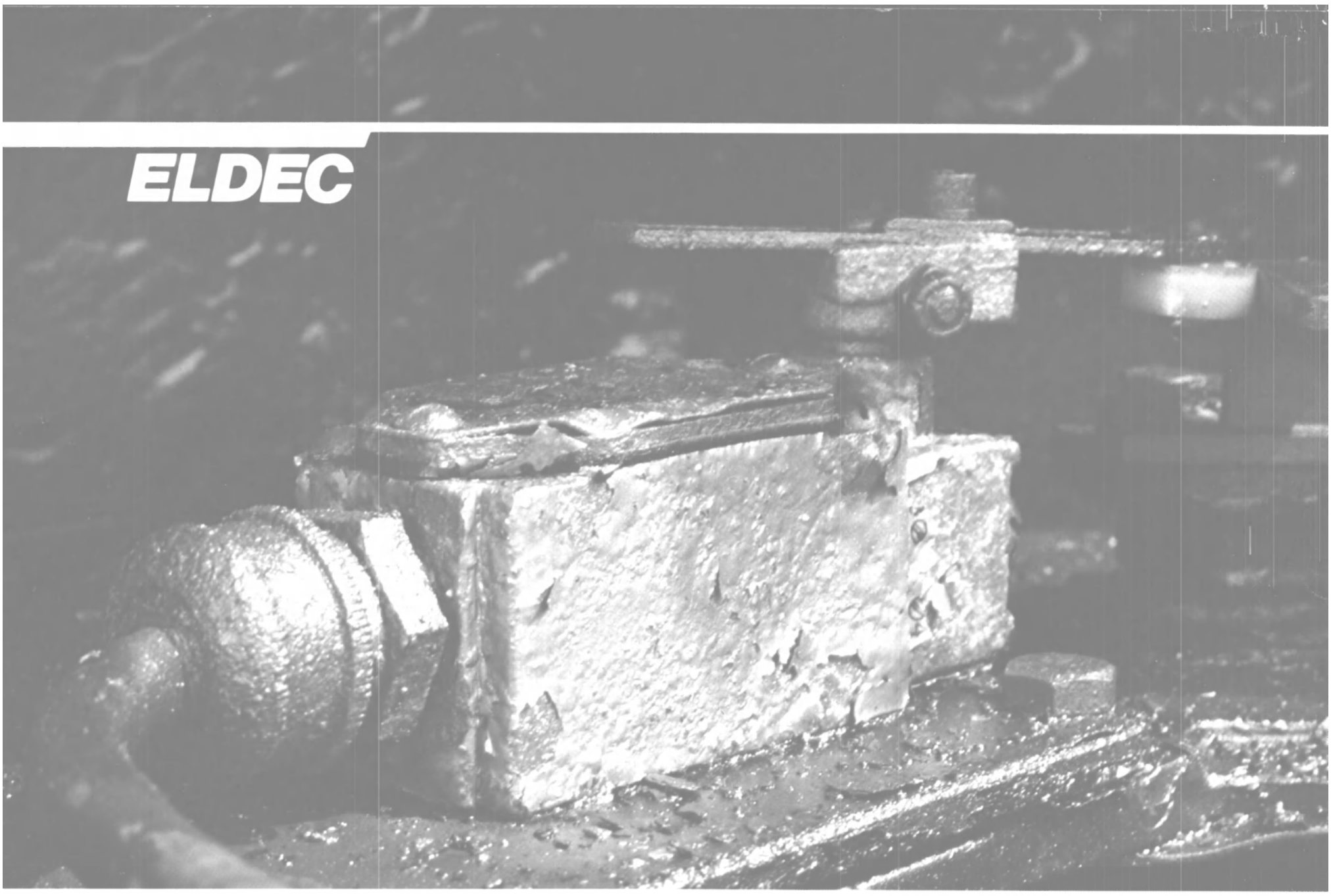
MARITIME REPORTER
AND
ENGINEERING NEWS

AWO ANNUAL
NAVAL TECHNOLOGY & SHIPBUILDING
MARCH 1989 ISSUE



TIME FOR A SWITCH...

After 20,000 cycles, when most mechanical switches are through, ELDEC solid-state switches are just beginning.

In fact, lifespans of over one million cycles are typical. But that kind of reliability is no good if the electronics can't survive the marine environment.

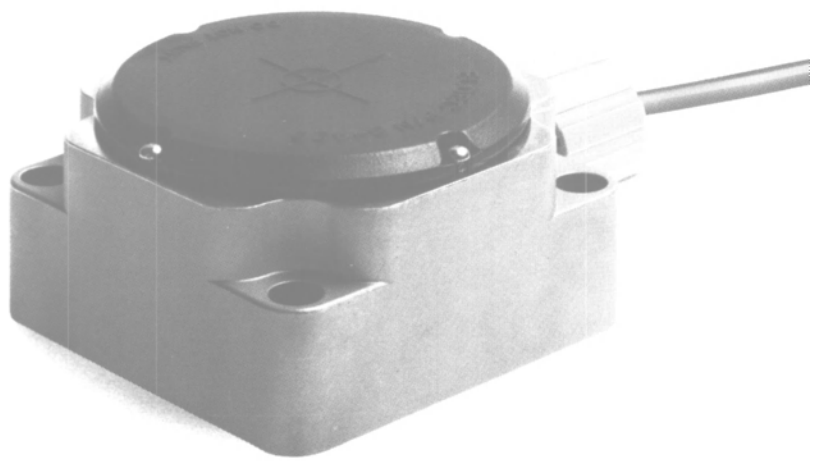
ELDEC non-contacting switches can stand up to the sea.

- Encased in non-corroding, stainless steel.
- EMI hardened to **exceed** MIL STD 461B, Class A4.
- Operating range from −30° to +65°C.
- Meets MIL STD 901C, Grade A, Class 1 for shock.

Two wire AC and three wire DC switches for direct mechanical replacement.

The price is right.
Purchase price is competitive with the best quality mechanical switches. And with less maintenance and replacements, life cycle cost savings are unsurpassed.

Send for more information today.
Once you compare, you'll agree, it's time for a switch.



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Circle 164 on Reader Service Card

The shortest distance between two points...

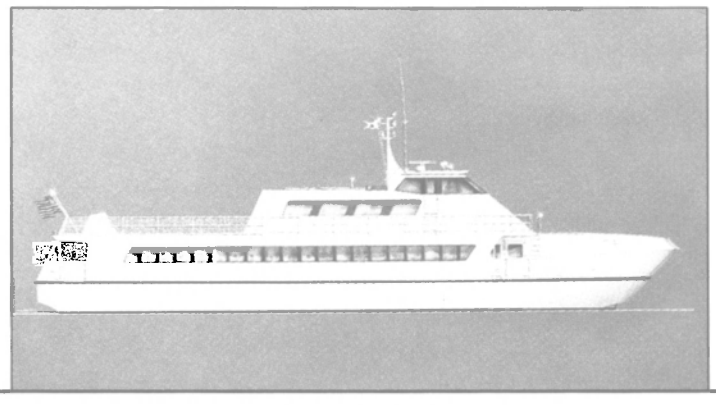
is coming off the ways at Avondale.

The internationally recognized expertise of Avondale Industries, Inc. in the fabrication of commercial and combatant ships is being applied today to smaller craft. The Avondale Boat Division, capitalizing on the company's superior engineering and assembly technology, is capturing contracts to build state-of-the-art boats for demanding customers. Such as the high-speed, surface effect passenger ferries ordered recently by Tri-State Marine Transport, Inc.

These remarkable boats will travel 50 knots-plus and get 400 busy executives from Kennedy to Wall Street or vice versa in minutes–most definitely the fastest route between these two points.

Avondale was chosen for this job because of our reputation for quality control, ability to meet tight deadlines and competitive pricing.

We can guarantee the shortest distance between design and delivery for you, too.



Avondale

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Avondale Industries, Inc.
P.O. Box 50280
New Orleans, LA 70150-0280
Telephone: (504) 366-7298

An Employee Owned
And Operated Company

Air Ride 109 Passenger Ferry, designed by Air Ride Craft, Inc.

Circle 27 on Reader Service Card

ON THE COVER

Photos: Cover and page 44-photos courtesy AWO; page 23-Guided missile frigate Reuben James (FFG 57) U.S. Navy photo; page 25-Ticonheroga class Aegis guided missile cruiser Vincennes (CG 49) U.S. Navy photo.

