Schaumburg, Ill., a subsidiary of Motorola Inc., announces the availability of the Triton 40.S SSB transceiver for mobile/fixed marine radio communications.

The Triton 40.S radio features a microprocessor-controlled, dual loop frequency synthesizer. Two versions are available: a 2 to 18 MHz, 125-watt model; and a 2 to 13.5 MHz, 150-watt unit. Up to 40 simplex or semiduplex channels can be stored in the radio's memory, and frequencies may be changed aboard the vessel at any time.

Frequency changes are simplified with an easy-to-use, plug-in programming card accessory that includes a keypad and LED display. Other features include constant SINAD squelch for effective noise elimination between messages, electronic channel switching for operator convenience, and long-term reliability, plus a dimmer switch for easy night viewing of the channel selector. Also available is a noise blanker that effectively suppresses ignition noise interference.

The Triton 40.S transceiver is enclosed in a rugged, plated steel housing and weighs 18.5 pounds. Measuring a compact 10 3/4 by 15 1/4 by 4 inches, this radio can be mounted in a variety of locations, including overhead, for user convenience, and is compatible with Motorola's fully automatic, microprocessor-controlled antenna tuner.

NAV-COM

Circle 44 on Reader Service Card

In today's business climate, vessel owners are looking more and more at each ship as an individual profit center. And, in considering bottom-line profits, each vessel is being equipped with the latest business management tools to provide virtually unlimited communication flexibility—voice, data, and telex.

Nav-Com is the source for these systems, with a staff of electronics and communications specialists able to integrate the most up-to-date hardware and software, fully integrated into a complete vessel package. Nav-Com reports it has developed, for example, two systems that can handle any shipboard communication requirement.

The first, Comnet,™ is built around a central electronic switching system that provides as many internal extensions and outside trunk lines as necessary, as well as complete data distribution for computer work stations. The system handles voice via any standard pushbutton or rotary telephone, combined voice and data with instruments such as the Northern Telecom Displayphone,® high speed facsimile, and pure data through our own Busiship™ microcomputer system. All of these

functions can then be integrated with the Magnavox MX-211A Satcom for reliable, cost-effective worldwide communications.

The second new system from Nav-Com, designed for shipboard data management, is called Busiship™. Each workstation uses a specially maritized IBM-PC/XT microcomputer with 10 megabyte hard disk and a wide range of software to handle vessel business

data tasks such as position reporting, purchase requisitions, requests for medical assistance, electronic mail, data logging, word processing, and automatic accessing of subscriber data bases such as the Automatic Notice to Mariners Service from DMAHTC and the UPI news service. Other applications could include vessel inventory control, complete shipboard personnel filing, voyage planning—

even cargo loading calculations. Busiship is completely integrated into the overall ship communications system to enhance the ship/office business operations activities.

Nav-Com communications and data systems are professionally designed, engineered and installed. They are supported wherever ships sail by the worldwide Magnavox service network.

(continued on page 36)

SEA CUSHIONs Joined the Navy to Help Save Money.



Prior to installing SEA CUSHION foam-filled fenders, the U.S. Navy was spending millions of dollars each year to replace broken fender piles at its piers. Many times this amount was also being spent to repair ship hull damage caused while berthing.

SEA CUSHIONs were installed for trial in 1979 at a pier which was experiencing a chronic fender pile breakage at a rate of several per week. Not a single pile has been broken since the SEA CUSHIONs were installed.

SEA CUSHIONs are now installed at naval bases throughout the U.S. and overseas. They are eliminating berthing damage to piers and ships as a major maintenance cost.

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Navigation/Communication Review

(continued from page 35)

NAVIDYNE

Circle 45 on Reader Service Card

Navidyne Corporation of Newport News, Va., recently introduced its ESZ-10000 Satellite Communicator, said to be the first satcom terminal to use a "phased array" antenna system in place of

the traditional parabolic dish. The result is a small, lightweight antenna unit that meets all INMARSAT requirements with no sacrifice in performance margins.

The ESZ-10000 retains all of the popular operating features of its predecessor, the ESZ-8000, packaged in a much smaller and more reliable unit. The below-decks equipment incorporates the latest advances in solid-state circuitry for maximum reliability and ease of field service. Like the ESZ-8000, the new unit has a fully inte-

grated, CRT-based operator's console that simplifies operating procedures through menu-driven displays, leading the user step by step through all operating procedures.

The CRT also serves as a word processor for composing and editing telex messages. Options available with the ESZ-10000 include remote indicators, multiple private telephones, automatic position reporting, voice-channel data modems, expanded memory, and a high-speed data modem (56 kbps).

NEWMAR

Circle 63 on Reader Service Card

NEWMAR of Newport Beach, Calif., introduces the NAV-222, a new automatic digital direction finder for easy and precise navigation. The compact unit utilizes a microprocessor in place of motors or moving parts and enables signals to be locked in from either the beacon or broadcast band by a lightweight delta loop antenna mounted permanently on the cabin top or mast.

Two digital LCD displays indicate station frequency to the nearest KHz and relative bearing of the station to the nearest degree. The circular LED display indicates the actual bearing in azimuth to the station. A rotating azimuth bezel allows relative bearings to be converted to true bearings for simple navigation or homing.

The speaker can be remotely located for maximum audibility, while the processor unit can be tabletop-, bulkhead-, or overhead-mounted.

NORCONTROL

Circle 46 on Reader Service Card

Norcontrol's Databridge 7 is a third-generation, automatic radar plotting aid (ARPA) that acquires and tracks up to 50 radar targets and continuously displays collision-avoidance data on the most threatening 20. It will sound a collision warning alarm whenever any of these target tracks exceed user-specified values for closest point of approach and time to closest point of approach. As a collision-avoidance system, it meets or exceeds IMO recommendations and U.S. Coast Guard and Maritime Administration standards.

The Databridge 7 is the latest of a long line of ARPAs stretching back to 1969, when a Norcontrol unit was the first collision-avoidance system ever installed on board a merchant vessel. It is manufactured by Norcontrol of Horten, Norway, a division of Kongsberg Vaapenfabrikk A/S. In the U.S. and Canada, it is marketed by Kongsberg North America Inc. of Hauppauge, N.Y.

The DB-7 acquires targets throughout the operator-designated search area—not just when a target penetrates a guard ring. The system displays anti-collision data in the form of vectors superimposed over a daylight-viewable, 16-inch radar presentation. Operator selection of true or relative vectors and vector length provides the utmost in system flexibility. Full trial maneuver facilities, including operator selection of time-to-maneuver, quickly and clearly show the results of maneuver alternatives. The DB-7 warns the operator when the proposed maneuver does not satisfy his CPA and TCPA criteria, or when it will bring him into conflict with a previously non-threatening target.

Databridge-7 is much more than a simple ARPA. Channels and

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Circle 247 on Reader Service Card

Maritime Reporter/Engineering News

fairways, radar locked to fix geographical references, can also be displayed. In addition to warning the operator if the vessel strays from its intended track, this display provides the information that is vital to insure that a maneuver to avoid a collision with another ship does not result in a collision with the bottom.

Norcontrol hasn't forgotten the operator. In addition to a control panel layout designed to simplify operation and reduce fatigue, the DB-7 includes a built-in training simulator. Preprogrammed training exercises are presented to the officer to develop his ability to operate the system and effectively use all of the information it provides. Operational problems related to new crew members or crew turnover are virtually eliminated.

Finally, Norcontrol's reputation for reliability and service is the best assurance to shipowners that the DB-7 will operate perfectly and keep on working for years to come.

Other shipboard systems from Kongsberg/Norcontrol are: DC-7 alarm and monitoring systems, AC-111 engine/bridge control systems, tank level measurement and control, and radar plotting simulator.

PUROFLOW

Circle 47 on Reader Service Card

Puroflow Corporation of Newport News, Va., manufactures power-line filters that provide essential protection to navigation and communications equipment. Modern solid-state electronics are extremely vulnerable to voltage transients and spikes. Puroflow filters save shipowners large sums of money in repair and replacement costs by reducing failures and service calls while prolonging system life.

These filters react instantly when power surges occur, shunting away excess current and maintaining a constant flow of correct voltage. They are designed to protect against both short- and long-term voltage fluctuations.

Puroflow's filters are said to be unique in the industry, in that they also contain integral noise filters to protect against noise disturbances from radio transmitters, electric motors, and other sources.

RACAL-DECCA

Circle 48 on Reader Service Card

Introduced in late 1983, the Racal-Decca MNS 2000 is the first ever integral, multi-sensor positioning receiver with automatic selection of Loran C, Omega, Transit, or Decca Navigator. It takes the positional data acquired and processes it into various navigational formats for display and interfacing with, for example, a compatible autopilot, ARPA radar, hard-copy printer, or automatic chart-plotting table. An associated

color video plotter will be introduced shortly.

The bright-track color display has been very well received since introduction in January this year. It has a 12-inch rectangular face with basic information written on the right side. The method of color presentation is said to be unique to Racal. Relative tracks are shown, from which courses and speeds of echos can be gauged. An important point is that the control panel can be mounted remote from the

display, which itself works off the top unit of the company's 370 or 270 radars.

There is now a range of three Racal "super-adaptive" autopilots, the term given to its advanced design whereby a programmed mathematical model of the ship enables the autopilot to differentiate between the influence of the weather and that of the ship's characteristics. The former is virtually ignored to produce up to four percent savings in fuel (proved

by an independent Japanese trial). Japanese lines alone have recently ordered 30 of these units.

RADIO-HOLLAND

Circle 49 on Reader Service Card

Radio-Holland U.S.A. Inc. of Houston has announced FCC type acceptance of the Sailor Program 1000B SSB radiotelephone/telex system. This full duplex product is an extremely flexible product (continued from page 38)

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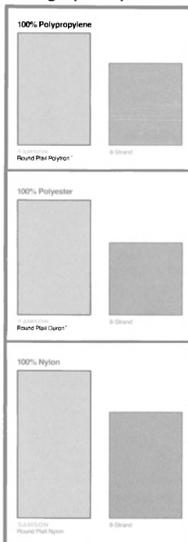
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Radio-Holland

(continued from page 37)

ble, modular communications system appropriate for virtually any class of vessel. The 400-watt transmitter and matched receiver cover the frequency range from 1.6 to 27.5 MHz. The standard system configuration consists of receiver, transmitter, exciter, and power

supply in a compact cabinet, plus autotuned antenna coupler. Frequency selection is via convenient keypad, and readout is by large LCD.

System flexibility provides even more. With the addition of either the Sailor H1240 radiotelex modem/H1249 video display/printer package, the user has a fully automatic telex system operating in the ARQ mode in full duplex or on just one antenna on a single simplex frequency.

Radio-Holland also announces that, for compulsory ship equipment, the FCC has type approved the Sailor main/reserve 500 kHz SOLAS station. This system, based on components from the Program 1000 series, consists of a main 400-watt, 500 kHz radiotelegraph transmitter with auto alarm receiver and main receiver, operating directly from ship's mains. Plus, a reserve system that operates from a 24-volt dc battery and consists of a 100-watt reserve

transmitter, auto alarm keyer, and reserve receiver.

Both of these communications systems provide unique advantages for shipowners. They are extremely compact and simple to install. They are also very economical, primarily because they utilize standard units from the Program 1000 series and are produced in a factory that has an annual output exceeding 20,000 maritime radiotelephone sets.

In addition to the SSB radio systems, Radio-Holland also distributes the full range of Sailor VHF sets. Both the RT144 simplex/semiduplex and the RT146 full duplex radios are familiar to most mariners. Both sets offer digital frequency synthesis, dual watch capability, and compact design, but the RT146 features a transceiver unit that can be mounted anywhere and supports an unlimited number of full-function control stations.

In the near future, a new supercompact 25-watt VHF, the RT2047, will be available. This radio, measuring just 4 1/2 inches high by 8 1/2 inches wide by 10 1/2 inches deep, features full duplex operation, plus up to 60 private channels, dual watch, quick channel 16, selective calling, built-in loudspeaker, and a large LCD display that shows systems functions in use.

RAYTHEON MARINE

Circle 50 on Reader Service Card

Among new products from Raytheon Marine Company of Manchester, N.H., the 1210 Mariners Pathfinder® Bright Display radar, a 12-inch unit, meets IMO dual-radar requirements on ships. Like the company's 16-inch Mariners Pathfinder, said to be the industry's most popular large radar, the 1210 has Raytheon's exclusive Bright Display system that permits simultaneous viewing by several people, even in daylight.

The 1210 radar has two-level video, which helps enhance target clarity by improving differentiations between rain and sea clutter and other targets. A target "stretcher" automatically enlarges small, distant targets to make them easier to see. The unit's automatic, full-time interference rejection stores and compares signals from successive sweeps, then displays only consistently positioned signals. This feature also helps insure the validity of Seaguard intrusion alerts. Raytheon's exclusive built-in Seaguard monitors a 360-degree safety zone from 1/4 to 64 nautical miles, and has visual and audible target alerts. Eleven radar ranges are provided from 1/4 to 64 nautical miles.

Raytheon's Raypath Automatic Radar Plotting Aid (ARPA), a low-cost unit introduced only a year ago, meets all IMO requirements for high-seas vessels. The Raypath is exceptionally compact, yet uses

GASTECH 84

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CONFERENCE PROGRAMME

Session 1 WORLD GAS SUPPLIES
Chairman: C.H.B. Verberg, Director General for Energy, Ministry of Economic Affairs, The Hague
Natural gas supplies in the world energy market
A. Gratens, President, NV Nederlandse Gasunie, Groningen, The Netherlands
World gas reserves and availability
J.T. Jensen, Jensen Associates Inc., Boston, Mass., USA
The West European gas bargaining gamble
D. Nørborg, Institute of Energy Policy, Bekkestua, Norway
Availability and utilization of natural gas in India
A.C. Kapadia and R. Nangia, Oil Industry Development Board, New Delhi, India
Pricing for LNG
C.D. Carametos, Jr., International Gas Development Corporation (IGDC), Houston, Texas, USA
Offshore gas utilisation in Norway, Argentina and Malaysia
W. Prews, Deutsche Anlagen Leasing Service GmbH, Hamburg, Germany and F.W. Heerhoff, Wirtschaftsvereinigung Industrielle Meerestechnik e.V., Düsseldorf, Germany
Gastech Welcome Party for all delegates and exhibitors

Session 2 LPG PRODUCTION AND TRADE
Chairman: To be announced
Moderator: M.D. Tossaint, Poter & Partners Inc., New York, USA
As at previous Gastech meetings, the all-day LPG Session will bring together the world's leading LPG producers, marketers and traders. Fuller details will be published nearer the date of the meeting.

Session 3 SAFETY AND TRAINING
Chairman: D.R. Tucker, Consultant, Mersesville, UK
Legislation - is there a further need?
Speaker to be announced, Lloyd's Register of Shipping, London

A review of the developments in LNG storage safety as reflected by risk assessment
D.A. Ion - Health & Safety Executive, London
The filling limitations of cargo tanks - a review of the IMO Gas Carrier Code requirements
M. Buskenhauer, Germanischer Lloyd, Hamburg, Germany

On-board operations and safety training for LCT personnel
C.R. Angus, College of Nautical Studies, Warsash, Southampton, UK

Safety in the design of gas terminals
A. Valk, Compriems BV, Amsterdam and R. Sylvester-Evans, Cremer & Watson Ltd., London

Operation and maintenance safety audit for an existing liquefied natural gas export facility
E.E. Dale and P.A. Cress, Arthur D. Little Inc., Cambridge, Mass., USA

An independent hazard and operability audit during the design and construction of a major natural gas liquids facility
J.G. Sellers and C.I. Luck, Arthur D. Little Ltd., London

Rapid assessment of the consequences arising from LPG release
M. Considine and C.C. Grant, UKAEA, Safety & Reliability Directorate, Culcheth, Warrington, UK

Cocktail/Buffer Reception for all registered Delegates and Spouses. Sponsored by Poter & Partners, New York and London

Session 4 TRANSPORTATION TECHNOLOGY & OPERATIONS
Chairman: R.I. Lake, Robert T. Lake & Associates Inc., Houston, Texas, USA and R.C. Floods, Consultant, London

Report on the year's activities of the Society of International Gas Tanker & Terminal Operators
M.P. Holdsworth, SIGTTO, Bermuda

The interdependence of plant, port, shipping and customers facilities in an LNG scheme
D.B. Jenkin, Shell International Gas Ltd. & P. Singleton, Shell International Petroleum Co. Ltd., London

Gas transportation from Northern Norway: a presentation of possible options
I. Bakke, Moss Rosenberg, Verit AS, Stavanger and R.F. Schrader & Co. A. Amundsen Kvaerner Engineering AS, Lyseaker, Norway

SPB LNG Carrier (fatigue strength, quality control and recent design development)
T. Fujitani, Ishitawama Harumi H.I., Tokyo, Japan

A 30 000m³ semi-pressurised ethylene carrier
H. Bockhaus and R. Obshager, U.S. Gastechnik GmbH, Remagen-Rolandseck, Germany

Optimisation of LPG carrier design and its influence on long-term operating costs
V. Puklavan, Liquid Gas Ingenieurgesellschaft mbH, Bonn, Germany

The prediction of sloshing pressure in prismatic tanks of LNG carriers
T. Tanaka et al., Nippon Kokaikan KK, Tsu Research Laboratory, Tsu, Mie, Japan

Trends in NGL recovery from natural and associated gases
S.H. Chen and D.G. Elliott, Davy McKee International Inc., Houston, Texas, USA and C. Collins, Davy McKee (London) Ltd., London

Fuel cost optimisation in LNG transport
I. Buret and J. Tessier, Chantiers du Nord et de la Méditerranée and M. Godin and H. Cotton, Chantiers de l'Atlantique, France

Cryogenic performance of the new generation of LNG carriers
P. Jéan, Gaz Transport, Paris

Refrigerated LPG loading/unloading system using a CALM buoy
M. Chouin & J.M. Simon, Entreprise d'Equipments Mécaniques et Hydrauliques, Saint-Cloud, France and F. Bonjour, Compagnie Française des Pétroles - TOTAL, Paris

LPG carriers at Nord Méditerranée - experience and new trends
I. Buret, Y. Hervé and J. Tessier, Chantiers du Nord et de la Méditerranée, France

Structural integrity monitoring of LNG tankers
H. Armond, IBCN, Paris

On the structural details of gas tankers
P.J. Lattelle, Bureau Veritas, Paris

Session 5 COMMERCIAL DOCUMENTATION & CONTRACTS
Chairman: J.M. Sisson, Consultant, Coventry, UK

LPG spot price assessment - bulk market NWE & Mediterranean
K. Putter, Consultant, West Horsley, Surrey, UK

LNG contracts in a period of energy surplus
C.B. Greenwald, Arent, Fox, Kintner, Plotkin & Kahn, Washington DC, USA

A general outline of shipping and trading documents needed for the international LPG market
H. Vallery-Masson, Natatom Shipping & Trading Co. Paris

The broker's growing role and function in a changing energy market
F. Baudu, Petromat Barry Roghona-Salles, Paris

Session 6 LIQUEFIED GAS TERMINALS AND STORAGE
Chairman: Incoming guest: A. Pastukov, AVP Corporation, Newbury Port, Mass., USA

Dynamic load attenuation for double-wall tanks
R.E. Hills, Pittsburgh-Des-Moines, Neville Island, PA, USA

A new method of protective insulation for the outer reservoir of a double-walled cryogenic storage tank
R. Krause, G. H. Montage GmbH, Ludwigshafen am Rhein, Germany

Experimental dynamic comparison of Perlite insulation
T. Kaups, CBI Industries Inc., Oak Brook Ill., USA

A large LNG self-supporting tank: ultrasonic control of the joint between the 9% nickel steel wall and the bottom
J.P. Capdevielle and A. Gov. Gaz de France, Paris

An experimental study on the behaviour of the outer concrete wall of a double-wall LNG storage facility under extreme thermal loads
S.R. Spindel, Bilfinger + Berger Bau, Mannheim, Germany

Planning and building of the Antwerp Gas Terminal
M.S. McKinney, UER International Ltd., London and J. Orielemans, Transoil Holding BV, Ridderkerk, Netherlands

Design and construction of the Port Botany, Australia LPG butane import terminal
G.M. Howell, PDM John Perry Pty Ltd., South Perth, Australia

Chairman: Guest speaker: W. Brumhagen, U.S. Gastechnik GmbH, Remagen-Rolandseck, Germany

Design of an in-ground storage tank for refrigerated propane
Kagawa, Tokyo Gas Company, Tokyo, Japan

Internal pressure equalising system to reduce boil-off
T.I. Marchal, Preload Technologies Inc., Garden City, New York, USA

A concrete storage barge - results of a large-scale offshore model test
E. Függen, U.S. Gastechnik GmbH, Remagen-Rolandseck, and M. Nussbaumer, Ed. Zublin AG, Stuttgart, W. Germany

Calibrating accurate level gauges in partly filled LNG/LPG tanks. The transfer calibrator
T.I. Marchal, Fovboro Trans-Somos Inc., Burlington, MA, USA

Verification of plastic foam insulation reliability
M. Huber, M. Zehn and P. Anstot, Bureau Veritas, Paris

Vapour recovery from liquid hydrocarbon storage tanks
C.A. Durr, M.D. Kellogg Inc., Houston, Texas, USA

A new concept for large concrete LPG storage tanks
Speakers to be announced, Compagnie Française des Pétroles - TOTAL, Paris and Technigaz, Maastricht, France

Session 7 GASES AS TRANSPORTATION FUELS
Chairman: T.I. Joyce, T. Joyce Associates, Fairfax, VA, USA

European automotive LPG - prospects for growth
W.C.J. Arnold, UER International Ltd., London

LPG as a transportation fuel and how it will affect LPG demand in the United States through the 1980's
S.A. Vogel, Synergy Gas Corporation, Farmingdale, NY, USA

Portability: the key to new gas markets
H.I. Mellin, Future Fuels, Inc., Detroit, Mich., USA

Canadian prospects for natural gas-fuelled vehicles
J.S. Hiron, Transportation Energy Division, Ministry of Mines, Energy and Resources, Ottawa, Canada

The marketing of natural gas as an alternative automotive fuel in New Zealand
A. Veart, Auckland Gas Co. Ltd., Auckland, New Zealand

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MR

the same 16-inch Mariners Pathfinder radar and other high-technology features such as Raytheon's Raycas, and is currently in use on more than 1,000 vessels. The Raypath scans to 64 miles, has automatic target acquisition, and tracks up to 20 targets simultaneously at ranges from 1½ to 12 nautical miles.

Raytheon's new microprocessor-controlled, 150-watt RAY-1285 SSB marine radiotelephone is preprogrammed for all of the 192 ITU channels, with memory capability for 44 user-programmed channels or frequencies. The unit's remote antenna-coupler provides fully automatic tuning.

Raytheon Marine is exclusive sales and service agent for JRC satellite communications equipment in the U.S., Mexico, and Scandinavian countries. Newest and most advanced among satellite communications systems is the JUE-35A INMARSAT Ship Earth Station, with larger video display, smaller antenna/radome, and increased memory. The JUE-35A SatCom provides 24-hour global maritime communications by telephone, telex, printer facsimile, and a wide range of interfacing equipment through the INMARSAT Organization.

RAYTHEON OCEAN SYSTEMS

Circle 51 on Reader Service Card

Raytheon Ocean Systems Company of East Providence, R.I., is dedicated to the development of products and systems to meet the growing needs of the worldwide scientific and industrial ocean industry. Ongoing research and development programs at the company focus on ocean- and maritime-oriented projects such as the recent development of a new digital survey Fathometer® depth sounder, the DSF-6000, which provides switch-selectable single or dual (simultaneous) operating frequencies of 24/100 kHz, 24/200 kHz, or 40/200 kHz.

Depth range of the DSF-6000 is in excess of 3,000 meters (9,842.4 feet), with automatic or manual switching among seven overlapping phases. Ranges are switch-selectable in feet, meters, or fathoms. Range, speed of sound in the water, tide and draft, and time tics are printed on the chart.

Computer-controlled output information bus and self-test capability are standard, and the controls and chart are illuminated. The digitizer, transceiver, and recorder are in one unit, with the digitizer providing automatic or manual bottom acquisition and automatic tracking. The DSF-6000 is said to be ideal for high-resolution, quality hydrographic profiles.

Raytheon systems for deep/shallow water bathymetry and sub-bottom profiling are used worldwide aboard oceanographic vessels for scientific and commercial ex-

ploration, including offshore oil work. Since 1964, Raytheon Ocean Systems Company has also supplied dry paper, modular solid-state recorders for military and commercial applications on land, sea, and in the air.

RDI

Circle 52 on Reader Service Card

RDI Radar Devices, Inc. of San Leandro, Calif., a leading manufacturer of guard zone warning equipment, recently introduced several new navigation and communications products. These include the RDI ARPA I, M10 Collision Avoidance System, Star* Trac Satellite Navigator, and Satcom I Inmarsat Satellite Communications System.

For shipowners having to comply with the mandatory International Maritime Organization (IMO) ARPA fitting, the RDI ARPA I, M10 represents the most economical solution.

The Amendments to the International Convention for the Safety of Life at Sea, SOLAS 1974, adopted by the Maritime Safety Committee in November 1981, state: "Automatic radar plotting aids fitted prior to September 1, 1984 which do not fully conform to the performance standards adopted by the Organization may, at the discretion of the Administration, be retained until January 1, 1991."

In simple terms, this statement provides an opportunity for a shipowner to fit an RDI ARPA I to a 12-inch radar and comply with the spirit of the IMO regulations until 1991.

In 1982, the U.S. Coast Guard permitted an add-on ARPA solution for existing 12-inch radars. These ARPA I/12-inch radar combinations may be retained until 1991 when the IMO ARPA specifications take full effect.

The Star* Trac satellite navigator, a commercial satnav at a competitive price, offers 64 navigation displays plus log/gyro interface for a list price of \$2,495.

The new RDI Satcom I features a self-prompting keyboard to make operation simple. Designed for use with Inmarsat, the unit can be interfaced with the Star* Trac satnav to provide an automatic vessel monitoring system for less than \$33,000.

REGENCY

Circle 53 on Reader Service Card

Regency Electronics, Inc. of Indianapolis, Ind., uses a built-in microcomputer "brain" to bring outstanding capabilities into a small, hand-held, two-way marine radio (transceiver). It features a pushbutton keyboard for fast, easy access to all available U.S. and international marine channels, plus 10 weather channels; automatic scanning of any or all channels; a special "call waiting" (programmable priority) feature to prevent interruptions during conversa-

tions; a side-lighted liquid crystal display that is fully legible even in direct sunlight; and more.

The Polaris MT 1000 also offers a key lock and transmitter lock to prevent unintentional operation; a special backup battery that maintains its in-memory programming for up to two years even when its rechargeable batteries have been depleted; and a sealed rubber keypad to keep its circuitry even in inclement weather or continued salt-spray exposure.

Either of two transmit power levels (1 or 3 watts) can be selected. The 3-watt operation offers more dependable communications over a greater range; 1-watt operation helps conserve batteries. Its NiCad batteries provide up to eight hours of use on a single charge.

Regency now offers a selection from more than 15,000 frequencies in six bands in its D310 programmable scanner. It incorporates a novel memory/backup system that needs no batteries, yet maintains its programming for up to a week during power outage or storage.

The D310 requires no added

crystals, yet covers six bands: low and high VHF (30-50 and 148-174 MHz); UHF (450-470 MHz); UHF "T" (470-512 MHz), and two FM "hams" bands (144-148 and 440-450 MHz). Programming its 30 channels is simplified by plain-language prompts that appear on its display to identify the action in process or required next.

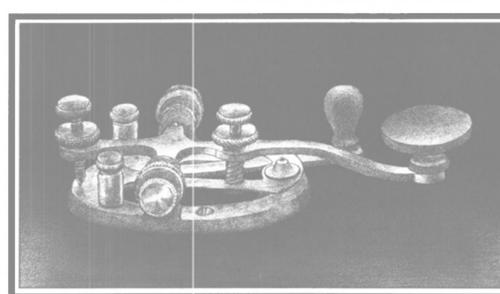
ROBERTSON/KONGSBERG

Circle 54 on Reader Service Card

Based on extensive research into microprocessor technology, Robertson/Kongsberg of Hauppauge, N.Y., announces the new AP-9 autopilot with adaptive rudder control system for medium to large vessels of all types.

The key feature of the AP-9 is new, predictive software that computes rudder response characteristics and completely replaces the conventional dead-band principle. Combined with a totally new rudder feedback unit, this virtually eliminates rudder overshoot, re-

(continued from page 40)



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Robertson/Kongsberg

(continued from page 39)
sulting in more precise rudder positioning and extremely accurate steering.

The AP-9 uses LCDs to give course information and confirm the status of various control parameters. The use of touchbutton controls and the ability to take heading information from both magnetic and gyrocompass inputs makes the new unit suitable for almost any vessel. It can take heading input from most popular brands of gyrocompasses, as well as from Robertson's highly accurate SKR-82 gyrocompass.

There is also a built-in interface for any National Marine Electronics Association compatible navigation receiver. While designed primarily for larger commercial vessels and meeting all classification society requirements, the AP-9 remains amazingly cost-effective even for large yachts.

The AP-9 has a full range of remote controls and rudder angle indicators, as well as extensive self-test features. A complete second steering station is available as an option.

Robertson also offers a complete line of professional steering levers

(follow-up and non-follow-up) and rudder angle indicator systems. The RSG Robertson Subsea Gyrocompass provides a unique solution to the problem of underwater navigation.

Always a leader in technology, the Robertson product line also includes the RMP Multipurpose Pilot, a high-performance, integrated positioning system with joystick control of rudder, thruster, and propeller force control.

SEA-TEX

Circle 55 on Reader Service Card

Marine navigation information obtained by a conventional radar system can now be displayed in six different colors on the CRM-1 Color Radar Monitor from SEA-TEX of Clearwater, Fla. The 360-degree presentation is continuous and never fades from view, and the color CRT allows exceptional daylight viewing, even without a hood.

The CRM-1 monitor connects to most conventional radar systems, and converts system data into a six-color display depending on the strength of the returning echo. The strongest echos are displayed in red, medium echos are yellow, weak signals come in green, and the sea surface is displayed as

blue. Variable Bearing Marker (VBM) is displayed as a white dotted line, and Variable Range Marker (VRM) appears as a white dotted circle. The plot line is black.

The plotting feature helps the operator determine relative bearing, course direction, and speed of moving targets around his vessel. Plotting time can be selected 15 seconds (fast) or one minute (slow).

Range capability is from one-half to 64 nautical miles, depending on capability of the master radar. The CRM-1 can be interfaced with most conventional radars and can operate up to 50 feet away from the master radar.

An audible proximity alarm warns of a target's entry into a guard zone established by the operator. Five zones can be selected: full 360-degree radius, 180-degree on the bow, 90-degree on the bow, 180-degree on the port, and 180-degree on the starboard. Distance of range gates can be from one-half to 64 nautical miles from the vessel.

SIMRAD

Circle 56 on Reader Service Card

Simrad, Inc. of Seattle recently announced the immediate availability of the Simrad/Taiyo TD-

C338HS automatic direction finder. The unit has a fully synthesized frequency range from 200 kHz to 17.999 MHz, with 100-frequency memory and 100-channel scanning. Frequency is selectable via keyboard or rotary encoder, in 0.1 kHz steps.