Norwegian Yard Wins $150-Million Order To Build 15 Trawlers

Sterkoder Mek Verksteder, Kristiansund, Norway, recently received an order to build fifteen 213-foot freezer trawlers. Contractor for the project was not disclosed by the yard.

Stolt Buys Parcel Tanker For European Small Tanker Service

Stolt Tankers and Terminals (Holdings) S.A., has purchased the M/T Stolt Kingfisher for operation in its European Small Tanker Service (ESTS). ESTS is managed from Stolt-Nielsen Nederland B.V. in Rotterdam to provide transshipment within the North Sea, Baltic and Mediterranean areas for vegetable oil and chemical parcel cargoes which Stolt Tankers carry between Europe and all world areas.

According to **Benson Murphy**, executive port director, the new terminal is being built adjacent to the building now being used by Crown Cruise Line, and is part of a $7-million improvement program of the piers used by Crown Cruise Line and the adjacent parking lots and entrance way. He said the new building is scheduled for completion in July.

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Picard Next President Of Raytheon Company

Dennis J. Picard was recently elected as Raytheon Company's next president by the diversified electronic company's board of directors. Mr. **Picard**, currently senior vice president and general manager of Raytheon's Missile Systems Division, Bedford, Mass., will replace company president **R. Gene Shelley**, who is retiring August 1, 1989.

The board also expanded the number of directors from 13 to 14 and elected Mr. **Picard** to the board, effective immediately.

In addition, the board of directors requested that **Thomas L. Phillips**, Raytheon's chairman and CEO since 1975, extend his service with the company until December 31, 1990. Mr. **Phillips** has agreed to the board's request.

Mr. **Phillips** announced that **John P. Shanley**, vice president and assistant general manager for programs at the Missile Systems Division, would replace Mr. **Picard** as general manager of the division.

HBC Barge Acquired By Trinity Industries

Trinity Industries, Inc., Dallas, Texas, has acquired HBC Barge, Inc., Brownsville, Pa., a shipbuilder which has constructed 4,000 barges since its founding in 1938. Terms of the sale were not disclosed.

HBC Barge, located on a 43-acre site about 40 miles south of Pittsburgh on the Monongahela River, joins eight other shipyards in the Trinity Marine Group, New Orleans, La. The barge builder has covered facilities for year-round construction and a 300-foot marine railway for vessel repair.

In making the announcement, **John Dane III**, president of the Trinity Marine Group, said, "We are pleased to acquire HBC because of its excellent reputation for building high quality barges and because the acquisition will make us more competitive in obtaining contracts for barges which will operate on the upper Mississippi River and its tributaries."

He added that HBC will continue to be operated by its current management and no major changes are anticipated.

HBC currently has a backlog of 115 barges. It builds hopper barges and tank barges, and has built tug and push boats. Best known for its 195-foot coal barges, HBC can construct vessels up to 300 feet.

HBC is also known for technical innovation in design and production including an automatic welding technique which eliminates the variability of man-made plug welds. Mr. **Dane** said the new weld called "HBC Steelfuse" has proven stronger than the surrounding steel. The benefits are longer vessel life and reduced maintenance, according to Mr. **Dane**.

Other members of the Trinity Marine Group include Halter Marine, Inc., Moss Point Marine, Inc., Equitable Shipyards, Inc., Gretna Machine Iron Works, Inc., Aluminum Boats, Inc., and recently acquired Thunderbolt Shipbuilding and Repair, Inc.

For free literature detailing the shipbuilding services of the Trinity Marine Group,

Circle 28 on Reader Service Card

$12.6-Million Ferry Being Ordered By Sealink For Service To Isle Of Wight

A $12.6-million ferry is being planned by Sealink British Ferries for service to the Isle of Wight. An order for the ferry, which will have capacity for 1,000 passengers and 140 cars or freight equivalent, is expected to be placed this spring.

Several shipyards whose names have not been disclosed are being asked to tender. The vessel, a sistership to the 2,968-gross-ton St. Cecilia built by the Cochrane yard in Selvy two years ago, is expected to enter service in the autumn of 1990 as a fourth ferry carrying passengers, cars and freight between Portsmouth and Fishbourne near Ryde.

Maritime London 89 To Be Held April 17-21 In City Of London

The Seatrade Group will hold Maritime London 89, a week of business activities focusing international attention on London's involvement in world shipping, will be held at the Barbican Center in the City of London from April 17-21, 1989.

Seatrade also announced that it will sponsor three major annual industry awards, for outstanding contributions to safety at sea, the fight against marine pollution, and the search for greater efficiency in ship operations. These three Seatrade Awards, adjudicated by an international panel of judges, chaired by **C.P. Srivastava**, secretary general of the International Maritime Organization (IMO), will be presented to the winners at a dinner in the City of London's Guildhall on Monday, April 17. Over 600 senior people from all sectors of maritime-related business worldwide will gather for a reception and formal, black-tie dinner to honor the award winners.

One of the cornerstones of the Maritime London 89 event, the Seatrade Exposhipping London 89 exhibition, which has been bringing buyers and sellers together since 1983, will take place over four days, from Tuesday, April 18 to Friday, April 21, in all four halls of the Barbican Center. A new feature of the exhibition will be a series of on-site technical and financial seminars that are expected to attract a record attendance to the show. In the past, this major exhibition has attracted an international attendance of between 6,000 to 10,000 industry personnel.

Other features of the Maritime London 89 week will include the Money & Ships Conference, a major debate on important issues affecting the industry, to be held in the Barbican Center.

For further information on Maritime London 89 and Exposhipping London 89, contact: **Anthony F. Nash** or **Anita Bridges**, The Seatrade Organization, Fairfax House, Causton Road, Colchester CO1 1RJ, UK; telephone: (0206) 45121; telex: 98517 DISOP G; and fax: (0206) 45190. You may also contact: **Michael Kazakoff**, the Seatrade Organization, Suite 1805, 40 Rector Street, New York, N.Y. 10006; telephone: (212) 393-1000; telex: 233629 SEA UR; and fax: (212) 608-5874.

Marine Interiors Offers Free Literature Listing Products And Services

Marine Interiors, Inc. of Langley, Wash., is offering free literature describing the products and services offered by the company, as well as the benefits of using their product line.

In addition to discussing different types of seating, the literature describes tables of various sizes and finishes, as well as such options as trays, head rests, arm rests, foot rails, storage pockets for brochures and magazines, etc.

Benefits listed besides durability and longevity include comfort—all seating is contoured to provide the most comfort for the passenger; most USCG standards for structural fire protection and stability are met or exceeded; seating is offered in a variety of finishes, custom colors, powder coated or completely upholstered with or without removable cushions; Marine Interiors caters exclusively to the passenger vessel industry and recognizes and takes into consideration all factors concerning vessel owners and operations management before designing a seat or table.

Services include saving the customer money by providing in-house USCG interior services—the company will assist with floor plans, colors, fabrics, floor coverings; fast and knowledgeable installation services; and custom services to accommodate special needs, i.e., odd areas like bows and sterns, handicapped accommodations, etc.

For further information and free copies of the literature from Marine Interiors,

Circle 71 on Reader Service Card

Ulstein Establishes Branch Office In Nova Scotia

The Ulstein Group of Norway, one of Europe's main suppliers of marine equipment, has established a new branch office in Dartmouth, Nova Scotia. This is the third area where the company is represented in North America. Ulstein is already located in Vancouver and New Orleans.

All sales and services activities will be performed by the new office including diesel engines, rudders and other ship equipment, together with shipyard activities and naval architectural services.

Ulstein Maritime Ltd. in Vancouver is the regional office for North America, apart from manufacturing the group's Z-drive propellers.

The address of the new office is: Ulstein Maritime Ltd., 51-201 Brownlow Avenue, Dartmouth, Nova Scotia, Canada B3B 1W2, phone (902) 468-2883, fax (902) 468-2759.

For details on Ulstein products,

Circle 115 on Reader Service Card

Former Home Lines Executive Joins ABS

Andrea Puccio has joined the staff of the American Bureau of Shipping as passenger ship projects manager. Mr. **Puccio**, who has many years of experience with passenger liners and cruise vessels, will help ABS extend its classification of this type of vessel.

Until recently, Mr. **Puccio** was the vice president of Home Lines Technical Department, where he supervised the reconversion and newbuilding of all Home Lines vessels, including the Atlantic and the Homeric. He was responsible for all technical matters relating to classification, maintenance and repair, and operations.

T.A.S.T. Corporation North American Agent For Dubai Drydocks —Literature Available

Dubai Drydocks has selected T.A.S.T. Corporation, Fairfield, N.J., to be their exclusive representative in the U.S. and Canada, according to an announcement by T.A.S.T. president **Alfred E. Stanford**.

Dubai Drydocks is a premier ship repair yard in the Arabian Gulf, comprising three ultra-large crude carrier (ULCC) drydocks and facilities. The yard is capable of handling vessels of all types and sizes, ranging from the largest tankers afloat to numerous dry cargo and bulk carriers and offshore drilling rigs.

For free literature detailing the ship-repairing facilities and services of Dubai Drydocks,

Circle 103 on Reader Service Card

Mako Maritime Sells Passenger Cruise Ship

Mako Maritime, brokers and managers of cruise and commercial vessels around the world, has completed the sale of a 16,000-ton luxury passenger cruise ship

The 503-foot vessel was purchased by Carter Green Redd Investments, doing business as Pride Cruise Lines of Gulfport, Miss. The ship, known as the Atlas, will be renamed Pride of Mississippi. It is registered in the Bahamas.

In addition to serving as exclusive broker for the Atlas, Mako Maritime has also been retained to manage ship operations and will be responsible for everything from shipboard concessions to entertainment to code compliance.

Mako Maritime, with offices in Miami and affiliates throughout Europe and the Mediterranean, offers management, training, recruitment, design, sales and marketing and various related services.

For more information and free literature,

Circle 56 on Reader Service Card

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FOR FASTER, EASIER, AND BETTER SHIP CONSTRUCTION

Rockwool TNF Joiner Package Consisting of:

- Bulkhead panels
- Continuous steel linear ceilings
- Light fixtures and vents
- Modular bathrooms
- Sound insulated doors
- Floating floors
- Engineering and supervision

Non Progressive and Progressive Panels

- Modular (quick) installation
- Built-in Thermal insulation
- High aesthetic appeal
- SOLAS, USCG, ABS, DNV, B-15/A-60 certification
- Engineering and supervision
- Integrated accessories; lights, vent diffusers, access panels, speakers

ACRA-MOLD™ ACRYLIC HEAD MODULE

- One piece—no seam acrylic construction
- Module arrives on the job complete—all plumbing, electrical and accessories factory pre-installed
- Approximately 4 man-hours for installation
- Weighs up to 30% less than conventional steel modules
- Economical custom design

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Circle 293 on Reader Service Card

Swagelok Quick-Connects With Heavy-Duty Body Sleeve Now Available

Quick-connects with a heavy-duty body sleeve design are now available from Swagelok Quick-Connect Co., Solon, Ohio. The design allows users to install instrument-quality Swagelok Quick-Connects in rugged industrial systems.

The sleeve protects the Quick-Connect body when the unit is uncoupled. Dropping and other rough handling will not damage the open end of the body.

The Swagelok Quick-Connects feature automatic shutoff to minimize pressure loss or fluid spillage during uncoupling. Operation is an easy straight-line action—push to connect, pull to disconnect.

Sizes are 1/8-inch to 1/2-inch in brass and 316 stainless steel. End connections can be Swagelok Tube Fittings, NPT, 37-degree AN flare, or Cajon Hose Connectors. Service ratings range from vacuum to 3,000 psi and 400 degrees F.

For more information and free literature from Swagelok Quick- Connect Company,

Circle 67 on Reader Service Card

Strachan Shipping Appoints Singleton VP, Stevedoring In Savannah

Strachan Shipping Co. president **J.R. MacPherson** has announced the appointment of **Bill Singleton** as vice president of stevedoring for the Savannah, Ga., area.

A veteran of 20 years in the maritime industry, Mr. **Singletonwill** be responsible for the overall daily stevedoring operations for Strachan in Savannah, Charleston and Jacksonville. He will report to **Edward J. Condon**, Strachan's vice president of stevedoring for the South Atlantic area.

Strachan Shipping Co. is one of the nation's largest shipping agents and stevedores with offices in major ports on the East, Gulf and West Coasts.

Palmer Offers Brochure On Cavitation-Reducing Polymer Coatings

Palmer Internationl, Inc., Worcester, Pa., has developed two elastomeric compounds, DuraTough DP and DuraTough DL, for the repair of marine components damaged by cavitation. These compliant compounds are designed to inhibit the deterioration of metal substrates caused by cavitation and low percentages of entrained solids (silt and sand) in high volume and high velocity fluid flow environments.

Both materials are cold-applied over a grit blasted surface treated with a corrosion-inhibiting primer. DuraTough SP is mixed to a firm paste and is used for filling areas deeply pitted by cavitation, and can be applied to vertical or horizontal overhead surfaces up to 1-1/2 inches thick without slumping. DuraTough DL is a high viscosity, brushable topcoat, applied to protect metals from damage caused by cavitation and entrained solids' erosion.

Tests conducted by the B.C. Hydro Research & Development Laboratory, Surrey, British Columbia, show that DuraTough resists cavitation erosion five times better than carbon steel and two time better than 308L stainless weld overlay. (Figures obtained from ASTM G 32 Vibratory Cavitation Test methods for low intensity cavitation.)

According to Palmer International, repairing cavitation-damaged marine components (rudders, struts, screws, bearing "barrels," circ pumps, sea chests, Kort nozzles) with DuraTough is extremely cost-effective.

For more information and free literature on Palmer polymer coatings,

Circle 60 on Reader Service Card

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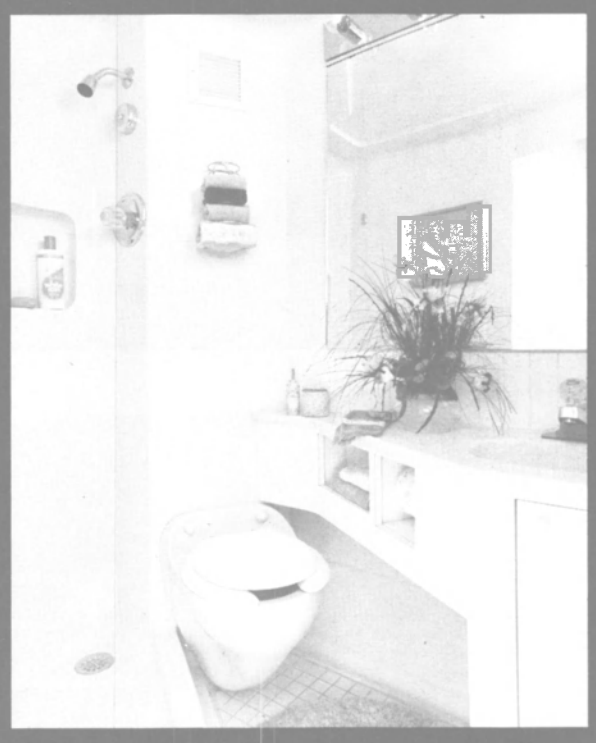
FOR FASTER, EASIER, AND BETTER SHIP CONSTRUCTION



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Twin Disc Expands Marine Transmission Series For Workboat Applications

—New Free Brochures Available—

Twin Disc, Inc., Racine, Wis., has expanded their popular MG-516 Marine Transmission Series with the addition of the model MG-5161, and has added a deep case version to their high performance MG-5111 Marine Transmission Series. Both new high capacity, compact reverse-reduction marine transmissions are designed for the rugged service encountered by diesel engine's in vessels such as fishboats, towboats, tugs, ferries, crewboats and other workboats.

The MG-516 Marine Transmission covers a power range of 235 to 447 kw (315 to 600 hp) and is offered in ratios 3.07:1, 3.50:1, 4.04:1, 4.52:1, 5.05:1 and 6.00:1. The MG-5161 covers a power range of 235 to 425 kw (315 to 570 hp) and is offered in two ratios—6.53:1 and 7.00:1.

Rated 475 hp at 1,800 rpm continuous duty for all ratios, both the MG-516 and MG-5161 models feature identical ratings and ratios forward and reverse when used with right-hand standard rotation engines. The transmissions can also be set up for use with left-hand rotation engines driving through forward for ahead.