Frequency, channel, and signal strength are indicated by digital LED indicators. Bearings are displayed automatically by a CRT indicator, which includes auto sense control. The TD-C338HS is one of the most advanced, state-of-the-art MF/HF automatic direction finders available.

SPERRY

Circle 57 on Reader Service Card

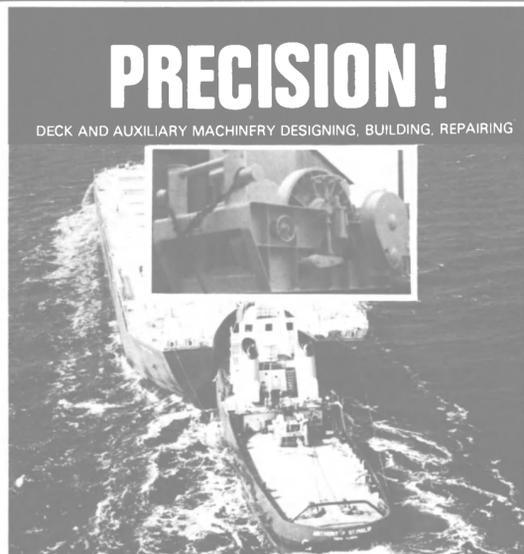
Sperry Corporation of Great Neck, N.Y., one of the world's largest commercial maritime suppliers of navigation and guidance systems, has recently introduced a new line of vessel traffic surveillance (VTS) systems using a new computer-controlled console that provides full-color graphics, a touch-sensitive screen for control functions, and harbor data management capabilities.

Sperry has also developed new

(continued on page 42)

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For more than 30 years, Servo has set the standard in Doppler DF systems for marine, aviation and ground applications throughout the world.

Typical of these systems is the Model 7014 SERVOSEA™, a general purpose VHF radio DF service-proven in operation in a shipboard environment. It features just two major components—a fully synthesized 285-channel receiver/display control unit and a medium aperture, 8-element Doppler antenna which is electronically commutated for sequential sampling of received signals—without any moving parts. Both are lightweight and portable, but sturdy in construction for long life and durability. Space requirements are minimal and power consumption is low, making the Model 7014 an ideal choice for shipboard use. Principal design and performance features include:

- VHF/FM, 155.475 to 162.55 MHz and 121.5 MHz for emergency or distress
- Solid-state, lightweight, rugged construction, fully tested for shipboard use
- Accuracy to within $\pm 1^\circ$
- Automatic digital displays for frequency and directional bearing
- "Ring-Of-Lights" LED vector display
- Overhead passage of aircraft detected, with code "OHP" on bearing display
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- Audio output with internal speaker
- Low power consumption
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Sperry

(continued from page 40)

communications links to send and receive data from remote radar sites using low-cost, voice-quality cable or microwave hookups.

In its most recent configuration, the VTS system provides for simultaneous tracking of more than 200 targets, operation and control of up to eight remote radar sites, harbor data management information, trial maneuvering, zone monitoring, speed monitoring, anchor watch, buoy watch, and operator procedure instruction capabilities.

Sperry has also delivered and installed a number of new SRP-2000 ship control systems, which combine both ship control and navigation functions at a single console.

The company has also become involved recently in the development, installation, and servicing of complete electronics systems for commercial ships. Sperry recently completed the design, development, and installation of a fully integrated electronics suite for the Abdul Aziz, including navigation, control, communications, medical, security, and entertainment subsystems. The communications subsystem provides for one of the first computer-controlled communications networks ever installed aboard a non-military ship, and includes intra-ship phones, intercoms, and hand-held radios interconnected to a computer-controlled external communications network of high-powered high-frequency, low-frequency, and SSB transmitters and receivers, satellite communications equipment, and a variety of VHF and UHF systems.

STANDARD

Circle 58 on Reader Service Card

What are said to be the lightest, most compact 5-watt VHF and 2-watt UHF intrinsically safe, hand-held radios on the market today are now available from Standard Communications Corporation of Los Angeles. They are designed for use in hazardous locations and for bridge-to-bridge communications.

The HX500S operates in the 156-158 MHz VHF/FM marine band and includes a six-channel capability. Channels six and 16 are factory-installed. The UHF version operates at 450-512 MHz.

Measuring only 6 1/4 inches high by 2 3/8 inches wide by 1 3/8 inches deep, the HX500 radio weighs just 19.4 ounces with a battery. Power for the HX500 Series comes from a choice of twist-off battery packs rated at 500 mA or 900 mA.

TEXAS INSTRUMENTS

Circle 59 on Reader Service Card

Texas Instruments of Dallas re-

cently introduced the TI 9900 II Loran C navigator, a complete Loran C-based navigation system with the performance, features, and accuracy of the popular TI 9900, plus an exceptional array of additional capabilities.

The TI 9900 II features 100 waypoints that can be entered as time differences or latitude/longitude coordinates. Trips of up to 50 legs can be stored, with reverse capabilities. A unique trip planning function allows the user to compute course and distance between two waypoints without receiving a Loran signal. Additional capabilities of the system include automatic waypoint sequencing and the display of range and bearing to the next waypoint as each one is passed.

According to Gary Howe, TI's marine marketing manager, "The TI 9900 II has been designed with the user in mind. A sealed, fully backlit keyboard is provided, with oversized keys, not a membrane key pad. This makes entering information fast, sure, and easy, even with gloves on."

In addition, most of the TI 9900 II's navigation functions—range to destination, course-over-bottom, cross track error, speed-over-bottom, time-to-go, ETA, velocity-made-good, magnetic variation, and many more—can be instantly displayed with only one simple key-press. A large, clear, alphanumeric dot matrix display provides navigation information in plain, easy-to-read English, eliminating confusion caused by similar-looking letters and numbers, such as "b" and "6."

Six highly advanced, electronic notch filters are built into TI 9900 II, providing precise protection from signal interference no matter where the vessel is operated.

The high-performance characteristics of the system include wider dynamic range, greater envelope-cycle-distortion tolerance, and shorter acquisition time. The TI 9900 II provides standard interfaces for a LORSAT integrated navigation system, a TI 8000 integrated marine system, printers, and autopilots at no additional cost.

The feature-oriented TI 9900 II also includes three separate alarm systems for safer navigation. An arrival alarm can be programmed to sound when the vessel comes within 0.5 nautical mile of the destination waypoint. A programmable off-course alarm will sound if the course deviation exceeds the set limit, in hundredths of a nautical mile. The anchor watch alarm can be programmed to alert those on board if the anchor drags.

TRACOR

Circle 60 on Reader Service Card

Tracor Instruments of Austin, Texas, manufactures the Bridge-

star Satellite Navigator, economically priced at \$2,495. Outstanding features of this unit include a "Sleep Mode" that uses less than 3 watts of power, no-charge compass/log interface, point-to-point route planning, and wide range power supply.

Perhaps the most unique of these features is the Sleep Mode. After each satellite pass, the unit automatically turns itself "off" to conserve power. Twenty minutes before the next satellite pass, the unit automatically restores all functions in order to calculate the next fix. After that fix, the unit once again "goes to sleep." During the Sleep Mode, all timing and dead reckoning functions are continued, with no loss of data. During this period, the unit can be "awakened" at any time by operator command.

Of equal importance, the Bridgestar has established a reputation for reliability said to be unmatched in marine electronics. This dependability and Tracor's outstanding service have led to a higher level of usability than is found in many other systems.

Bridgestar is also among the easiest to operate of any navigation receiver. This simplicity of use, combined with the large, easy-to-read display, insures error-free, safer navigation.

Satellite navigators provide, on the average, a satellite fix every 30 to 90 minutes, depending on latitude and the number of operational Transit satellites. When combined with Omega, the ultimate worldwide navigation system is achieved.

Tracor has introduced the Global Navigation System (GNS) priced at \$9,950 that combines the accuracy, all-weather satellite data with the continuous navigation capability of Omega. Any inaccuracies of Omega are corrected automatically by each satellite fix. Omega position fixes are transferred every 60 seconds to enhance the dead reckoning of the SatNav.

Tracor designed the GNS as two separate units capable of navigating independently as well as together. With this combination, the user gets total redundancy in worldwide navigation capability, and the maximum in safety.

TRIMBLE

Circle 61 on Reader Service Card

The Model 300 Loran computer offered by Trimble Navigation, Ltd. of Mountain View, Calif., is the Loran that continues navigating even where no Loran signals exist. The unit dead reckons position right through the signal interruptions that make other Lorans useless. It provides a constantly updated estimate of position even when the Trimble's normal Loran positioning capability is unavailable.

The Model 300 will stand alone as a principal electronic aid to

navigation or it may be the centerpiece of an integrated navigation system. Its dead reckoning software package assumes the chore of recording estimated positions and calculates set and drift, utilizing external inputs of speed, heading, and time from a known position.

A track mode permits automatic tracking of the last nine Loran fixes at whatever time intervals required, and the last 10 satnav fixes with its corresponding Loran fix. This function may be invaluable in knowing a precise starting position for the dead reckoning calculations or for retracing the course just traveled.

The Model 300 standalone package includes interface capabilities for satnav, wind and speed instruments, autopilots, CDI, plotters, RS422 for computers, external alarms, external speed and heading transducers, and the Trimble full-function remote display. Also available is the optional Hewlett-Packard interface loop for handheld or personal computers. This interface is like having a handheld remote controller.

II MORROW

Circle 62 on Reader Service Card

II Morrow Inc. of Salem, Ore., is a leading manufacturer of marine navigation equipment, specializing in the production of Loran C receivers and XY track plotters.

The Avenger III Loran C receiver is the most recent addition to the company's product line. This unit is one of the smallest and more compact Loran C receivers, providing high accuracy and great repeatability. Features offered include current L/L, current LOP, 100 waypoints in L/L and LOPs, full navigation computer with bearing to destination in degrees, speed over bottom in knots, range in nautical miles, ground track in degrees, time to destination in minutes, cross track error, and point-to-point bearing and range between any two of the 100 waypoints.

The unit also offers anchor watch, arrival alert, SRN and ECD display, magnetic variation adjustment, ASF adjustment, and five-year, non-volatile memory. It also features a universal power supply operating on any dc input from 6.5 to 48 volts.

The Avenger III comes with a full two-year warranty, one of the best in the industry, and is priced at \$1,295.

II Morrow also manufactures the Mariner M-33 track plotter, which provides a permanent hard-copy record of a vessel's track on any 8 1/2- by 11-inch sheet of paper or chart. This unit can even draw LOP grids on any scale to produce navigation charts.

The company is also the world's largest manufacturer of airborne Loran C receivers.



British Shipbuilders' executives at recent luncheon in New York included (L to R): J. Graham Day, chairman and managing director; John Pullen, director of corporate affairs; Louis W. Gornick, president of Penn International Marine Agencies, U.S. representative for BS; Kenneth R. Chapman, managing director-marketing; and Des Gleeson, director of marketing.

PIMA Hosts New York Luncheon On Behalf Of British Shipbuilders

During the recent Expoship North America 84 Exhibition in New York City, Louis W. Gornick, president of Penn International Marine Agencies, Ltd., hosted a luncheon at the Whitehall Club on behalf of British Shipbuilders and its managing director, J. Graham Day.

Attending the luncheon were about 75 guests representing the marine industry, including ship-

owners, naval architects, and representatives of classification societies, marine banks, and publications.

Mr. Day gave a short talk outlining the "new" British Shipbuilders' restructuring and plans for the future that will benefit ship-owners who are considering new construction and/or major conversions or repairs to their vessels.

McKenna Named Sales Manager At Aeroquip's Industrial Division



Robert J. McKenna

Robert J. McKenna has been promoted to sales manager, marine/military products, in Aeroquip Corporation's Industrial Division marketing department, based in Jackson, Mich.

He joined Aeroquip in 1978 as a product manager for hose and fittings products, and holds a bachelor's degree from Western Kentucky University.

Aeroquip Corporation, a Libbey-Owens-Ford company, is a worldwide leading manufacturer of fluid power and fluid system components.

Warren Introduces New Line of Process Pumps — Catalog Available

A new line of centrifugal process pumps meeting the sixth edition of

API Specification 610 has been introduced by Warren Pumps Division, Houdaille Industries, Inc., Warren, Mass. Designated the Series 3800, the pumps have been developed for a wide range of process and petroleum refining applications. The series 3800 is available in 28 sizes for capacities to 3,200 gpm and heads to 1,000 feet. Pump efficiencies meet today's requirements to achieve power savings. Only three power frame sizes are required for the entire line of 28 pump sizes, which reduces inventory and maintenance costs.

New catalog 3800 includes list of applications, pump sectional views, design data tables, interchangeability tables, dimensions and selection charts.

For a free catalog on the new Series 3800,

Circle 81 on Reader Service Card

Libby Joins DLI Engineering Corporation

Mark E. Libby recently joined DLI Engineering Corporation as a senior engineer, specializing in machinery incipient failure detection and diagnostics, according to Bert Lundgaard, president of DLI.

A 1967 graduate of the USCG Academy, Mr. Libby holds a BS degree in engineering and an MS in physical oceanography. For the

past nine years, Mr. Libby worked for the Navy in development and application of advanced technology programs for machinery testing and overhaul planning.

Peter Goetz Appointed General Manager Of Electro Dynamic

Peter B. Goetz has been appointed general manager of Electro Dynamic, an Avenel, N.J., facility of the General Dynamics Electric Boat Division in Groton, Conn. He will report to Fritz G. Tovar, vice president-general manager of Electric Boat.

Mr. Goetz originally joined General Dynamics at Electro Dynamic in 1962 as a design engineer. In 1968 he became industrial program manager and held increasingly responsible positions at the facility. He was appointed fa-

cility manager in 1973, the position he has held until now. Mr. Goetz earned a bachelor of electrical engineering degree from Villanova University in 1956.

Electro Dynamic is a manufacturer of fans, electric motors, generators, and controls for shipboard use and general industrial applications.

FMC Turbo Pumps Appoints Gava As New Regional Sales Manager

Daniel A. Gava has joined FMC Coffin* Turbo Pumps, FMC Corporation, as Southeast regional sales manager. Based in Houston, Mr. Gava will be responsible for industrial sales of high-speed centrifugal pumps and turbines. He was previously with Ingersoll-Rand, Pump Division, for six years.

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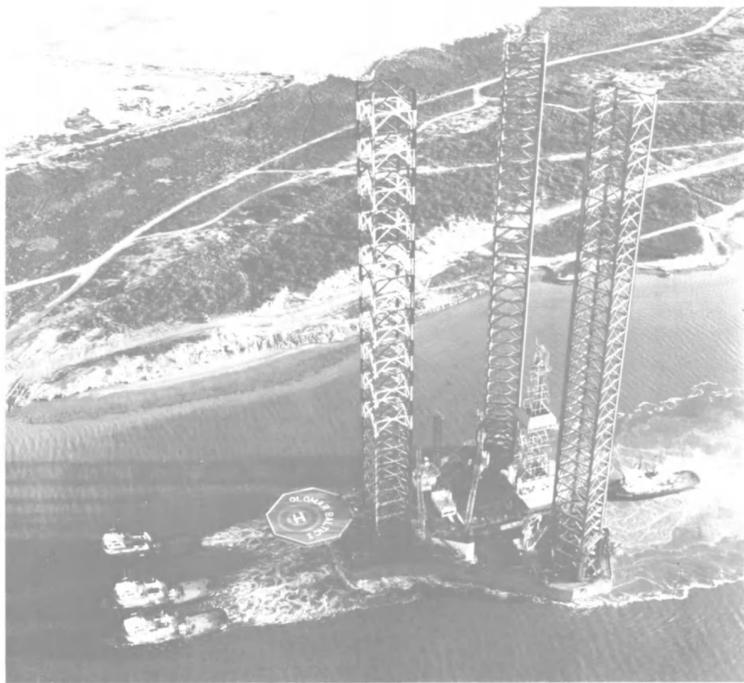
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136' LCU at Davis Boat Works, Newport News, VA.