The MG-516 transmission is equipped with a torsional flexible coupling to fit standard SAE 14-inch flywheels and offers solid, predictable response through oil controlled and oil cooled forward and reverse clutches.

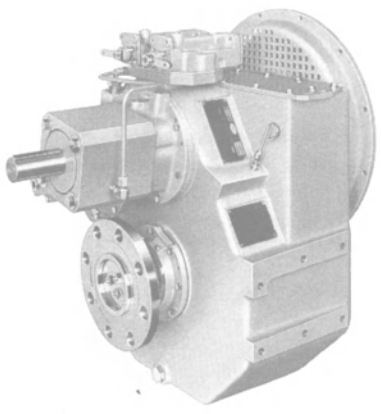
The MG-5111DC marine transmission, suited for the diesel engines in fishboats and workboats requiring low propeller speeds, is available in a power range of 164 to 421 kw (220 to 565 hp) with three optional transmission-mounted PTOs. The two identical capacity forward and reverse ratios, 3.92:1 and 4.95:1, make it possible to have either left or right-hand propeller rotation with identical right-hand engines. Transmissions can also be specified for use with left-hand rotation engines.

Rated 325 hp at 1,800 rpm continuous duty in all ratios, this transmission weighs only 771 pounds, which reflects the advanced design of the strong but lightweight high-grade iron housings. SAE No. 1 or No. 2 configurations are available.

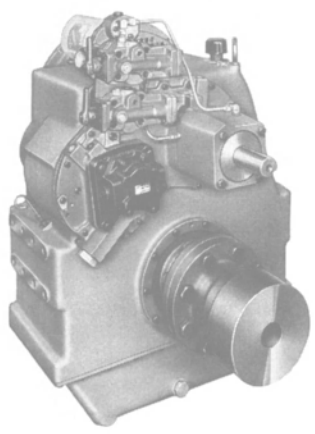
The new gear/clutch technology and gearing/bearing/clutch arrangement allow for service of major components without removing the transmission from the engine.

The new transmissions can use Twin Disc's Trolling Valve option, which offers the ability to obtain lower propeller speeds than would be possible at engine idle with the clutch fully engaged, permitting greater maneuverability and control.

In addition, the marine transmissions carry the standard Twin Disc comprehensive warranty, and Twin Disc renewal parts and parts kits are available through authorized dealers.



Twin Disc's new MG-5111 deep case marine transmission.



The Twin Disc MG-5161 shown with optional XA7512 hydraulic clutch PTO.

For a free brochures on the MG-511 deep case and MG-516 and MG-5161 marine transmissions from Twin Disc,

Circle 12 on Reader Service Card

Ulstein Hatloe Receives $29.3-Million Order To Build Support Vessel

The Norwegian shipbuilder Ulstein Hatloe recently received an order from Rieber Shipping of Bergen, Norway, worth about $29.3 million to build an advanced ice-strengthened support vessel.

The 298-1/2-foot vessel, which is expected to be delivered in September of next year, would be used to support Polar expeditions.

FELS Awarded Contract To Construct Another Cable Ship For AT&T

Far East Levingston Shipbuilding Ltd. (FELS) of Singapore has been awarded a second contract by American Telephone and Telegraph Company (AT&T) to build another cable-laying ship.

The first ship is expected to be delivered in 1990, while the second ship is scheduled to a 1991 delivery.

Soundcoat Offers Brochure On Vibration-Dissipating Noise Reduction Material

The acoustical laboratory of Soundcoat Company, Inc., Deer Park, N.Y., has improved upon their proprietary vibration control material DYAD where it can now provide high damping from -15 F for DYAD 601 to 250 F for DYAD 609.

DYAD is used for constrained layer damping where a layer of viscoelastic material is sandwiched between the vibrating structure and a thinner metal constraining layer. It is the viscoelastic material compound which dissipates the mechanical energy of vibration into the form of heat.

Due to DYAD's extended temperature range it can now be used to reduce noise and vibration significantly in equipment where low and high temperature requirements must be met, such as skies to engines.

The Soundcoat Company, with laboratories and manufacturing facilities in New York and California, is involved in noise control research and development and manufacturing damping, barrier, absorption, gasketing and glass fiber materials. The company has provided noise control solutions and materials for all types of equipment in every industry from ships to aerospace to office machinery.

For additional information and Soundcoat Bulletin No. 701,

Circle 59 on Reader Service Card

NautiCan Enterprises Reports Advanced Propeller Nozzle Improves Thrust, Lowers Drag

—Color Brochure, Technical Paper Offered—

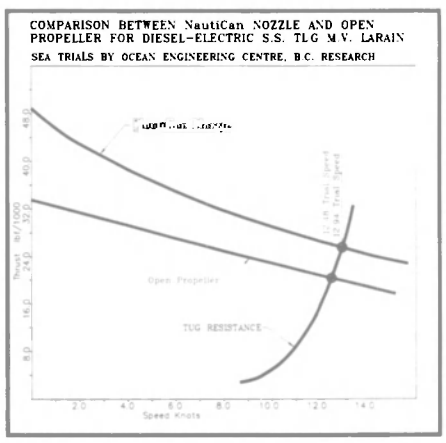
NautiCan Enterprises, Ltd., North Vancouver, B.C., Canada, claims to have made a significant breakthrough in nozzle design more than 50 years after the development of the original Kort nozzle in Germany.

The outline of the Kort nozzle has become familiar to operators of towboats, fishboats, supply vessels and other workboats over the years. The inside of the Kort nozzle is shaped like a venturi tube, flared entry, cylindrical section usually made of stainless steel at the propeller plane and a cylindrical or cone section on the nozzle exit. Its leading and trailing edges are made from the pipe or the solid round. The exterior of the nozzle is always a cone.

After carrying out extensive tests on various nozzle configurations, **Josip Gruzling**, marine engineer, NautiCan Enterprises Ltd., decided that if one could design a nozzle with an airfoil shape that had extremely low drag, then it would be possible to increase the efficiency of any vessel.

The new NautiCan nozzle has a continuous curvature of its inside and outside surfaces, similar to the wing section of an advanced aircraft. Unlike the conventional nozzle which is circular, the new nozzle is actually a 36-sided polygon.

NautiCan Enterprises claims that



The Westrac, operated by Western Towboat, is fitted with NautiCan nozzles.

by adapting the advanced theory of the wing section to the original nozzle design, the newly developed nozzle not only improves thrust at lower speeds but also increases the free-running speed of a vessel.

According to company literature, the superior performance of the NautiCan nozzle was achieved with the use of a more efficient airfoil section. Model tests performed at the Vienna Ship Model Basin showed that the NautiCan nozzle has 17 times less drag than an industrial standard 19A type nozzle. There was no flow separation observed on either the inside surface or outside surface of the NautiCan nozzle. The model test also showed a 12 percent better efficiency over the open propeller at higher speeds.

NautiCan Enterprises reports that in actual sea trials, speed increases of 0.4-1.0 knots were attained. In the instance where a NautiCan nozzle was used to replace an existing Kort nozzle, the measured bollard pull increased from 20,000 pounds to 23,000 pounds. Free running speed of the vessel was increased by three-quarters of a knot.

With the use of an advanced propeller design in place of the conventional Kaplan propeller, there was a significant reduction in vibration and noise.

The NautiCan nozzle is fabricated out of a number of small segments, each of which resembles a section of an aircraft wing. The inside surface of the nozzle is made entirely of stainless steel.

For a recent order for eight 42-inch NautiCan nozzles from Ulstein Maritime Ltd., NautiCan Enterprises developed a one-piece, hollow-cast nozzle using stainless steel or high tensile bronze.

The nozzles and propellers were incorporated into Ulstein Maritime Z-Drive units and supplied to the U.S. Navy.

To date, NautiCan Enterprises has received orders for 11 nozzles for the U.S. Navy's torpedo weapons retrievers (TWRs), as well as over a dozen installations aboard tugs and fishing vessels. A survey vessel, the GSI Explorer, operated by Geophysical Services Ltd., is fitted with three of the nozzles.