Circle 305 on Reader Service Card

43



First Super 300 Class jackup drilling rig Glomar Baltic I shown moving through the Brownsville Ship Channel on the way to its first drilling assignment in the Gulf. A new design, the rig was built by Marathon LeTourneau's Gulf Marine Division in Brownsville, Texas, and will be operated by Global Marine Company.

First Marathon Super 300 Jackup Now Drilling In Gulf Of Mexico

The Glomar Baltic I, first Marathon LeTourneau Super 300 Class jackup drilling rig, recently began its first drilling assignment in the Gulf of Mexico. The rig, which is being operated by Global Marine Company, was built at Marathon's Gulf Marine Division in Brownsville, Texas. A new design, the Super 300 is a large jackup designed to work in locations with water depths and environmental conditions too severe for standard 300-foot water depth jackups but not hostile enough to require a Marathon Gorilla Class rig.

The Glomar Baltic I is fitted with the Super 300's optional leg length of 515 feet (the standard length is 448 feet).

In this enhanced configuration, the rig can drill in 350 feet of water with 100-knot winds and 55-foot-high waves.

Like the Gorilla rigs, the Super 300 utilized the Marathon LeTourneau Slotilever™, which allows drilling in both the slot and cantilever positions. With the derrick package over the slot, the rig's drilling mode and survival mode are the same.

The new rig's hull is 270 feet long by 268 feet wide by 28 feet deep. It is designed for a normal elective variable load capacity of 4,250 tons plus 650 tons derrick pull-in load.

The Super 300 is classed +A1 by the Amer-

ican Bureau of Shipping and built in accordance with the Mobile Offshore Drilling Unit Regulations of the U.S. Coast Guard. When required by the customer, the Super 300 can be constructed to meet the requirements of the U.K. Department of Energy, the Netherlands Department of Mines, and other regulatory bodies.

Anixter Bros. Publishes New Buyers Guide Of Products For Business Communications

Anixter Bros., Inc., Skokie, Ill., has published a new telecommunications catalog: "A Buyers Guide of Products for Business Communications."

The buyers guide features a full line of business communications products for every facet of industry and commerce that uses telecommunications products for voice, video or data transmission. Products include subscriber equipment, and a complete line of communications wire and cable such as inside/outside telephone wire, plenum, data and station wire and cable.

Anixter stocks the products of hundreds of leading manufacturers including AT&T's

Western Electric, TIE, Comdial, AMP, SAN/BAR, TRW, Porta Systems, and many others. The company maintains a network of fully stocked computer-linked distribution centers in all major markets in the U.S. and Canada. Anixter also provides services such as repair, refurbishment, pre-assembly and pre-connection for a wide range of telephone products.

For a copy of the Buyers Guide,

Circle 67 on Reader Service Card

Litton Division Awarded \$23-Million Navy Contract For Gas Generators

Litton Systems Incorporated, Clifton Precision Instruments and Life Support Division, Davenport, Iowa, has been awarded a \$22,995,500, multi-year firm-fixed-price contract to furnish 65 oxygen/nitrogen, liquid/gas mobile generation systems and related data. The Naval Regional Contracting Center, Philadelphia, is the contracting activity.

Union Flonetics Announces Availability Of R-10 Line Of Relief Valves

Union Flonetics, Clinton, Pa., a division of The Union Corporation, has announced the availability of the R-10 line of relief valves designed to prevent overpressurization of shipboard piping systems. Developed for the U.S. Navy and built to MIL-V-24332 (liquid service) and MIL-V-22549 (gas service) specifications, these are available in sizes through 8 inches in bronze or steel. Special attention to the spring design assures that "set point" repeatability is maintained throughout the life of the valves. Union Flonetics R-10 Relief Valves have been tested and meet the vibration requirements of MIL-STD-167 and high shock requirements of MIL-S-901.

For additional information on the R-10 line,

Circle 66 on Reader Service Card



"IT'S JACQUES COUSTEAU!"

Maritime Reporter/Engineering News



Shown above during the reception at the Waldorf in New York City, left to right: Jens Larsson, William H. Bevan, Ludwig Eizak, Sid Unger, Chaim Barash, and Bengt L. Fink, vice president, Cityvarvet AB.

U.S.-Based Repair Service Introduced by Cityvarvet AB

Cityvarvet AB, previously Gotaverken Cityvarvet AB, recently introduced a new United States-based service for their subsidiary, Ciserve AB, at a reception in the Waldorf-Astoria in New York City. Ciserve is the travel arm of Sweden's Gothenberg-based shipyard that specializes in providing highly skilled labor to vessels at any port or while at sea.

Based in Norfolk, Va., at the NORSHIPCO shipyard, the service began with several diesel engine repairs and the complete overhaul of the main engines on the passenger ship Daphne. During the reception, Cityvarvet's vice president Bengt Fink described the condition of the ship repair industry and dispelled some of the misconceptions about Swe-

den's climate and accessibility due to its geographic position. Mr. Fink explained that the yard's reputation for efficiency is well known to Europeans, making them frequent callers at the facility. Cityvarvet is now actively contacting the United States maritime fraternity to better acquaint them with their ship repair capabilities.

Cityvarvet dropped the Gotaverken name from its former title, Gotaverken Cityvarvet AB, in order to emphasize their specialization in repair only, as opposed to the newbuilding and engine manufacturing of the large Gotaverken group. Cityvarvet's facilities include nine drydocks, with the largest being the floating drydock for 240,000-deadweight-ton vessels, and the mammoth graving dock that will handle up to 400,000-dwt vessels.

For additional information and brochures on both the Cityvarvet AB and Ciserve AB ship repairing facilities,

Circle 92 on Reader Service Card

EG & G Sealol Offers New Spring-Loaded Clearance Seal Design

EG & G Sealol has designed a seal that combines the most important benefits of both a face seal

and a clearance seal. They can be used for applications that require isolating fluids or hot gases from bearings and other mechanisms. Specific applications include compressors and aircraft auxiliary power units.

The spring-loaded clearance seals operate by maintaining a minimal clearance between ring and shaft. Matching the ring assembly's expansion rate to that of the shaft keeps clearance and, thereby, leakage content throughout the operating range. The new design requires no pressure differential, permits unlimited shaft movement and limits leakage.

For more information on the new seal design,

Circle 73 on Reader Service Card

Central Gulf Awarded \$31.8-Million Navy Contract For Freighter Charter

Central Gulf Lines Incorporated, New York, N.Y., has been awarded a \$31,779,445 contract for the chartering of the Dawn, a U.S.-flag breakbulk ship that will deliver Department of Defense cargo worldwide. The charter period is four years. The Military Sealift Command, Washington, D.C., is the contracting activity.

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The 500-passenger Landing Queen.

Sternwheeler Landing Queen Delivered By Walker Marine Yard

The 500-passenger Landing Queen, a 290-ton displacement sternwheeler riverboat, was christened recently at the Landing at Seven Coves, a country club/resort hotel on Lake Conroe, Texas. More than 200 guests attended the ceremony, which was hosted by **Wilburn S. (Bill) Bruce**, owner of the vessel and the resort. The craft was christened by his wife, **Mrs. Barbara Bruce**.

The Landing Queen measures 120 feet from bow to sternwheel, has a 38-foot beam, and is 38 feet from her keel to the top of the pilothouse. The boat is said to be one of the largest to navigate any inland lake in the U.S.

The all-steel vessel was constructed by James K. Walker Marine, Inc. of Moss Point, Miss. It was built in modular sections that were then tack-welded together. After approval by the American Bureau of Shipping it was disassembled and shipped overland by truck to the Landing's site on Lake Conroe, where it was reassembled and permanently welded by Walker craftsmen. Finish carpentry and outfitting were done locally.

The Landing Queen is distinguished from other Paddlewheelers in Texas because she has an authentic riverboat structure, rather than a superstructure built on a barge. Her curvilinear design

is dictated by the fore-and-aft sheer and the side-to-side camber of the decks, which is the mark of all true riverboats. The vessel was designed by naval architect **William G. Preston**, owner and president of Marine Power, Inc., Gulf Breeze, Fla.

The Grand Salon on the Main Deck is enclosed, with year-round Carrier air conditioning. It seats 124 for dinner, features a stage for plays and musical entertainment, and has an antique-style bar. Five brass and cut glass chandeliers, 26 sconces, Encarnex marble, custom-cut leaded and beveled doors and windows, antique-style floral carpets, and 80,000 linear feet of solid oak moldings and rift-cut raised oak paneling are blended in a rich setting of colors and textures.

The Boiler (second) Deck is covered by the third deck but the sides are open to the lake breezes. This deck is for moonlight cocktail dance cruises. It is appointed with Honduran mahogany decking, carved glass panels, antique-style bar, authentic embossed tin ceilings, a bandstand for live music, and imported marble restrooms.

The Hurricane Deck and the Texas Deck form the split-level third deck. The Texas Deck is the uppermost deck upon which the pilothouse is installed. The Hurricane Deck wraps around the Texas Deck and is the favorite for obser-

vation, as it is the highest public deck and is open. Another antique-style bar is located on this deck.

Beneath the elegant Victorian facade, the Landing Queen is as modern as she is beautiful. The vessel is powered by two 18-foot-diameter paddlewheels that are independently controlled and fully reversible for maximum maneuverability. The paddlewheels are driven by two variable-speed hydraulic motors that are powered by two 200-bhp GM Detroit Diesel engines. Each engine drives a 40-kw electric generator, providing 120- or 220-volt power.

The pilothouse, quaint in outward detail, including an authentic 72-inch mahogany riverboat helm, is thoroughly modern in-

side. Four television monitors enable the captain to visually supervise the boat from every angle, not only for berthing and getting under way, but for normal cruising as well. Electronic instrumentation keep him constantly advised of wind direction and velocity, barometric pressure, depth of water, and a host of functions related to the operation of the engines and the subsystems that make the Landing Queen one of the safest passenger boats ever built.

Brunch and dinner will be served on daily cruises on the 20-mile-long lake. A dockside service building, built out over the water alongside the vessel's berth, will include a complete gourmet kitchen to supply the boat.

J.L. Konopasek Announces New Organization

James L. Konopasek is pleased to announce the organization of J.L. Konopasek & Associates, a new Jacksonville, Fla.-based, company offering naval architecture and marine engineering services.

Mr. Konopasek brings his experience from positions in both the Canadian and U.S. marine industries. While with German & Milne Inc. of Montreal, Mr. Konopasek's design project involvement included polar icebreakers, the commercial fisheries, and vessels for Arctic energy resource development. In the Atlantic and Gulf regions he has taken part in the designs of offshore supply vessels, tug-barge configurations and general service vessels to the offshore oil industry. Mr. Konopasek's most recent position with Offshore Power Systems has involved him as a key participant to both naval ship and commercial engineering projects.

The company is also offering naval architecture computer processing services through the support of a minicomputer system, and seeks to provide an all-round, positive



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For information on Konopasek & Associates,

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Texas Instruments Awarded \$7.2-Million Navy Contract

Texas Instruments Incorporated, Dallas, Texas, is being awarded a \$7,245,100 increment of funds to a fixed-price contract for 20 AN/ASQ-81(V) magnetic detecting sets and spare parts. The Naval Air Systems Command, Washington, D.C., is the contracting activity.



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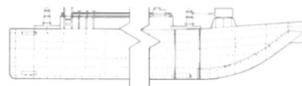
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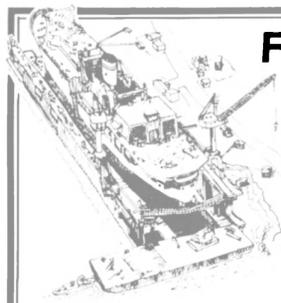
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McKillip, John Crane packing product manager.

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Krupp Atlas Elektronik Introduces Four New Advanced Radars



Krupp Atlas Elektronik, recently announced they have four new advanced radars designed for ships of any size or class, the Atlas Rasterscan 7600/8600 Series. All represent a significant technological breakthrough in contemporary marine radar design by offering continuous true daylight rasterscan display on a 16-inch screen, resulting in a quality of

presentation superior to a conventional TV picture.

Comprising RM, TM and two ARPA models, the ergonomically designed Series incorporates latest advances in signal processing techniques in addition to its revolutionary rasterscan display concept. Each conforms to, or exceeds, IMO, USCG and other leading internationally recognized specifications and is capable of operating over ranges of between 0.3 and 72nm.

Models are of compact console-type design and may be operated in either sitting or standing position via a simplified membrane-based control panel and integrated display for interactive guidance.

Both RM and TM models provide for the manual acquisition of up to 10 targets as well as semi-automatic plotting with target data readout, including CPA and TCPA.

The 7600 Series ARPA version similarly permits manual acquisition of up to 10 targets while providing fully automatic tracking facilities. The unit also allows for the checking of guard zones for automatic warning of closing targets.

These characteristics have been further extended with the 8600 Series ARPA, which is specifically designed to exceed basic IMO requirements and may also be configured for use in integrated navigation systems or stationary radar surveillance centers for the monitoring of rivers, harbors or coastal approaches.

For complete details and information on the new 7600/8600 models,

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EDO Awarded \$11.4-Million Navy Contract For Sonar Change Kits And Services

EDO Corporation, Government Systems Division, College Point, N.Y., has been awarded an \$11,401,000 fixed-price-incentive letter contract for 12 each AN/SQR-18 (A) (1) and AN/SQS-35 (V) engineering change kits, AN/SQR-18A (V) (1) array handling equipment sets, AN/SQR-18A (V) (1) towed array reels; engineering services and data. The Naval Sea Systems Command, Washington, D.C., is the contracting activity.

Mueller Steam Specialty Introduces Duplex Strainers
— Literature Available

Mueller Steam Specialty is offering a brochure on their Duplex Strainers which are designed to strain foreign matter from fluid handling systems where flow cannot be shut down for basket cleaning such as cooling water, condensers, fire lines, fuel lines, lubricating systems, salt and fresh water systems, chemical process systems, etc.

These Duplex Strainers feature single shaft drive to operate the flow diverter valves. Quick flow transfer requires less than 90° handle rotation. An automatic actuator is also available. There are no external linkages, sprockets, chains, cranks or wheels. The drive mechanism is completely enclosed, protected from line fluid erosion and corrosion.

Mueller Steam Specialty Duplex Strainers are available from stock in cast iron, carbon steel, stainless steel and bronze, all with trim materials appropriately matched to the body material. Special materials, baskets and coatings are available on application.

For more information and a free brochure on the Duplex Strainers,

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The 68,082-dwt bulk carrier Century Hope was recently delivered at the Tamano Works of MES to her owner, Kowin Shipping Company Limited of Hong Kong. Driven by a set of Mitsui-B&W 6L67GBE diesel engines she recorded a maximum trial speed of 16.32 knots.

Bulk Carrier Century Hope Delivered By Mitsui To Hong Kong Owner

The 68,082-dwt bulk carrier Century Hope was delivered recently at the Tamano Works of Mitsui Engineering & Shipbuilding Company, Ltd. to the Kowin Shipping Company of Hong Kong.

The bulker has an overall length of 730.68 feet, molded beam of 105.64 feet, depth of 60 feet, and full-load draft of 43.5 feet. Main propulsion is by a Mitsui B&W 6L67GBE slow-speed diesel engine with a maximum continuous rating of 13,000 bhp at 123 rpm. On sea trials the ship achieved a maximum speed of 16.32 knots.

Cargo space is divided into seven holds with a total capacity (grain) of 80,120 cubic meters. No. 4 hold can also be used as a ballast tank to secure sufficient draft in stormy conditions. Holds Nos. 2 and 6 can also be used as ballast tanks in port for draft adjustments.

Hull weight reduction has been achieved with 32-kilogram (70.5-pound), high-tensile steel for the decks, bottom shell plating, double bottom, and upper and lower hopper sections, with the exception of some areas of the side shell plating. The bottom and waterline area of the hull are coated with self-polishing, long-life antifouling paint to reduce the frictional resistance and thereby conserve fuel.

The propulsion plant features, besides the fuel-efficient Mitsui B&W main engine, a Mitsui Integrated Duct Propeller. Remote maneuvering, control, and monitoring systems qualify for the UMS (unmanned engine room) notation of Lloyds Register of Shipping.

Navigation equipment includes a Lorán C receiver and Decca Navigator.

Saab Control Systems Ordered For Wilhelmsen Product Carriers

The new tanker control system from Saab Marine Electronics has been ordered for the two 63,000-dwt product carriers under construction at the Uddevalla yard in Sweden for Wilh. Wilhelmsen of Oslo.

Included in the Saab system are radar level-gauging in cargo tanks, electronic control of pumps and valves, and the engine monitoring function. Data is displayed on 20-inch CRTs located in the cargo control room and the engine control room.

The first Saab tanker control system is scheduled for delivery in May this year for installation on the first of four 45,000-dwt product tankers being built at the Boelweft yard in Belgium for Anders Jahre/Exmar of Norway.

Saab Marine Electronics is represented in the U.S. by Salwico, Inc. of Hoboken, N.J. For additional information on the Saab tanker control system.

Circle 83 on Reader Service Card

ITT Corporation Awarded \$3.8-Million Order For Surveillance Radar

ITT Corporation, ITT Gilfillan Division, Van Nuys, Calif., has been issued a \$3,857,396 unpriced delivery order under a basic ordering agreement to furnish various quantities of 20 line items of spare parts for the AN/SPS-48 three-dimensional long-range surveillance radar, used for detecting and tracking aircraft for air control and missile systems engagement. The Navy Ships Parts Control Center, Mechanicsburg, Pa., is the contracting activity.

FOR MORE INFORMATION ON EQUIPMENT AND SERVICES ADVERTISED IN THIS ISSUE

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179	CANTIERI NAVALI RIUNITI	VESSEL CONSTRUCTION REPAIR
296	COLT INDUSTRIES, FAIRBANKS MORSE ENGINE DIV.	DIESEL ENGINES
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BUYERS DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of **MARITIME REPORTER/Engineering News**. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all 24 issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers' contract, MR/EN assumes no responsibility for errors. If you are interested in having your company listed in this Buyers Directory Section, contact John C. O'Malley at (212) 689-3266.

AIR COMPRESSORS

Flexvaal Company, 11 Chestnut St., Amesbury, MA 01913

Squire Caspwell Company, 3411 Commercial Ave., Northbrook, IL 60062

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION

Bailey Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231

Cospolich Refrigerator Co., Inc., 949 Industry Rd., Kenner, LA 70062

Flakt AB, Box 8862, S-40272, Gothenburg, Sweden

Marlo Cool/Nuclear Cooling, Inc., P.O. Box 171, High Ridge, MO 64049

Mechanical Resources, Inc., 210 West Side Ave., Jersey City, NJ 07305

Nance Industries, P.O. Box 1547, Beaumont, TX 77704-1547

Stal Refrigeration AB, Bulvaragatan 16, S 601 87 Norrköping, Sweden

United Technologies Carrier Transcold, P.O. Box 4805, Syracuse, NY 13221

Unitemp Inc., 3590 Kennedy Rd., So. Plainfield, NJ 07080

York Division, Borg-Warner Corp., P.O. Box 1592, York, PA 17405

ANCHORS AND CHAIN

G.J. Wortelboer Jr. B.V., Eemhavenstraat 4, P.O. Box 5003, 3008 AA Rotterdam, Netherlands

Neptunia, Via Giovanni da Verrazzano, 12, 16165 Genova, Italy

ANODES—Cathodic Protection

American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906

Engelhard Industries Division, 2655 U.S. Route 22, Union, NJ 07083

Kaiser Chemical, Div. of Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Em. 1128 EB, Oakland, CA 94643

The Platt Bros. & Co., Box 1030, Waterbury, CT 06721

BASKET STRAINERS

North Star Marine & Industrial Products, Inc., 84 Wall Street, Farmingdale, NY 11735

Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

BEARINGS—Rubber, Metallic, Non-Metallic

Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44061

Lucan Q. Moffitt, Inc., P.O. Box 1415, Akron, Ohio 44309

Norton Chempast, 309-150 Day Rd., Wayne, NJ 07470

Thompson-Gordon Limited, 3225 Mainway, Burlington, Ontario, Canada T7M 1A6

Waukesha Bearings Corp., P.O. Box 798, Waukesha, Wisc. 53186

BLASTING—Cleaning—Equipment

Apache Equipment, Inc., 10490 Shadow Wood Dr., Suite 112, Houston, TX 77043

Aqua-Dyne Inc., 2208 Karbach St., Houston, TX 77092

Atlantic Sandblasting & Coatings, Inc., 2700 Guy Verger Blvd., Tampa, FL 33605

Aurand, 1270 Ellis St., Cincinnati, OH 45223

Butlerworth, Inc. (USA), 3721 Lopos Dr., P.O. Box 18312, Houston, TX 77223-9989

Butlerworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England

CLEMCO, P.O. Box 7680, San Francisco, CA 94120

Complete Abrasive Blasting Systems, 18250 68th Avenue South, Kent, WA 98031

E.I. DuPont De Nemours & Co., Inc., Starblast Division, Room X39186, Wilmington, DE 19898

Rockwell International, Power Tool Division, 400 N. Lexington Ave., Pittsburgh, PA 15208

Schmidt Mfg. Inc., P.O. Box 37, Fresno, TX 77545

BOILERS

B&D Marine and Industrial Boilers, Inc., P.O. Box 5702, North Charleston, SC 29406

Combustion Engineering, Inc., Windsor, Connecticut 06095

Forney Engineering Co., P.O. Box 189, Addison, TX 75001

Foster Wheeler Boiler Corp., 110 S. Orange Ave., Livingston, NJ 07039

Hovee-Baker Engineers, Inc. (Econoflex Burners), Combustion Systems Div., P.O. Box 956, Tyler, TX 75710

Way-Wolf Associates Inc., 45-10 Vernon Blvd., Long Island City, NY 11101

Asea Stal, 525 Executive Blvd., Elmsford, NY 10523-1296

BROKERS

S. Danoff U.S.A. Ltd., 2050 Canal Way, Miami, FL 33145

Capt. Asad Company, Inc., P.O. Box 53434, New Orleans, LA 70153

ECO Inc., 1036 Cope St., Claire Center, Annapolis, MD 21401

Hughes Bros., Inc., 7 Battery Pl., New York, N.Y. 10004

BRONZES—COMMERCIAL

Duramax Metals, Inc., 2401 Wesley Street, Portsmouth, VA 23707

BUNKERING SERVICE

Belcher Company, Inc., 8700 West Flagler, P.O. Box 525500, Miami, FL 33152

Gulf Oil Trading Co., 535 Madison Ave., New York, NY 10022

National Marine Service Inc. (Transport Div.), 1750 Brentwood Blvd., St. Louis, MO 63114

CARGO HANDLING EQUIPMENT

Alpha Technical Services, Inc., P.O. Box 446, Hamilton, OH 45012

MacGregor-Navire International, Box 8991, S-402 74 Göteborg, Sweden

MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016

CHOCKING SYSTEMS

Palmer Products Inc., P.O. Box 8, Worcester, MA 01949

Philadelphia Resins Corp., 20 Commerce Drive, Montgomeryville, Pa. 18936

CLAMPS

Band-It Company, P.O. Box 16307, Denver, CO 80216

CLOSURES—Marine

Cornell-Carr Co. Inc., 63 Main St., Monroe, CT 06468

CONDENSERS

Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

CONTROL SYSTEMS—Monitoring

American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906

Argo Marine, 140 Franklin St., New York, NY 10013

ASEA, Inc. 4 New King St., White Plains, NY 10604

Autronica Marine USA, 280 Industrial Pkwy., Northvale, NJ 07647

Avicon Corp., 7750 East Redfield Rd., Scottsdale, AZ 85260

Barringer Research, 304 Carlingview Dr., Rexdale, Ontario, Canada M9W5G2

Biospherics Inc., 4928 Wyoconda Rd., Rockville, MD 20852

Cooper Energy Services, Mount Vernon, OH 43050

Eldet Corp., P.O. Box 100, Lynwood, WA 98036

Ergon, Inc., P.O. Drawer 1639, Jackson, MS 39205

Falstaffe Motor/Generator Protector, Marine Sea Electronics Ltd., 101 Jardin Dr., Unit 24/25, Concord, Ontario, Canada L4K 1B6

Fluodyne, a Div. of Electrodata Inc., P.O. Box 11366, Santa Rosa, CA 95406

Grimman Aerospace, 111 Stewart Ave., Bethpage, NY 11714

Indecon Corp., 26 New St., Cambridge, MA 02138

Leslie Co., 401 Jefferson Rd., Parsippany, NJ 07054

Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696

Maritime Protection A/S, Box 100, N-4620 Vogabysgd, Norway

Megsystems, Inc., 1075 N.W. 58th Street, Boca Raton, FL 33431

National Control Systems, Inc., 827 Hanley Industrial Court, St. Louis, MO 63144

Navy-Vee, Inc., P.O. Box 1175, Huntsville, TX 77340

Norcontrol, 400 Oser Ave., Hauppauge, NY 11738

Norske Teletron A/S, Drammensveien 126, Oslo 2, Norway

Offshore Technology Corp., 578 Enterprise St., Escondido, CA 92025

Pandell Instruments Inc., 2100 N. Hwy. 360, Grand Prairie, TX 75050

Propulsion Systems, Inc., 21213 76 Ave., Kent, WA 98032

Secworthy Systems Inc., 36 Main Street, Essex, CT 06426

Telreflex, Inc., 771 First Ave., King of Prussia, PA 19406

Transomera Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062

Wessmar Marine Systems Div., 801 Dexter Ave. N., Box C19074, Seattle, WA 98109

COUPLINGS

Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696

SKF Steel, 20 Tower Lane, P.O. Box 745, Avon, CT 06001

CRANES—HOISTS—DERRICKS—WHIRLEYS

American Host & Derrick Company (AMH&D), St. Paul, MN 55107

Appleton Marine, P.O. Box 2359, Appleton, WI 54913

ASEA Stal-Laval Inc., 525 Executive Blvd., Elmsford, NY 10523

Blain & Voss Company, 55 Morris Avenue, Springfield, NJ 07081

Chester Hotel Division, Monogram Industries, P.O. Box 229, Lisbon, OH 44432

Grove Manufacturing Co., P.O. Box 21, Shady Grove, PA 17256

Hiab Cranes & Loaders Inc., R.D. 22 Interchange Plaza, York, PA 17404

Herz Equipment Rental Corp., 7 Enlin Rd., Bldg # 2, Parsippany, NJ 07054

Marine Travelift, Inc., 47 E. Faw St., Sturgeon Bay, WI 54225

National Crane Corp., 11200 North 148 St., Waverly, NE 68462

National Supply Company, 1455 West Loop South, Houston, TX 77027

J.D. Neuhous, Hebezeuge, D5810, Witten Heven, West Germany

Superior-Lidgerwood-Mundy Corp., 1101 John Ave., Superior, WI 54880

DECK MACHINERY—Cargo Handling Equipment

Argo Marine, 140 Franklin St., New York, NY 10013

Marine Technical Associates, 195 Patterson Avenue, Little Falls, NJ 07424

Murdoch Machinery Co., Inc., 79 S. Horton St., Seattle, Wash. 98134

Camlock Engineering Company, P.O. Box 2278, Irving, TX 75061

DECORATING—GRATING

International Grating, Inc., 7625 Parkhurst, Houston, TX 77028

Selby, Battersby & Company, 5220 Whiby Ave., Philadelphia, PA 19143

J.E. Steigerwald Co., Inc., 5515 Belair Rd., Baltimore, MD 21206

DIESEL ACCESSORIES—CYLINDER LINERS

B & W Marine Service, 30 Broadway, New York, NY 10004

General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, Massachusetts 02360

Gollen Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 10013

Hayden Corporation, P.O. Box 179, Jackson, MI 49204

Van der Horst Corp. of America, 314 Penn Ave., Olean, NY 14760

Gollen Marine Co., Inc., 160 Van Brunt St., Brooklyn, NY 10013

Jergens, Inc., 19250 Nottingham Rd., Cleveland, OH 44110

Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217

Valad Electric Heating Corporation, 162 Wilday St., Tarrytown, NY 10591

Ward Leonard Electric Co., 31 South St., Mt. Vernon, NY 10550

Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

EMULSIFICATION SYSTEMS

Cleancon A/S, N. American Agents, American United Marine Corp., 5 Broadway, Route 1, Saugus, MA 01906

Fire-Brite, Hoffer Manufacturing Co., Inc., 1700 E. Church St., Jacksonville, FL 32220

EQUIPMENT—Marine

American General/Levin Corp., 445 Littlefield Ave., So. San Francisco, CA 94080

Argo Marine, 140 Franklin St., New York, NY 10013

ASEA Stal-Laval Inc., 525 Executive Blvd., Elmsford, NY 10523

Banish Division, Houdaille Industries, Inc., P.O. Box 16307, Denver, CO 80216

Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227

General Stone Products Company, Executive Plaza IV, Hunt Valley, MD 21031

Harvey's Commercial Marine Div., 2505 S. 252nd St., Kent, WA 98032

b.v. Halimatra Industrial Equipment, P.O. Box 33, 4940 aa Raamsdonksveer, Holland

Imperial Manufacturing Co., P.O. Box 4119, Bremerton, WA 98312

Juniper Industries Inc., 72-15 Metropolitan Ave., Middle Village, NY 11379

Keefort Marine Products, 550 South Fulton Ave., Mount Vernon, N.Y. 10550

Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302

John P. Nissen, Jr. Company, Glenside, PA 19038

Stal-Laval Turbin AB, S-612 20 Finspong, Sweden

EVAPORATORS

Alfa-Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024

Agua-Chem Inc., P.O. Box 421, Milwaukee, WI 53201

MECO (Mechanical Equipment Company, Inc.), 861 Carondelet St., New Orleans, LA 70130

Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

FANS—VENTILATORS—BLOWERS

American United Marine Corp., 5 Broadway, Rte. 1, Saugus, MA 01906

Argo Marine, 140 Franklin St., New York, NY 10013

Hartzell Fan, Division of Castle Hills Corp., 901 S. Downing St., P.O. Box 919, Piqua, OH 45356

Joy Manufacturing Company, 338 So. Broadway, New Philadelphia, OH 44663

Zidell Explorations, 3121 S.W. Moody St., Portland, Ore. 97201

FENDERING SYSTEMS—Deck & Vessel

Hughes Bros., Inc., 17 Battery Place, New York, N.Y. 10004

InterTrade Industries, 15301 Transolar Lane, Huntington Beach, CA 92649

Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062

Samsom Ocean Systems, Inc., 99 High St., Boston, MA 02110

Secowal International, Inc., 6269 Leesville Ave., Falls Church, VA 22044

FILTERS

Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307

Mueller Steam Specialty, P.O. Box 1569, Lumberton, NC 28359

Wm. W. Nugent & Co., P.O. Box 948, Skokie, IL 60076

FINANCING—Leasing

A.G. Becker Financial Inc., 2 First National Plaza, Chicago, IL 60670

Gulf Western Leasing Corp., 1500 City West Blvd., Suite 300, Houston, TX 77047

Yeagan Marine, P.O. Box 25504, Ft. Lauderdale, FL 33320

FIRE PROTECTION, DETECTION, & ALARM SYSTEMS

FEV, Inc., 7 Westchester Plaza, Elmsford, NY 10523

G.V.P. Publishing Company Video (Firefighting Videotape), P.O. Box 2608, Houston, TX 77001