According to a paper, "Advanced Nozzle/Propeller Development," presented by Mr. **Gruzling** at the Society of Naval Architects and Marine Engineers (SNAME)-Pacific Northwest Section's spring meeting last year, the full potential of the nozzles will be realized only when they are applied to vessels operating at higher speeds. Improved flow over the nozzle section opens possibilities for quieter running propellers for military applications and seismic research vessels and passenger vessels.

For a free copies of the technical paper and a full-color brochure detailing the features and advantages of the NautiCan nozzle,

Circle 94 on Reader Service Card

Two 76-inch NautiCan nozzles installed aboard a tug owned by Western Towboat Co., Seattle, Wash.

Carnival Finalizes Purchase Of HAL

Carnival Cruise Lines (CCL), Miami, Fla., has completed its purchase of Holland America Line (HAL), according to CCL president **Mickey Arison**.

The $625-million purchase includes Holland America's Alaskan and Caribbean cruise operations, Windstar Sail Cruises, Westours, and Westmark Hotels.

Mr. **Arison** indicated that the two companies would remain separate entities, and that there would be no changes in the HAL's operations or management.

However, Mr. **Arison** did indicate that HAL's letter of intent to order two cruise ships from Bremer Vulkan AG, Bremen, West Germany, had expired because financing for the vessels had not been arranged within the agreed time period.

Over $700 Million To Be Spent On Containerships By Royal Nedlloyd NV

Over $700 million is to be spent on new containerships by the Dutch shipping and transport group Royal Nedlloyd NV.

Tenders have been called for from a number of shipyards in Europe and Japan for five containerships, costing $48 million apiece, to carry 3,000 twenty-foot containers (TEUs) each. The vessels are for delivery in 1991.

Options have been taken out on five more containerships which could carry 3,800 twenty-foot containers, as well as on another five vessels with capacities of 4,600 TEUs each, all for 1994 delivery.

Total value of the firm contract and the options is about $725 million.

Four Wartsila Vasa 46 Main Engines To Power New Luxury Cruise Liner

The new luxury cruiser of the Finnish Birka Line Ab, now under construction at Wartsila Marine's shipyard in Turku, Finland, will have a propulsion plant consisting of four six-cylinder Vasa 46 engines. The total output of the main machinery is 21,100 kw at 500 rpm.

The cruiser will also be fitted with Vasa type auxiliary engines. Electricity onboard will be generated by four six-cylinder Wartsila Vasa 32 engines with a total output of 9,800 kw at 750 rpm.

Both the main and auxiliary engines will be elastically mounted. The main engines drive two CP propellers through reduction gears. The engines will be delivered to the shipyard at the end of 1989. The vessel is scheduled for operation in the autumn of 1990. The 32,000-grt cruiser, designed for 1,700 passengers, will operate in the Baltic Sea.

For free literature giving full information on Wartsila engines,

Circle 52 on Reader Service Card

Gladding-Hearn Announces Sale Of 3rd High-Speed Ferry For Great Lakes

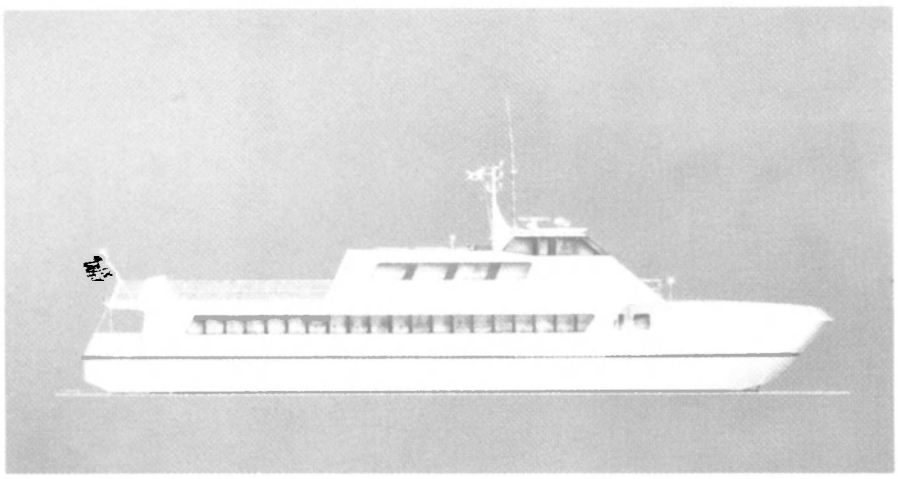
Gladding-Hearn Shipbuilding, The Duclos Corp., which launched its second high-speed ferry designed by Australian **Philip Hercus** for service in the Great Lakes just over a year ago, recently announced the sale of its sixth International Catamaran (INCAT) to Put-In-Bay Transportation Co., located 12 miles from Port Clinton, Ohio, on Lake Erie's Put-In-Bay Island.

According to company president **Charles Duggan**, the 93-foot welded aluminum, twin-hulled vessel, dubbed M/V Put-In-Bay Express, will be one of the fastest commercial ferries operating in North America.

Powered by twin 1,750-hp German-built Deutz MWM diesel engines and driven by two KaMeWa water jets, the new vessel will reach speeds of 30 knots (34.5 mph) fully loaded. The ferry, which will take seven months to build, is expected to make the 12-mile trip between Port Clinton and Put-In Bay in 20 minutes.

For free literature giving full information on the facilities and capabilities of Gladding-Hearn Shipbuilding,

Circle 75 on Reader Service Card



Artist's conception of the "Air Ride 109" passenger ferry under construction at Avondale Industries' Avondale Boat Division, New Orleans, La. She will be operated in New York City commuter service by Tri-State Marine Transport, Inc.

Avondale Boat Division Building 400-Passenger SES Ferry

Commuter Boat To Operate Between Kennedy Airport And Manhattan

The Avondale Boat Division, New Orleans, La., of Avondale Industries, Inc., has received an order for a high-speed 400-passenger Surface-Effect-Ship (SES) catamaran that will be operated by Tri-State Marine Transport, Inc., in New York City commuter service between Kennedy Airport and downtown Manhattan.

Expected to enter into service this spring, the 109-foot "Air Ride" passenger ferry, with a beam of 34 feet, designed by Air Craft, Inc., will travel at speeds between 40 to 50 knots, dramatically reducing commuting time between downtown and the airport.

The SES passenger ferry will be powered by two 16-cylinder Deutz MWM 604B series diesel engines, each rated at 2,253 hp at 1,800 rpm, fitted to KaMeWa waterjets.

A Surface-Effect-Ship is an air-supported craft with catamaran-like sidewalls, in which the volume of air between the hulls is trapped with flexible bow and stern seals. This trapped air is then pressurized, providing a lift force on the entire hull. The effect is that, with the reduced drag between the boat and the water, the vessel can provide more speed with the same amount of power.

SES craft provide a stable platform in heavy seas and handle similarly to conventional planing boats.

The state-of-the-art "Air Ride" ferry will have two decks with bar and buffet facilities and will be fitted with extensive noise reduction systems for passenger comfort.

For free literature detailing the boatbuilding services of the Avondale Boat Division,

Circle 15 on Reader Service Card

Lykes Names Two Senior VPs And Three New VPs

In order to strengthen the company for its future needs and provide an organization responsive to the demands of the industry, **W. James Amoss**, chairman and chief executive officer of Lykes Bros. Steamship Co., Inc., recently announced the reorganization of the finance division, the election of a new senior vice president to head the Planning and Analysis Group, and the election of a new chief financial officer.

John D. List, formerly vice president and treasurer, has been named senior vice president and chief financial officer.

J.T. Lykes III, formerly vice president and treasurer, has been named senior vice president and chief financial officer.

Both Mr. **List** and Mr. **Lykes** will report to president and chief operating officer **Eugene F. McCormick.**

Elizabeth A. Wetzel has been named vice president and treasurer, and **George P. Buchert** has been named vice president-voyage reporting.

Lykes Bros. Steamship Co., Inc., headquartered in New Orleans and with offices around the world, operates a fleet of 28 American-flag vessels including 10 container, two roll-on/roll-off, and 16 multipurpose vessels.

Port Of Palm Beach Builds New Cruise Terminal

The Port of Palm Beach has broken ground on a new $1.7-million cruise terminal building to accommodate the growing fleet of Crown Cruise Line.

The 19,000-square-foot two-story building, which will be leased to Crown Cruise Line, will provide space for baggage handling and customs on the lower level and have embarkation, check-in facilities, a VIP lounge and offices on the second level.

OMI Restructures Board Of Directors

OMI Corp., a major bulk shipping company, has expanded its board of directors to nine members from seven, and has announced the appointment of four new directors, **Chaim Barash, Livio Borghese, Emanuel L. Rouvelas, and Franklin W.L. Tsao.**

Mr. **Barash** is OMI's senior vice president, operations. Mr. **Borghese** is chairman of International Investment Banking, Prudential-Bache Capital Funding, New York; Mr. **Rouvelas** is a partner in the law firm of Preston, Thorgrimson, Ellis & Holman, Washington, D.C.; Mr. **Tsao** is president of Shipcentral Limited, a New York ship brokerage and real estate investment firm, and of A.L. Burbank & Co., Ltd., ship brokers.

Navigation & Communications Equipment Review

Through recent technology breakthroughs and advancements, the leading manufacturers of marine electronics are constantly introducing innovative products in an effort to make navigation safer and more precise, and communications faster and easier.

Newer, more compact, and more powerful lorans, radars, radiotelephones, weather chart recorders, navtex receivers, ARPAs, hand-held phones, etc., with state-of-the-art, cost-effective features continue to be introduced to the marine market.

In an effort to sort out some of these new choices, the editors of MARITIME REPORTER have asked a number of the marine market leaders in the fields of navigation and communication equipment and services to report on their newly introduced product lines. The following review is based on information we had received at press time.

FOR MORE INFORMATION

To receive free literature describing any of the high-tech products detailed in this review, circle the appropriate reader service number listed under each company's name, using the postage-paid card bound into the back of this issue.

ALDEN

Circle 82 on Reader Service Card

Alden Electronics, Inc., Westboro, Mass., has introduced the low-cost Alden Faxmate™ Weather Chart Recorder.

Armand Bouchard, Faxmate product manager, said "Alden is introducing Faxmate to provide an economical means for all mariners to be able to acquire vital weather and oceanographic charts while underway. As an added bonus, the Faxmate can double as a printer for an IBM PC or compatible computer, since it features a standard Centronics interface."

Designed to operate with any HF or ham radio, the Faxmate provides mariners with surface analyses charts which show current locations of storms as well as prognoses which predict the indicated speed and direction of these storms. Many transmit sites now broadcast sea surface temperature, mixed layer depth and the location of warm and cold water eddies which are so helpful in locating species of fish.

The Faxmate complements Alden's current line of Marinefax recorders which have won the coveted National Marine Electronics Association (NMEA) Award for reliability and performance for the last eight consecutive years.

FURUNO

Circle 83 on Reader Service Card

Furuno U.S.A., Inc., South San Francisco, Calif., has recently introduced a number of new products, including radar video plotter adapters, radars, and a direction finder.

Furuno's new FR-8000D series radars are designed to provide top performance at a reasonable price for most workboats, fishing vessels, and smaller passenger boats. These radars, available in 5-, 10-, and 25-kw models, features extremely high resolution, 12-inch monochrome CRT displays with no-compromise eight-level quantization.

Following last year's successful introduction of the FR-2010D X-band radar, Furuno expanded this line with the addition of a 30-kw S-band model for top performance in adverse weather. This new FR-2030S is particularly suited for oceangoing ships, fishing vessels and ferries, all of which are inevitably involved in rough sea conditions. The FR-2030S provides a bright 20-inch diagonal high resolution CRT that shows radar returns in eight levels of high contrast yellow-orange against a selectable background for day or night. Target detection is enhanced by use of echo stretch and averaging.

Furuno also introduced an innovative family of video navigation plotter adapters for all the new digitized radars. Two series are available—the RP series, which are basic video plotters, and the ARP series, which provide automatic tracking of manually acquired targets. All plot control electronics are contained in the radar display units, making for an extremely compact and convenient installation. Of course, appropriate heading and position sensors must be fitted.

For general navigation and rescue operations, Furuno offers the microprocessor-controlled ADF FD-160. Its built-in microprocessor permits programming of up to 200 channels in 100-Hz steps from 100.0 kHz to 29.9999 MHz. All channels and reception modes are stored in memory and preserved by rechargeable battery.

Two forms of scanning are provided: band scanning that traces frequencies within a selected range or steps through preset intervals, or channel scanning that accesses designated channels either in order or in preset steps.

Also within the past year, Furuno U.S.A. was appointed exclusive distributor for the Lokata line of 406 MHz distress beacons in the U.S. These advanced beacons transmit on the worldwide frequency for satellite-aided search and rescue, and include information on ship identification and type emergency. Signals are relayed via polar-orbiting COSPAS-SARSAT satellites to ground stations which then calculate vessel position to within 1-2 km.

GALBRAITH-PILOT MARINE

Circle 84 on Reader Service Card

The Galbraith-Pilot Marine Division of Marine Electric RPD, Inc., recently unveiled a new line of shipboard communications equipment ranging from water-tight control panels for helicopter flight decks to cruise passenger ship emergency loudspeaker systems with a capacity of 400 loudspeakers capable of reaching all quarters of a large cruise vessel.

This line of communications equipment features control panels for four, five or seven speaker groups; a water-tight control panel for four speaker groups for use on weather deck and gangway watch stations; an intercom control panel for all interior quarters; and amplifiers with power from 50 to 250 watts.

Also included is a complete range of loudspeakers, some weather-proofed for outdoor deck locations; entertainment speakers for ward rooms, staterooms and lounges; and explosion-proof speakers for engine rooms, cargo holds and other potentially hazardous areas.

Accessories such as handsets, push-button switches, stowage boxes and jack boxes are also available.

GOLDSTAR

Circle 95 on Reader Service Card

Goldstar Precision, Cerritos, Calif., has introduced a new color radar series featuring models GS-924C, GS-932C and GS-948C for the commercial vessel and passenger boat market.

Featuring high-resolution 8-inch color CRTs with real images in eight colors, 5-kw transmitter power and a choice of 24- , 32- or 48-nm, the new Goldstar color scan radar series offers sophisticated, high-tech performance.

According to Goldstar, each unit has on screen readouts of all operational information of features status to assure the easier and safer operation of the radars. Three different digital Guard Zones are set up using the two EBLs and VRMs with audible and visual alarm on the target's penetration into the guarded area. Other features include: track history showing targets movement; off-centered display for picture exapnsion in aft and bow direction; STC, FTC and IR, etc.; and interfacing with Loran-C NMEA 0182/0183 and Compass NMEA 0183 to supply ship's course.

GS-924C series radar facilitate the easy-to-operate multifunctions. The series features a menu table with such functions as: "TUNE"—maximize the target echoes on the screen; "RAIN"—suppress the clutter caused by rain, snow, fig, mist, etc.; "ILLUM"—adjust the brightness level of the control panel; "BRILL"—adjust the CRT brightness level; "BACK"—select daylight blue or black background color; "PICT"—select the target presentation mode in color or monochrome; "NAV"—select navigation mode in Head-up or Course-Up; "RINGS"—range rings on/off; "IR" interference rejection on/off; "TRACK"—track history on/off; "EXP"—target expansion on/off; and "LORAN"—latitude and longitude or time difference.

HARRIS

Circle 108 on Reader Service Card

New from Harris is a remote control device for its RF-3200 marine single sideband radio. Now you can mount the radio in one location and the remote control up to 125 feet away, with operation from either location.

The RF-3234 Remote Control Unit is now available as an optional accessory with the RF-3200. The package includes a remote control unit with built-in speaker, a mounting cradle with hardware, microphone, control cable and an interface circuit board for installation in the RF-3200 transceiver.

Front-panel controls on the RF-3234 include channel and scan group selectors, scanning switch, squelch, clarifier, mode and noise blanker, as well as indicators showing system status. Operation of the remote control is similar to the RF-3200, making it easy to learn and use.

The RF-3234 is the latest in a series of options to be introduced by Harris for the RF-3200 radio. Harris designed the RF-3200 with spare slots inside the transceiver so it can be easily upgraded with slip-in circuit boards as new options are available. Other new options planned for the radio include ARQ modem capability for data transmission and an FCC and DOC accepted linear 1,000-watt amplifier for added power.