Waller Kidde, Waller Kidde Dr., Wake Forest, NC 27586

Warmold Fire Systems, One Stanton St., Marnette, WI 54143

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Ferrous Corporation, 910-108th N.E., P.O. Box 1764, Bellevue, WA 98009

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U.S. Borax, 3075 Wilshire Blvd., Los Angeles, CA 90010

FURNITURE

Boiley Carpenter & Insulation Co., 74 Sullivan Street, Brooklyn, N.Y. 11231

Comfort-Mate, Inc., 7988 NW 56th Street, Miami, FL 33166

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Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207

Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696

MacGregor-Navire International, Box 8991, S-402 74 Göteborg, Sweden

MacGregor Navire U.S.A. Inc., 135 Dermody St., Cranford, NJ 07016

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American Standard, Inc., Heat Transfer Div., Buffalo, NY 14240

Riley-Beard, P.O. Box 31115, Shreveport, LA 71130

HULL CLEANING

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Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
Fleetweather Ocean Services, Inc., Rd. # 2, Box 260, Hopewell Junction, NY 12533
Christopher J. Foster, Inc., 16 Sitsink Drive East, Port Washington, N.Y. 11050
Friede and Goldman Ltd., 935 Grover St., New Orleans, LA 70112
GEOC Corporation, 73 Oak Ridge Road, NJ 07438
Giannotti & Associates, Inc., 703 Giddings Ave., Suite U-3, Annapolis, MD 21401
Gibbs & Cox, Inc., 119 West 31st Street, New York, NY 10001
John W. Gilbert Associates, Inc., 66 Long Wharf, Boston, MA 02110
The Glosten Associates, Inc., 610 Colman Bldg., 811 First Ave., Seattle, WA 98104
Phillip Gresser Associates, Ltd., 3250 South Ocean Blvd., Palm Beach, FL 33480
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
J.J. Henry Co., Inc., Two World Trade Center—Suite 9528, New York, N.Y. 10048
Hi-Test Laboratories, Inc., P.O. Box 226, Buckingham C.H., VA 23921
Hoffman Maritime Consultants Inc., P.O. Box 186, Glen Head, NY 11545
Inframarine, Inc., P.O. Box 33043, Jacksonville, FL 32201
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
Capt. Ernest James, 2847 Beavercrest Dr., Lorain, OH 44053
Janzen Engineering Co., 6655-H Amberton Drive, Baltimore, Md. 21227
James S. Kroger & Co., Inc., 3333 Rice St., Miami, Fla. 33133
Rodney E. Loy & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
John J. McMullen Associates, Inc., 1 World Trade Center, New York, N.Y. 10048
MacLean & Harris, Inc., 28 West 44 Street, New York, N.Y. 10036
Fendall Marbury, 1923 Lincoln Drive, Annapolis, MD 21401
Marine Consultants & Designers, Inc., 308 Investment Insurance Bldg., Corner E. 6th St. & Rockwell Ave., Cleveland, Ohio 44114
Marine Design Inc., 401 Broad Hollow Road, Rte. 110, Melville, N.Y. 11746
Marine Power Associates, 4475 Mission Blvd., Suite 235, San Diego, CA 92109
Marine Technical Associates, Inc., 95 River Rd., Hoboken, NJ 07030
George E. Meese, 194 Acton Rd., Annapolis, Md. 21403
Metrolap Inc., P.O. Box 2366, Littleton, MA 01460
R. Carter Merrill, 715 S. Cherokee, Bartlesville, OK 74003
NKF Engineering Assoc., Inc., 8150 Leesburg Pike, Vienna, VA 22202
Nelson & Associates, Inc., 1405 N.W. 167th Street, Miami, FL 33169
New England Engineering & Marine, Inc., 2 Box 50, York, ME 03909
Nickum & Spaulding Associates, Inc., 2701 First Ave., Seattle, WA 98121
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
Ocean Oil International Engineering Corporation, 3019 Mercedes Blvd., New Orleans, La. 70114
PRC Guralnick, 5252 Balboa Ave., San Diego, CA 92117
Pearson Engineering Co., Inc., 8970 S.W. 87th Ct., Miami, Florida 33156
S.L. Petchul, Inc., 1380 S.W. 57th Avenue, Fort Lauderdale, FL 33317
Precision Systems Engineering, 8248 Eastgate Dr., Mt. Laurel, NJ 08054
M. Rosenblatt & Son, Inc., 390 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105
Schmahl and Schmahl, Inc., 1209 S.E. Third Ave., Fort Lauderdale, Florida 33316
SEACOR Systems Engineering Associates Corp., 19 Perina Blvd., Cherry Hill, NJ 08003 (Publications Division at Cherry Hill location)
STV/Sanders & Thomas, Inc., 1745 Jefferson Davis Hwy., Arlington, VA 22202
Seaworthy Engine Systems, 36 Main Street, Essex, CT 06426
Seaworthy Engine Systems, 17 Battery Place, New York, NY 10004
George G. Sharp, Inc., 100 Church St., New York, NY 10007
Simmons Associates, P.O. Box 760, Sarasota, FL 33578
R.A. Steam, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54225
J.F. Stronach Associates, 666 Old Country Rd., Garden City, NY 11530
Richard R. Taubler, Inc., 610 Carriage Ln., Dover, DE 19901
Timaco, 627 Azalea Road, Mobile, AL 36609
Tracor Hydroautics, Inc., 7210 Finsell Rd., Laurel, MD 20707
Uhlig & Associates, Inc., 8295 SW 188th St., Miami, FL 33157
Vevy Engineering Works Ltd., CH-1800 Vevy, Switzerland, U.S. Rep. Carl G. Birmekamp & Co., Inc., 102 Hamilton Ave., Stamford, CT 06902
Thomas B. Wilson, Associates, 1258 North Avalon Blvd., Wilmington, CA 90744
Yacht Design Institute, 9 Main St., Blue Hill, ME 04614

NAVIGATION & COMMUNICATIONS EQUIPMENT
Alden Electronics, 1145 Washington St., Westborough, MA 01581
American Hydramatic Co., Buckwheat Bridge Rd., Germantown, N.Y. 12526
Anschutz & Co. GmbH, Postfach 6040, D-2300 Kiel 14, West Germany
Alkon Dynamics, Section 6, 10 West Orange Ave., South San Francisco, CA 94080
CMC Communications Inc., 5479 Jelpart Industrial Blvd., Tampa, FL 33614
COMSAT World Systems, 950 L'Enfant Plaza, S.W., Suite 6151 Washington, D.C. 20024
Cybernet International, Inc., 7 Powder Horn Dr., Warren, NJ 07060
A/S Elektrisk Bureau, P.O. Box 98, N-1360 Nesbu, Norway
Electro-Nav, Inc., 840 Bond Street, Elizabeth, NJ 07201
EPSCO Marine, 550 Wholesalers Parkway, Harahan, LA 70123
Fleet Marine, 1820 N.E. 146th Street, North Miami, FL 33181
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
Harris Communications (RF Communications), 1680 University Avenue, Rochester, NY 14610
Henschel Corp., 9 Hoyt Drive, Newburyport, MA 01950
Hose McCann Telephone Company, Inc., 9 Smith Street, Englewood, NJ 07633
Japan Radio Co., Ltd., Akosaka Twin Tower (Main), 17-22 Akosaka 2-chome, Minato-ku, Tokyo 107, Japan
King Radio Corporation, 400 North Rodgers Rd., Olathe, KS 66062
Kongsberg North America Inc., 400 Oser Ave., Hauppauge, NY 11738
Kongsberg Voprenfabrik, Norcontrol Division, P.O. Box 145, Horten 3191, Norway
Krupp Atlas-Elektronik, 1453 Pinewood St., Rahway, NJ 07065
Lorain Electronics Corp., 2307 Leavitt Rd., Lorain, OH 44052
Magnavox Navigation Systems, 2829 Maricopa Street, Torrance, CA 90503
Magnum Distributors Inc., 1000 S. Dixie Hwy., #3, Pompano Beach, FL 33060
Nav-Com, Inc., 9 Brandwynne Drive, Deer Park, NY 11729
Navdyne Corp., 11824 Fishing Point Drive, Newport News, VA 23606
Perko Inc. (Lights), P.O. Box 6400D, Miami, FL 33164
Racor-Decco Marine, Inc., 4200 23rd Avenue West, Seattle, WA 98199
Radar Devices, Inc., 2955 Merced Street, San Leandro, CA 94577
Radio-Holland USA, Inc., 6033 South Loop East, Houston, TX 77033
Raytheon Marine Co., 676 Island Pond Road, Manchester, N.H. 03103
Raytheon Ocean Systems Company, Westminster Park, Risho Avenue, East Providence, RI 02914
Raytheon Service Co., 103 Roessler Rd., Glen Burnie, MD 21061
Rivertronic, P.O. Box 247, Godfrey, IL 62035
Robertson Auto Pilot, 400 Oser Ave., Hauppauge, NY 11738

Selemar S.p.A., Casella Postale 9, 50020 Montagnana Val Di Peso, Firenze, Italy
Servo Corporation of America, 111 New South Road, Hicksville, NY 11802
Simrad, Inc., 2208 N.W. Market St., Suite 600, Seattle, WA 98107
Sperry Corporation, Great Neck, NY 11020
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Texas Instruments, Inc., P.O. Box 405, 3438, Lewisville, TX 75067

OILS—Marine—Additives
Gulf Oil Company—U.S. (Domestic Oils), 909 Fannin Street, Houston, TX 77031
Gulf Oil, New York District Sales Office (Domestic), 433 Hackensack Avenue, Hackensack, NJ 07601
Gulf Oil Trading Co., 535 Madison Ave., New York, NY 10022
Mobil Oil Corp., 150 East 42 Street, New York, NY 10017
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002
Texaco, Inc. (International Marine), 135 East 42nd St., N.Y., N.Y. 10017

OIL/WATER SEPARATORS
Alfa Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
Biospherics Incorporated, 5001 Forbes Blvd., Latham, MD 20801
Butlerworth Inc. (USA), 3721 Lopus Dr., P.O. Box 18312, Houston, TX 77223-9989
Butlerworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale, NJ 07647
Dahl Manufacturing, Inc., 2521 Railroad Ave., Ceres, CA 95307
Hyde Products, Inc. 810 Sharon Dr., Westlake, OH 44148
Microphor, Inc., P.O. Box 490, Willis, CA 95490
Moisture Control Co., 40 Imp Dr., Inwood, NY 11696
National Fluid Separators, Inc., 1239 Hanley Industrial Court, St. Louis, MO 63144
PACE Marine Systems, Div. of St. Louis Ship, 611 E. Marceau St., St. Louis, MO 63111
Phoenix Oil Refiner Co., Inc., 330 Hill Ave., Nashville, TN 37210

PAINTS—COATINGS—CORROSION CONTROL
American Abrasive Metals, 460 Cof Street, Irvington, NJ 07111
Ameron, 4700 Romona Blvd., Monterey Park, CA 91754
Argo Marine, 140 Franklin St., New York, NY 10013
Bareco, 6910 East 14th St., Tulsa, OK 74112
A.W. Chesteron Co., Middlesex Industrial Park, Rt. 93, Stoneham, MA 02180
Chugoku Marine Paints (U.S.A.) Inc., 1290 Ave. of Americas, New York, NY 10104
CLICO, P.O. Box 7680, San Francisco, CA 94120
"CONSOL" manufactured by Contact Paint & Chemical Co., Inc., 200 S. Franklinton Rd., Baltimore, MD 21223
Dempsey Company, Inc., 85 Paris St., Everett, MA 02149
Devco Marine Coatings Co., P.O. Box 7600, Louisville, KY 40207
Drew Ameroid Marine, One Drew Chemical Plaza, Boonton, NJ 07005
E.I. Dupont de Nemours & Co., Inc., Nemours Bldg. Rm. N-2504-2, Wilmington, DE 19898
Esgard, Box 2698, Lafayette, LA 70502
Eureka Chemical Company, 234 Lawrence Avenue, So. San Francisco, CA 94080
Glidden Coatings & Resins, Architectural & Maintenance, 925 Euclid Ave., Cleveland, OH 44115
Grow Group, Inc., 200 Park Ave., New York, NY 10017
Hempel Marine Paints, Inc., Foot of Currie Ave., Wallington, NJ 07057,
2425 Fountainview, Suite 340, Houston, TX 77057, P.O. Box 10265, New Orleans, LA 70181
International Paint Company, Inc., 2270 Morris Avenue, Union, NJ 07083
Joegle Paint Co., Inc., 1912 Darby Rd., Haverlow, PA 19083
Marine Marine Coatings, Inc., 840 Key Hwy., Baltimore, MD 21230
Magnus Marine International, Inc., 150 Roosevelt Pl., P.O. Box 150, Palisades Park, NY 07650
Norton Chemplast, 309-150 Day Rd., Wayne, NJ 07470
Palmer Products Inc., P.O. Box 8, Worcester, PA 19490
Pile-Gard® Manufactured by Osrose-Marine Div., P.O. Drawer 0, Griffin, GA 30204
Products Research & Chemical Corp., 5454 San Fernando Rd., Glendale, CA 91203
Seaguard, 4030 Seaguard Ave., Portsmouth, VA 23705
Selby, Battersby & Company, 5220 Whiby Avenue, Philadelphia, PA 19143
Sermatech International, 4401 Sermetel Dr., Moss Point, MS 39563

PETROLEUM SUPPLIES
Shell Oil Co., 1 Shell Plaza, Houston, Texas 77002

PIPER REPAIRS
Atlantic Marine Systems, Inc., P.O. Box 326, Williamsville, NY 14221

PIPE—HOSE—Cargo Transfer, Clemps, Couplings, Coatings
Cajon Company, 9760 Shepard Rd., Macedonia, OH 44056
Cargolux Storage Sales Corp., 60 Imp Dr., Inwood, NY 11696
Crowford Fitting Company, 29500 Salon Rd., Solon, OH 44139
Hydro-Craft, Inc., 1821 Rochester Industrial Dr., Rochester, MI 48063
Knights Fitting Inc., 5309 Industrial Rd., Rossmore, MS 39567
Metropolitan Plumbing Supply Corp., 5000 Second St., Long Island City, NY 11101
Penco Div./Hudson Engineering Co., One World Trade Center, Suite 3000, New York, NY 10048
Selkir Mellobestos, Box 19000, Greensboro, NC 27419
Steufr Corporation, 21-31 Industrial Park, Waldwick, NJ 07463

PLASTICS—Marine Applications
Hubeva Marine Plastics, Inc., 390 Hamilton Ave., Bklyn, N.Y. 11231
Bombardeur, 1051 Dickson, Montreal, Quebec, Canada H1N 2H7
Armo Steel/Advanced Materials Div., 703 Curtis St., Middletown, OH 45043
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La 70150
Bergen Diesel Inc., 2110 1-10 Service Rd., Kenner, LA 70062
Bird Johnson Company, 110 Norfolk St., Walpole, Mass. 02081
Bombardier, 1051 Dickson, Montreal, Quebec, Canada H1N 2H7
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Caterpillar Engine Division, 100 N.E. Adams, Peoria, IL 61629
Detroit Corp., 7805 Ponca de Leon Circle, Atlanta, GA 30340
Call Industries Inc. (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511
Columbian Bronze Corporation, 216 No. Main Street, Freeport, NY 11520
Combustion Engineering, Inc., Windsor, Connecticut 06095
Daihatsu Diesel (USA) Inc., 180 Adams Ave., Hauppauge, NY 11788
Deutz Corp., 7805 Ponca de Leon Circle, Atlanta, GA 30340
Diesel Marine International, Ltd., c/o NORSHIPCO, P.O. Box 2100, Norfolk, VA 23501
Elliott Company, 1809 Sheridan Ave., Springfield, OH 45505
General Electric Co., Diesel Power Products, 2901 E. Lake Rd., Erie, PA 16533
General Motors, Electro-Motive Division, LaGrange, IL 60525
George Engine Company, Inc., Lafayette, LA
Gallen Engine Co., Inc., 160 Van Brunt St., Brooklyn, NY 11231
Harbormaster, 36 Hancock St., Quincy, MA 02271
Isotta Fraschini S.p.A., c/o Italian Aerospace Industries (U.S.A.), Inc., 1235 Jefferson Davis Hwy., Suite 500, Arlington, VA 22202
KHD Canada Inc., 180 Rue de Normandie, Boucherville, Quebec J4B 5S7, Canada
KaMeWa, P.O. Box 1010, S-68101, Kristinehamn, Sweden
KaMeWa, 1800 West Loop So., Suite 1620, Houston, TX 77027
Krupp Mak Diesels, Inc., 4329-33 Di Paolo Center, Glenview, IL 60025
Ligt Propellers, 3617 Koppens Way, Chesapeake, VA 23323
Lufkin Industries, Inc., P.O. Box 745, Lufkin, TX 77901
M.A.N.-B&W Diesel, 2, Ostervej, DK-4960 Høleby, Denmark
MTU of North America, One E. Putnam Ave., Greenwich, CT 06830, 10450 Corporate Dr., Sugarland, TX 77478, 2945 Railroad Ave., Morgan City, LA 70303, 180 Nickerson St., Seattle, WA 98109, 1730 Lynn St., Arlington, VA 22209
W.M.W. Murphy Diesel, 12 Greenway Plaza, Suite 1100, Houston, TX 77046
Maspeco Products, Inc., 20 Vesey St., New York, NY 10007

Maritime Industries Ltd., 6307 Laurel St., Burnaby, B.C., Canada V5B3E9
Michigan Wheel, 1501 Buchanan Ave., S.W., Grand Rapids, MI 49507
National Marine Service Louisiana, Inc., 222 Bayou Rd., Belle Chasse, LA 70037
Omiholster Inc., 9515 Sorensen Ave., Santa Fe Springs, CA 90670
Penke GM Power, Inc., 600 Parsippany Road, Parsippany, NJ 07054
Inland Water Propulsion Systems, Inc., 580 Walnut St., Cincinnati, OH 45201
Propulsion Systems, Inc., 21213.76 Ave. So., Kent, WA 98032
SACM (Societe Associee De Constructions Mechaniques De Mulhouse) 1, Rue De La Fonderie, Boite Postale 1210, 68054 Mulhouse Cedex, France
Schottel of America, Inc., 8375 N.W. 56 St., Miami, FL 33166
Karl Senner, Inc., P.O. Box 10055, New Orleans, LA 70181
Skinner Engine Company, P.O. Box 1149, Erie, PA 16512
Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland
Transamerica DeLaval Inc., Engine & Compressor Div., 550 85th Ave., Oakland, CA 94621
Transamerica DeLaval, Inc., Turbine & Compressor Div., P.O. Box 8788, Trenton, N.J. 08650
Turbine Specialties, Inc., P.O. Box 207, West State Street Road, Salina, KS 67401
Turbine Specialties/Gulf Coast, Inc., 1900 Industrial Blvd., Harvey, LA 70058
Ulstein Trading Ltd. A/S, N-6-65, Ulsteinvik, Norway
Voth Schneider America, 159 Great Neck Rd., Ste 200, Great Neck, NY 11021
Valvo Penta of America, P.O. Box 927, Rockleigh, NJ 07647
WABCO Fluid Power, an American-Standard Company, 1953 Mercer Rd., Lexington, KY 40505
Wartsila Power Inc., 5132 Taravello Rd., P.O. Box 868, Marrero, LA 70072
Waukesha Engine Division, Waukesha, WI 53187
Waukesha Industries, Inc., 3027 Shell Rd., Cincinnati, OH 45226
ZF of North America, Inc., 3225 Commercial Avenue, Northbrook, IL 60062
ZF of North America, Inc. (Motive Power Corporation, P.O. Box 365, New York, NY 15001)

PUMPS—Repairs—Drives
Argo Marine, 140 Franklin St., New York, NY 10013
Jain's Pump Repair, 48-55 36th St., Long Island City, NY 11101
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
Penco Div./Hudson Engineering Co., One World Trade Center, Suite 3000, New York, NY 10048
Sims Pump Valve Co., Inc., 1314 Park Ave., Hoboken, NJ 07030
Transamerica DeLaval, Pyramid Pump Div., P.O. Box 447, Monroe, NC 28110
Vito Motivator Company, 200 West 20th St., New York, NY 10011
Warren Pumps Division, Bridges Avenue, Warren, MA 01083
Wilden Pump & Engineering Co., 22080 Van Buren St., P.O. Box 845, Colton, CA 92324

REFRIGERATION—Refrigerant Valves
Baley Refrigeration Co., Inc., 74 Sullivan St., Brooklyn, N.Y. 11231
Port Refrigeration Div., 157 Perry St., New York, NY 10014

ROLLING SYSTEMS
Hilman, Inc., 2604 Atlantic Ave., Wall (Belmar), NJ 07719

ROPE—Manila—Nylon—Hawses—Fibers
American Mfg. Co., Inc., Willow Avenue, Honesdale, Pa. 18431
Atlantic Cordage Corp., 60 Grant Avenue, Carteret, NJ 07008
DuPont Co., KEVLAR Aramid Fiber, Room G-15465, Wilmington, DE 19898
Norton Chemplast, 309-150 Day Rd., Wayne, NJ 07470
Norton Ocean Systems, Inc., 99 High Street, Boston, Mass. 02110
Luby Cordage Company, P.O. Box 709, Orono, ME 04469
Wall Industries, Inc., P.O. Box 560, Elkin, NC 28621

RUDDER ANGLE INDICATORS—STEERING
Hy-Drive America Corp., 3629 Vernon Blvd., Long Island City, NY 11106
Marine Drive Systems, 519 Raritan Center, Edison, NJ 08817
Robertson, 135 Fort Lee Rd., Leonia, NJ 07650

SAFETY EQUIPMENT
Wormold Fire Systems, One Stanton St., Marinette, WI 54143

SANITATION DEVICES—Pollution Control
Argo Marine, 140 Franklin St., New York, NY 10013
Davitt Sales Inc., P.O. Box 232, Jefferson Valley, NY 10535
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
FAST Sewage Systems, Div. of St. Louis Ship, 611 East Marceau St., St. Louis, MO 63111
Marine Moisture Control Co., Inc., 60 Imp Dr., Inwood, L.I., N.Y. 11696

SCAFFOLDING EQUIPMENT—Work Platforms
McCaussey Lumber Co., 7751 Lyndon, Detroit, MI 48238
Patent Scaffolding Co., One Bridge Plaza, Fort Lee, NJ 07024
Trus-Loist Corp., P.O. Box 60 Boise, ID 83704

SHAFT SEALS, REVOLUTION INDICATOR EQUIPMENT
De-Johnson Co., 100 Norfolk St., Walpole, MA 02081
Crane Packing Company, 435 Regina Dr., Clarksburg, MD 20734
EG&G Sealol, Engineered Products Div., Marine Products Group, Warwick, RI 02886
Norton Chemplast, 309-150 Day Rd., Wayne, NJ 07470
Penco Div./Hudson Engineering Co., One World Trade Center, Suite 3000, New York, NY 10048

SHIPBREAKING—Salvage
The Boston Metals Co., 313 E. Baltimore St., Baltimore, Md. 21202
Fred Devine Diving & Salvage, Inc., 6211 N. Ensign, Swan Island, Portland, OR 97217
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, Ore. 97201

SHIPBUILDING EQUIPMENT
Pearlson Engineering Co., P.O. Box 8, Kendall Branch, Miami, FL 33156
Total Transportation System Inc., 813 Forrest Dr., Newport News, VA 23606
Total Transportation Systems (International) A/S, Bjornegarden, P.O. Box 248, N-5201, Os, Norway

SHIPBUILDING STEEL
Armo Steel Corp., 703 Curtis St., Middletown, Ohio 45042
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
Tilne, P.O. Box 729, Albany OR 97321
Walded Beam Company, P.O. Box 280, Cherry OH 44081

SHIPBUILDING—Repairs, Maintenance, Drydocking
Alabama Maritime Corp., P.O. Box 3026, Mobile, AL 36652
Amsterdam Drydock Company, Post Box 3006, 1003 AA, Amsterdam, Holland
Arsenale Triestino-San Marco Shipyards, Trieste, Italy, U.S. Rep. Marine Technologies & Brokerage, 33 Rector St., New York, NY 10006
Asmar Shipyards Co., Astilleros v Maestranos de la Armada, Prat 856, Pina 14, Casilla 150-V, Valparaiso, Chile, S.A.
Astilleros Balboa, S.A., c/o Jackson Marine Corp., 17 Battery Place, New York, NY 10004
Atlantic Dry Dock, P.O. Box 276, Ft. George Island, Jacksonville, FL 32226
Altonic Marine Inc., P.O. Box 138, Ft. George Island, Jacksonville, FL 32226
Avondale Shipyards, Inc., P.O. Box 52080, New Orleans, La 70150
Both Iron Works Corp., 700 Washington St., Bath, ME 04520
Bay Shipbuilding Corp., 605 North 3rd Ave., Sturgeon Bay, WI 54235
Bender Shipbuilding & Repair Co., Inc., P.O. Box 42, Mobile, AL 36601
Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
Blohm & Voss Company, 55 Morris Avenue, Springfield, NJ 07081
Burmeister & Wain Skipsvaerft A/S, P.O. Box 2122, Refshaleoen-1015 Copenhagen K, Denmark
Burrard Yarrrows Corporation, P.O. Box 86099, North Vancouver, B.C., Canada
Caneco Shipyards, Rua Carlos Seidl, 714, Caju, 20.931, Rio de Janeiro, RJ, Brazil
Cantieri Navali Riuniti, Via Cipro, 11, 16100 Genova, Italy
Carrington Slipways Pty. Ltd., Old Punt Rd., Tamago NSW Australia 2322
Conrad Industries, P.O. Box 790, Morgan City, La. 70380
Curacao Drydock Company Inc., 26 Broadway, Suite 741, New York, NY 10004
Daewoo International (America) Corp., 437 Madison Ave., New York, NY 10022
Daewoo Shipbuilding & Heavy Machinery Ltd., Ayangri, Chungsu-PO, Koje-Kun, Kyungnam, Korea



High-Speed Catamaran Crewboat Delivered By Fjellstrand

Fjellstrand A/S of Omstrand, Norway, recently completed the 96-passenger crewboat Asie III. An all-aluminum, semi-planing catamaran with asymmetric hulls, the vessel was handed over to the owner in Omstrand, then shipped as deck cargo to Singapore, where it was christened.

Asie III has a one-year contract of affreightment with Esso Production Malaysia Inc. (EMPI), with an option for an additional year. The vessel will operate in the South China Sea transporting personnel and light cargo between in-

stallations in the Semangkok, Irong Barat, and Tapis oil fields. This entails the vessel being stationed offshore for periods of 6-8 weeks. EMPI will also use the boat to evaluate the feasibility of using a high-speed vessel such as the Asie III between the shore base and the offshore installations.

The vessel has an overall length of 103.35 feet, beam of 30.84 feet, depth of 11.48 feet, and maximum draft of 7.38 feet. She is powered by two MTU 16V 396 TB 83 diesel engines, each developing 2,010 bhp at 1,940 rpm, driving Liaaen/Helix

controllable-pitch propellers through Reintjes reduction gears with a ratio of 2.5:1. A water jet, hydraulically operated bow thruster supplied by Frank Mohn is installed in each hull. Electric power is provided by two Mercedes Benz/Stamford diesel generators, each of 50 kw.

During trial runs the boat's speed was measured at 29.1 knots, 0.5 knots above the speed specified in the contract. Fjellstrand's 103-foot catamaran has been subjected to extensive tests in extremely rough sea conditions.

Built to Det norske Veritas classification IA2, Light Craft, R150, Passenger Catamaran, the Asie III is the third 103-foot offshore catamaran built by Fjellstrand. Of the previous vessels, one was delivered to Brazil and one to France. In addition to the three offshore boats, the shipyard has sold seven

103-foot passenger catamarans to Chinese and Norwegian shipping companies.

The vessel has two single cabins, one double cabin, and one four-man cabin forward on the main deck. Crew quarters also contain a galley, messroom, and a shower/lavatory. The passenger lounge has adjustable seats and two lavatories with showers. The cargo deck aft has an area of about 1,075 square feet and a capacity of 40 tons.

New Portable Ring Heater Announced By Jergens

A new induction ring heater that permits easy bearing installation in the factory or in the field without pressing, hammering or hot oil bath has been announced by Jergens, Inc. of Cleveland, Ohio.

The completely portable unit is said to be quick and clean and features a safe automatic temperature control. Available in 110V and 220V models with heating capacities for bearings up to 11-inch diameters, the new units were designed for in-shop and portable use on machine tools, electric motors, trucks, material handling, construction machinery and earth moving equipment or wherever press fit assembly onto shafts is critical.