The RF-3234 has a rugged, weather resistant housing that is designed for the harsh marine environment. The remote unit is less than 3-1/2 inches high, 8-3/4 inches wide and 5-1/2 inches deep. It weighs approximately 3-1/2 pounds, including the mounting frame.

The RF-3200, introduced by Harris last year, is a 125-watt SSB radio, which pioneered a number of new features not previously available.

HULL ELECTRONICS

Circle 96 on Reader Service Card

Hull Electronics Company has expanded its complete line of HF/SSB transceivers and automatic antenna couplers to include fully equipped radio stations for high-

speed data transmissions.

The first is a radio/telex station that handles FEC or SITOR messages in the ARQ mode; several of these stations have been installed and are in operation.

The second is a computer radio network station which permits computer-to-computer transmissions over Hull's HF/SSB radio link—said to be ideal for business communications between boat and shore. Either station's transmit power may be boosted by using Hull's soon-to-be-released 1 kw linear amplifier.

ICOM

Circle 97 on Reader Service Card

ICOM America, Inc., headquartered in Bellevue, Wash., recently introduced the technologically advanced commercial grade VHF marine transceivers IC-M500 and IC-M500D.

The IC-M500 has been FCC type accepted for mandatory and compulsory radio-telephone usage for small passenger boats.

The IC-M500D's full duplex system allows one to talk and receive at the same time, like a cellular telephone. The IC-M500D comes standrad with an HS-50 telephone handset.

The result of extensive research and rigid testing, the versatile IC-M500D meets all communications needs. Specially constructed with extensive moisture protection system, the IC-M500D is water-resistant, providing high reliability in moisture and saltwater air environments.

The IC-M500D features: extensive new water-tight design; excellent receiver sensitivity and performance; six scanning systems including dual watch and tri-watch; 48 memory channels in three 16-channel banks; 5-watt audio output, 10 watts with optional external speaker; 30-watt two-way hailer/intercom system; manual 30-watt foghorn (300Hz tone); optional plug-in scrambler; full duplex system standard on IC-M500D; all U.S. and international channels, plus expansion channels; and waterproof microphone/waterproof gold-plated connectors.

The IC-M500D also receives police, fire and land mobile frequencies. Additionally, the FCC-type accepted IC-M500 is backed by a one-year warrantly and lifetime service policy.

Also available from ICOM is the M500 digital voice scrambler for use with both the IC-M500 and IC-M500D.

KELVIN HUGHES

Circle 85 on Reader Service Card

The latest products from Kelvin Hughes, Ltd. of England, a subsidiary of Smiths Industries, plc, are the new generation Concept radar systems, HR 2000 and HR 3000.

Concept radar systems from Kelvin Hughes provide a unique and flexible approach to ergonomic bridge layout. The Concept HR series has been developed to achieve total radar system integration in either existing vessels or bridge designs for the 1990s.

The high resolution monitor, keyboard and processor of the Concept HR radar can be situated remotely in any configuration—either bulkhead, deck console, deck head or desk-mounted, or can form one fully integrated unit in which the monitor angles can be adjusted to suit operator preference. Additional remote monochrome or color monitors can also be included in the Concept package.

Concept HR systems offer relative motion, true motion, and ARPA facilities, combined with E-Plot II, an enhanced version of the unique Kelvin Hughes electronic plotting program. Identical positioning of keyboard controls for these features throughout the range assists operational confidence and familiarity.

On the Concept HR system, all ship data and status can be ideally zoned for instant assimilation.

KODEN

Circle 86 on Reader Service Card

Koden International, Inc., Nor-

well, Mass., has introduced a complete line of technologically advanced radar systems designed to meet commercial and workboat operating standards.

Koden developed one of the first color video sounders over a decade ago and is one of the most respected names in marine electronics.

The new radar line includes seven models, five of which have been designed to suit commercial requirements—MD-3730, MD-3731, MD-3751, MD-3711B, and MD-3721A. They are available with ranges from 32 to 96 nautical miles.

All feature 12-inch, daylight bright green (or amber) screens and eight-level quantization to facilitate discrimination of targets from sea-clutter, rain and snow. Additionally, a microwave integrated circuit (MIC) is positioned in the front end of the receiver where it maintains high receiving sensitivity with low loss, to clearly display small targets.

The use of a long-life magnetron ensures high reliability of the transmitter and modulator. Mechanical parts, common to other systems, were replaced with reliable, solid-state devices.

Other features include two EBLs, two VRMs, audible/visible proximity alarm, interference rejection, target enhancement and 50 percent downward off-center plotting. All are standard capabilities of each unit.

Picture presentation modes include head-up, north-up and course-up. The latter two modes are available when an optional interface unit is used to connect a gyrocompass.

Standard equipment supplied with each unit includes display unit, antenna unit with cable, power cable, spare parts kit and installation materials.

Koden has also introduced two Loran C units, the LR-771 and LR-769, as well as two new color track display plotting units, the LTD-200 and LTD-100.

Circle 143 on Reader Service Card

Circle 189 on Reader Service Card

Circle 145 on Reader Service Card

KRUPP ATLAS

Circle 87 on Reader Service Card

Advanced navaids from Krupp Atlas Elektronik include the FCC type-approved 7600-8600 Series of Atlas rasterscan radars. Together with a 12-inch companion model, the Atlas 5600, well over 1,000 systems have now been sold worldwide. A recently announced new 16-inch derivative, the Atlas 8630 VTC, has been specifically designed for port vessel traffic control applications and has already been ordered for service in China and elsewhere.

Other products available include the NACOS 20 integrated navigation bridge control system designed primarily for single manning and precision navigation at reduced cost. Typically comprising two rasterscan radars, a doppler log, echo sounder and an adaptive radar-controlled autopilot, the main console also includes a full-color navigation information display unit as well as interfaces for other sensors and bridge equipment.

The system has now been extended with the introduction of NACOS 25, a three-radar configuration with a special navigation control center and identical workstations for the watch-officer, pilot and master. All radars additionally display lat/long coordinates together with own-ship position.

Originally developed for the West German "Ship of the Future" program, some 60 NACOS systems have now been sold worldwide for Ship of the Future, research and conventional newbuilding applications.

MACKAY

Circle 98 on Reader Service Card

Mackay Communications, Elizabeth, N.J., a leader in service and communications for over 50 years, is now a premier marketing and sales organization. Shipowners, naval architects, government agencies, and shipyards can go to one source for all their equipment, consulting, service and installation needs. Mackay offers sales and service for a broad line of marine electronic equipment.

Mackay has recently announced a new generation high frequency marine radio console. The MRU-35M, is a 1,000-watt, solid-state unit that

incorporates the latest state-of-the-art communications technology demanded in today's single side band, CW and teletype environments. Mackay offers a complete product line of INMARSAT satellite earth stations from Standard "A" shipboard and transportable terminals to small size, inexpensive Standard "C" units. The Saturn 3S shipboard terminal incorporates the Okitex multiport/multifunction communications terminal which provides state-of-the-art message preparation/text editing and computer interface capability. The Saturn T is a transportable satellite terminal in 3 suitcases that can be set up and made fully operational in 15 minutes with no tools required. Mackay recently announced the Saturn C would be available this fall when the INMARSAT Standard C system becomes operational.

MARINESAFETY

Circle 9 on Reader Service Card

MarineSafety International (MSI), a wholly owned subsidiary of FlightSafety International, operates ship simulation facilities at Kings Point, N.Y., and Newport, R.I., which are used for port and harbor design assistance, maritime research, and training of ships' officers and harbor pilots.

One of the latest contracts awarded to MSI was for shiphandling simulator training for four groups of Panama Canal pilots, with an option for four additional groups in 1990.

The training consists of shiphandling and emergency exercises conducted in precisely simulated sections of the Panama Canal, Cristobal and Balboa Harbors. The pilots experience unexpected situations while piloting various types of ships. The handling characteristics of 24 different types of ships are modeled in the simulator's computer. Up to 10 other ships can be seen as passing, crossing or lock traffic.

The Panama Canal pilots are being trained at MSI's Newport facility, which houses four interactive ship simulators. Each simulator provides the pilot with a ship's bridge (or bridge wing) from which he sees a realistic visual scene of a portion of the 50-mile long canal. The visual includes waterways and locks, cultural features, navigation aids and other ship traffic. The pilot issues commands and his "ship" reacts as it would in real life.