For more information on the new electric ring heater,

Circle 82 on Reader Service Card

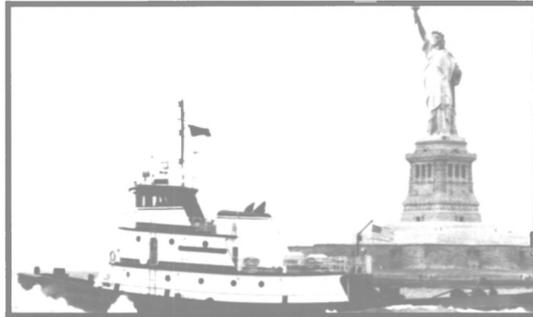
Davie Shipbuilding Ltd., P.O. Box 130, Levis, Quebec, Canada G6V6N7
 Dorbyl Ltd., Military Road, 1 Industrial Sites, West Bank, 5201 East London, Republic of South Africa
 Dravo Marine Equipment Company, Neville Island, Pittsburgh, PA 15225
 Eastern Marine, Inc., P.O. Box 1009, Panama City, FL 32401
 Equitable Shipyards, Inc., P.O. Box 8001, New Orleans, LA 70182
 FMC Corp., Marine & Rail Equipment Div., 4700 N.W. Front Ave., Portland, Oregon 97208
 Far East Livingston Shipbuilding Ltd., 31 Shipyard Rd., Jurong Town, Singapore 2262
 Ganstar Marine, 10 Pemberton Ave., No. Vancouver, B.C., Canada V7P 2R1
 Gladding-Hearn Shipbuilding Corp., 1 Riverside Ave., Somerset, MA 02725
 Gollen Marine Co., Inc., 60 Van Brunt St., Brooklyn, NY 11231
 HBC Barge, Inc., Grant Building, Pittsburgh, PA 15219
 Haller Marine, Inc., P.O. Box 29266, New Orleans, LA 70189
 Hoboken Shipyards, Inc., 1301 Hudson St., Hoboken, NJ 07030
 Hong Kong United Dockyards Ltd., P.O. Box 534, Kowloon Central Post Office, Kowloon, Hong Kong
 Hyundai Mipo Dockyard Ltd., 456 Cheonha-Dong, Ulsan, Korea
 I.N.M.A. S.p.A., 19100 La Spezia, v. le S. Bartolomeo 362, Italy
 Jakobson Shipyard Inc., P.O. Box 229, Oyster Bay, NY 11771
 Jeffboat, Inc., Jeffersonville, Ind. 47130
 Keppel Shipyard Limited, 325 Telok Blangah Road, P.O. Box 2169, Singapore 0409
 Koch Ellis Barge & Ship Service, P.O. Box 9130, Westwego, LA 70094
 Kane Corp., P.O. Box 6, SF-05801, Hyvinkaa, Finland
 Leewac Corporation, P.O. Box 2607, Morgan City, LA 70381
 Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, Wash. 98134
 M.A.N. GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, West Germany
 McDermott, Incorporated, 1010 Common Street, New Orleans, LA 70727
 Main Iron Works, Inc., P.O. Box 1918, Houma, LA 70361
 Marinette Maine Corporation, Marinette, WI 54143
 Jos. L. Meyer GmbH & Co., P.O. Box 2990 Popenburg 1, West Germany
 Mitsubishi Heavy Industries, Ltd., S-1, Marunouchi 2-chome, Chiyoda-ku, Tokyo, Japan
 Monark Boat Co., P.O. Box 210, Monticello, Ark. 71655
 Moran Shipping Agencies, 10 Jefferson Blvd., Warwick, RI 02888
 Moss Point Marine Inc., P.O. Box 1310, Escatawpa, MS 39552
 Nashville Bridge Company, P.O. Box 239, Nashville, TN 37202
 National Marine Service (Shipyard Division), P.O. Box 38, Hartford, CT 06108
 National Steel & Shipbuilding Corp., San Diego, Calif. 92112
 Neorion Shipyards S.A., Syros, Greece—U.S.A. Agents: Keppel Marine Agencies Inc., 26 Broadway, New York, NY 10004, 6420 Richmond Ave., Houston TX 77057
 Newport News Shipbuilding & Dry Dock Co., 4101 Washington Ave., Newport News, Va. 23607
 North Florida Shipyards, P.O. Box 3863, Jacksonville, FL 32206
 O.A.R.N. (Officine Allestimento-Riparazioni Navi), P.O. Box 1395, Genoa, Italy 16100
 Overseas Shipyards, Inc., 21 West St., New York, NY 10006
 Pennsylvania Shipbuilding, P.O. Box 442, Chester, PA 19016
 Port Allen Marine Service, P.O. Box 108, Port Allen, LA 70767
 Promet (PTE) Ltd., 27 Pandam Rd., Jurong Industrial Estate, Singapore 22
 Framet Marine Services Corp., 242 Allens Ave., Providence, RI 02905
 Puerto Rico Drydock & Marine Terminals, Inc., P.O. Box 2209, San Juan, Puerto Rico 00903
 Rauma-Repola, 26100 Rauma 10, Finland
 Samsung Shipbuilding & Heavy Industries Co., Ltd., Samsung Main Bldg. 250, Zka, Taepyeong-ro, Chung-ku, Seoul, Korea
 St. Louis Ship, 611 East Marceau St., St. Louis, MO 63111
 Savannah Shipyard Co., P.O. Box 787, Savannah, GA 31402
 Schuss Defries, Postfach 111146, Schiess-Str. 61, D-4000 Dusseldorf 11, West Germany
 Service Machine Group, Inc., P.O. Box 2664, Morgan City, LA 70381
 Southbay Boat Inc., P.O. Box 13308, San Diego, CA 92113
 Southern Oregon Marine Engineering and Construction, P.O. Box 1220, Coos Bay, OR 97420
 Southwest Marine, Inc., P.O. Box 13308, San Diego, CA 92113

Swiftships Inc., P.O. Box 1908, Morgan City, LA 70380
 Thomas Marine, 37 Bransford St., Patchogue, NY 11772
 Todd Shipyards Corp., 1 Steie St. Plaza, New York, N.Y. 10004
 Tracor Marine, P.O. Box 13107, Port Everglades, Fla. 33316
 Union Dry Dock & Repair Co., Foot of Pershing Road, Weehawken, N.J. 07087
 Verolme Estaleiros Reunidos Do Brasil S.A., Rua Buenos Aires, 68, Rio de Janeiro—RJ—Brazil
 Vickers Cockatoo Dockyard Pty. Ltd., P.O. Box 162 Milsons Point, N.S.W. 2061, Australia
 Walker Boat, P.O. Box 729, Paducah, KY 42002-0729
 Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201
SHIPPING-PACKING
 Pilotege Consultants, Inc., P.O. Box 2046, New Hyde Park, NY 11040
SILENCERS
 Riley-Beard, P.O. Box 31115, Shreveport, LA 71130
SMOKE INDICATORS
 Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928
STUFFING BOXES
 Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
SURVEYORS AND CONSULTANTS
 Francis B. Crocco, Inc., P.O. Box 1411, San Juan, Puerto Rico 00903
 Frank Jeffrey & Assoc., 5201 Westbank Exp., Suite 206, Myrtle, IA 70073
 M.A. Stream Associates, Inc., 400 Second Ave. W., Seattle, WA 98119
TANK CLEANING
 Butlerworth Inc. (USA), 3721 Lapas Dr., P.O. Box 18312, Houston, TX 77223-9989
 Butlerworth Systems (UK), 123 Beddington Lane, Croydon CR9 4NX, England
 Perco Div./Hudson Engineering Co., One World Trade Center, Suite 3000, New York, NY 10048
 Petrochemical Services, Inc., 3820 Dauphine St., New Orleans, LA 70117
TANK LEVELING INDICATORS
 Marine Moisture Control Co., 60 Inip Dr., Inwood, NY 11696
 Metal Goods Manufacturing Company, 309 W. Hensley Blvd., Bartlesville, OK 74003
 Metritape, Inc., P.O. Box 2366, Littleton, MA 01460
 Narconrol, 135 Fort Lee Rd., Leonia, NJ 07605
 Salwicko Inc., 5 Marine View Plaza, Hoboken, NJ 07030
 Transamerica Delaval, Inc., Gems Sensors Division, Cowles Road, Plainville, CT 06062
TOWING—Barges, Vessel Chartering, Lightering, Salvage, etc.
 Bay-Houston Towing Co., 805 World Trade Bldg., Houston, Texas 77002
 Bulkhead Marine Corporation, 1800 West Loop So., Houston TX 77027
 Curtis Bay Towing Co., Mercantile Bldg., Baltimore, Md. 21202
 Henry Gillen's Sons Lightering, 21 West Main St., Oyster Bay, N.Y. 11771
 James Hughes, Inc., 17 Battery Pl., New York, N.Y. 10004
 International Transport Contractors Holland B.V., 5 Kenoopark, P.O. Box 21, Haarlem, Holland
 McAllister Bros., Inc., 17 Battery Pl., New York, N.Y. 10004
 McDonough Marine Service, P.O. Box 26206, New Orleans, La.
 Midland Affiliated Co., 580 Walnut St., Cincinnati, OH 45201
 Moran Towing & Transportation Co., Inc., One World Trade Center, Suite 3335, New York, N.Y. 10048
 National Marine Service, Transport Div., 1750 Brentwood Blvd., St. Louis, MO 63144
 Susterman & Young Co., Inc., 918 World Trade Bldg., Houston, Texas 77002
 Turecama Coastal & Harbor Towing Corp., One Edgewater St., Clifton, Staten Island, N.Y. 10305
VALVES AND FITTINGS
 Camlock Flange Sales Corp., 60 Inip Dr., Inwood, NY 11696
 Clow Corporation, 1375 Magnolia Ave., Corona, CA 91720
 Dover Corporation, Narnis Division, P.O. Box 1799, Tulsa, OK 74101
 Elliott Manufacturing Co., Inc. (Remote Valve Operating Equipment), P.O. Box 773, Binghamton, NY 13902
 Hayward Marine Products, 900 Fairmount Avenue, Elizabeth, NJ 07207
 Jamesbury Corp., 640 Lincoln Street, Worcester, MA 01605
 Marine Moisture Control Co., 60 Inip Dr., Inwood, N.Y. 11696
 Metropolitan Plumbing Supply Corp., 50-09 Second Street, Long Island City, NY 11101

Newmans Inc., 7500 E. Reading Pl., Tulsa, OK 74101
 Pittsburgh Brass Manufacturing, Sandy Hill Rd., R.D. 6 Box 387-A, Irwin, PA 15642
 Stacey/Fetterolf Corp., P.O. Box 103, Skipjack, PA 19474
 Stockham Valves & Fittings, Box 10326, Birmingham, AL 35202
 Tate Temco, Inc., 1941 Lansdowne Road, Baltimore, MD 21227
 Union Finematics, P.O. Box 459, Clinton, PA 15026
 Robert H. Wager Co., Inc., Passaic Avenue, Chatham, N.J. 07928
 Waukesha Bearings Corp., 405 Commerce St., P.O. Box 798, Waukesha, WI 53186
 Westron Corporation, Valve Components Group, 4025 Remembrance Rd., N.W., Grand Rapids, MI 49504
 Wiley Co., 318 Bishop Rd., Highland Heights, OH 44143
 William E. Williams Valve Corporation, 38-52 Review Avenue, Long Island City, NY 11101
 Wilson Inc., 34655 Mills Road, North Ridgeville, OH 44039
 Zidell Explorations, Inc. (Valve Division), 3121 S.W. Moody Avenue, Portland, OR 97201
VISION ANALYSIS
 DJL Engineering Corp., 253 Winslow Way West, Bainbridge Island, WA 98110
VIBRO TRAINING FILMS
 Gulf Publishing Company Video, P.O. Box 2608, Houston, TX 77001
 ICHCA Canada, P.O. Box 2366, Station D, Ottawa, Ontario, Canada K1P5P9
WATER PURIFIERS
 Alfa Laval, Inc., Dept. MR-2, 2115 Linwood Ave., Fort Lee, NJ 07024
 Aquas-Chem, Inc., P.O. Box 421, Milwaukee, WI 53201
 Bull & Roberts, Inc., 785 Central Ave., Murray Hill, NJ 07974
 Drew Chemical Corporation, One Drew Chemical Plaza, Bantion, NJ 07005
 Everpure, Inc., 640 N. Blockhawk Dr., Westmont, NJ 06559
 Marine Moisture Control, 60 Inip Dr., Inwood, NY 11696
 MECO (Mechanical Equipment Company, Inc.), 861 Carondelet St., New Orleans, LA 70130
 Riley-Beard, P.O. Box 31115, Shreveport, LA 71130
 Village Marine Tec., 2000 W. 135th St., Gardena, CA 90249
WELDING
 CRC Automatic Welding, P.O. Box 3227, Houston, TX 77253-3227
 Metallizing Co. of America, Inc., 321 So. Hamilton, Sullivan, IL 61951
 Miller Electric Mfg. Co., P.O. Box 1079, Appleton, WI 54912
 Oerlikon Welding Industries, Inc., P.O. Box 40964, Houston, TX 77240
WINCHES AND FAIRLEADS
 Broden Winch Co., 800 East Dallas, Broken Arrow, OK 74012
 CONMAACO, Inc., 820 Kansas Ave., P.O. Box 5097, Kansas City, KS 66119
 Fritz Culver, Inc., P.O. Box 569, Covington, LA 70434
 Markay Machinery Co., 79 South Horton St., Seattle, Washington 98134
 McElroy Machine & Mfg. Co., Inc., P.O. Box 4454, W. Biloxi, MS 39531
 Rest-O-Matic Systems, Inc., 418 Hellom Street, Wrightsville, PA 17368
 Smith Berger Marine Inc., 516 So. Chicago St., Seattle, WA 98108
 Stanspec Corp., 13600 Daise Ave., Cleveland OH 44110
 Superior-Lidgerwood-Mundy Corp., 1101 John Avenue, Superior, WI 54880
WINDOWS
 Kearfott Marine Products, A Singer Co., 550 South Fulton Avenue, Mt. Vernon, N.Y. 10550
WIRE AND CABLE
 Anixter Bros., Inc., 4711 Golf Road, One Concourse Plaza, Skokie, Illinois 60076
 Atlantic Cordage Corp., 60 Grant Ave., Carteret, NJ 07008
 Delco Wire & Cable, Inc., 257 Rittenhouse Circle, Keystone Industrial Park, Bristol, PA 19007
 Seacoast Electric Supply Corp., 225 Passaic St., Passaic, NJ 07055
 Seacoast Electric Supply Corp., 1505 Oliver St., Houston, TX 77007
WIRE ROPE—Slings
 AUCCO, 60 Grant Ave., Carteret, NJ 07008
 Atlantic Cordage Corp., 60 Grant Ave., Carteret, NJ 07008
 Bethlehem Steel Corp., Martin Tower, Bethlehem, PA 18018
 A.L. Don Company, Foot of Dock Street, Matawan, NJ 07747
 I & I Sling Company, 2626 Market Street, Dept. D, Aston, PA 19014
ZINC
 The Platt Bros. & Co., Box 1030, Waterbury, CT 06721
 Smith & McCracken, 153 Franklin St., New York, N.Y. 10013

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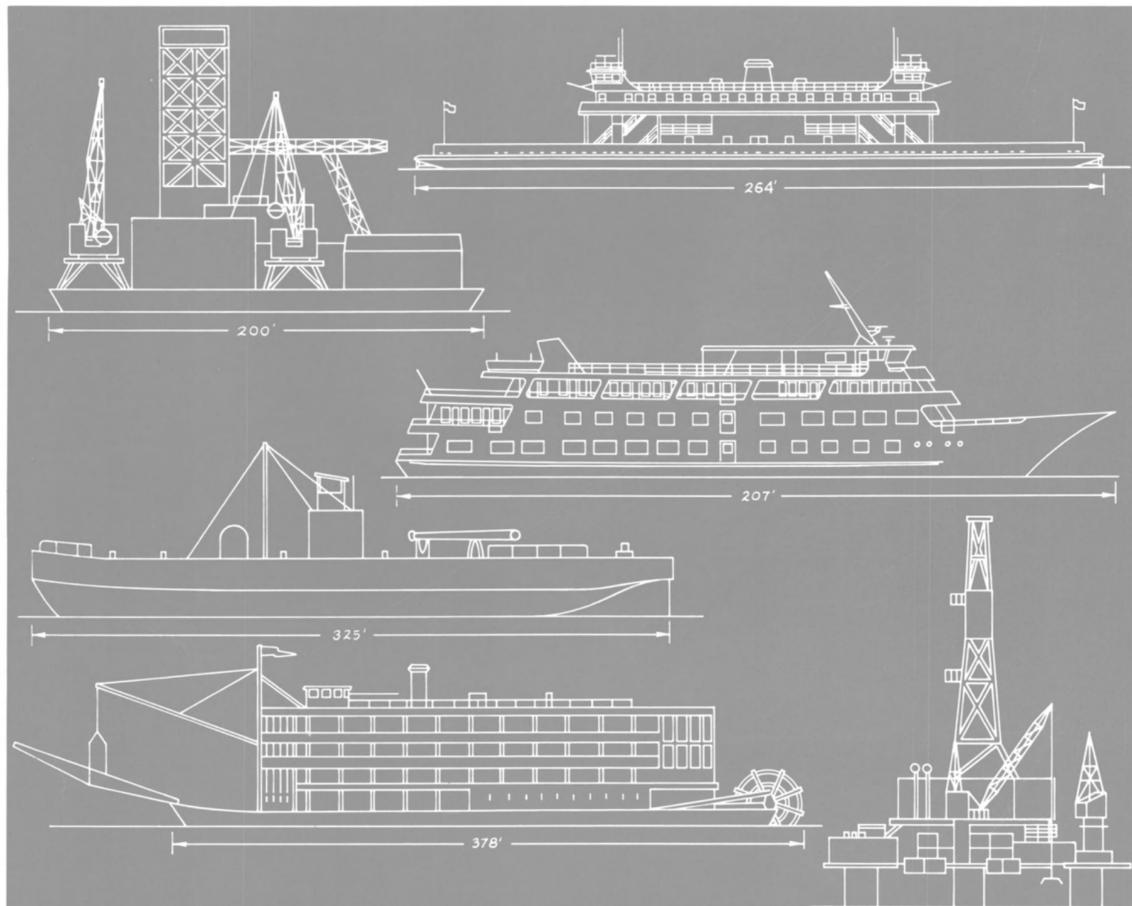
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