In addition to the Panama Canal pilot training, MSI Newport provides shiphandling simulator training for up to 1,200 U.S. Naval officers per year, for ship's officers and pilots from the St. Lawrence Seaway and for masters and mates from U.S. shipping companies.

MICROLOGIC

Circle 99 on Reader Service Card

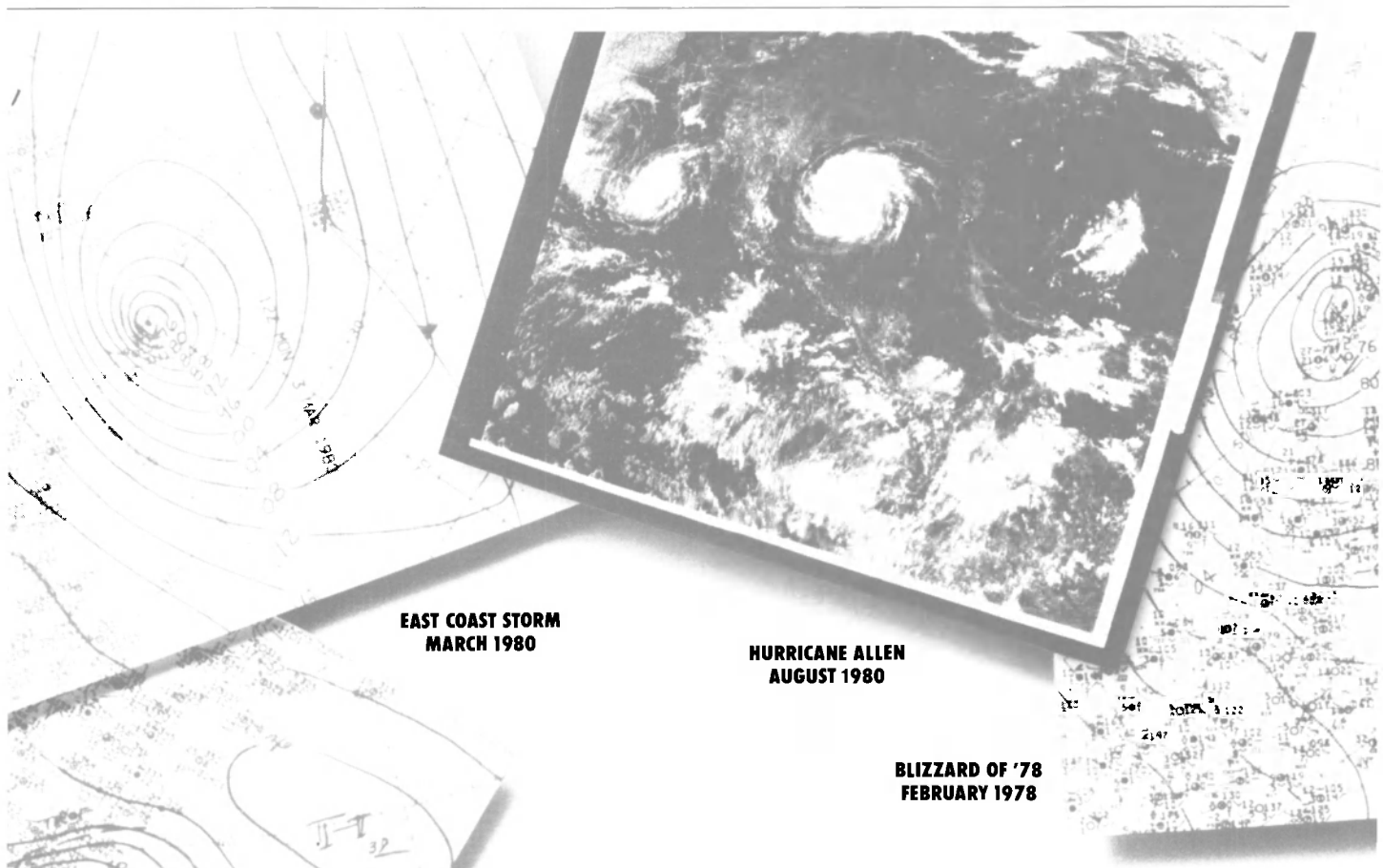
Micrologic, Chatsworth, Calif., is offering the ML-8000 Loran, a water-proof portable unit with telescopic antenna that lets one navigate to any of its 250 waypoints using its advisory and prompting messages.

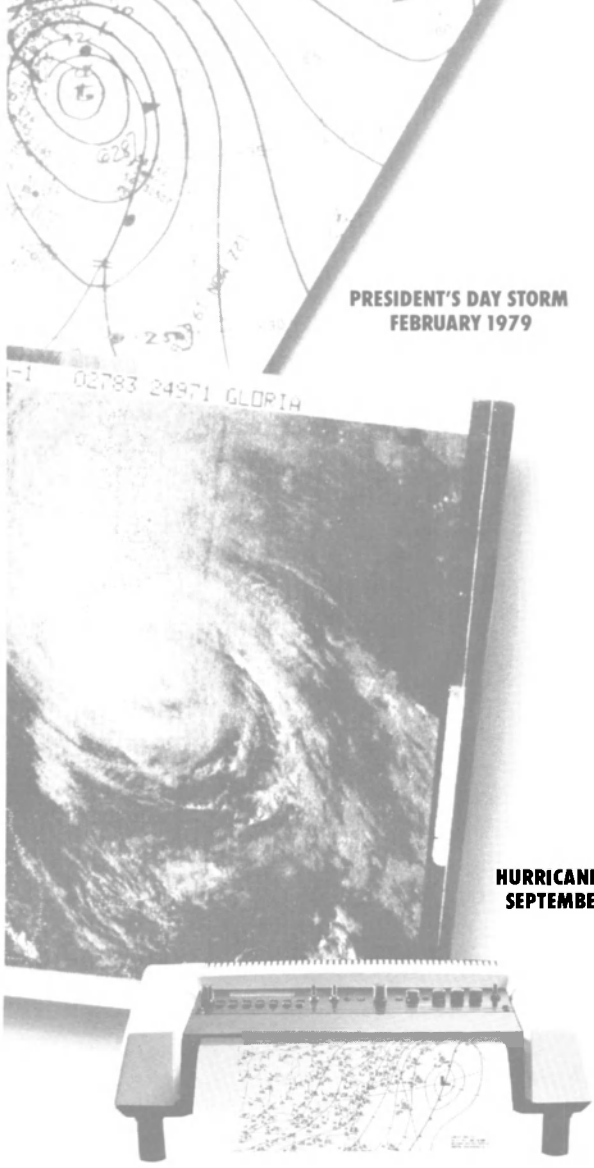
The portable ML-8000 provides eight hours of operation and comes with its own charger. The unit can also be operated on continuous charge by simply wiring a power input plug into the boat's 12-volt system.

All waypoint entries can be made using Lat/Lon, TDs, Range/Bearing or present position. The Loran provides automatic chain and secondary station selection, magnetic variation, ASF (land mass) correction, waypoint sequencing and waypoint routing. There are nine routes available with 20 waypoints in each route. Manual override functions provide maximum coverage in fringe areas.

The navigational outputs include parallel routing for search patterns, specified approach heading, simulataneous long and short run speed and course averaging, range and bearing to a waypoint or between waypoints, velocity made good (VMG), cross-track error (CTE), course error, time-to-go, ETA, and adjustable graphic course deviation scaling.

Audible and visual alerts are provided for waypoint arrival, anchor watch, cross-track error and borders (useful when nearing off-limit waters). Present positions can be saved by pressing the "SAVE" key and recalled later by pressing the





"RECALL" key.

NMEA 0180 is standard on the Portable ML-8000 for autopilot and CDX outputs.

NAVAL ELECTRONICS

Circle 1 on Reader Service Card

Naval Electronics, Inc., Tampa, Fla., has recently introduced the HTS-1 "audio booster" amplified speaker. It is a portable speaker with a powerful amplifier built in, boosting receiver sound by a factor of 10 times, according to the company. The HTS-1 amplified speaker is normally powered by four "AA" batteries but can also be powered by internal rechargeable Nickel-Cadmium batteries, as it has a built-in charger. The HTS-1 can operate from a 12-volt source such as a cigarette lighter socket, or any DC source from 6-15 vDC.

The HTS-1 incorporates a 10db audio amplifier and a 3.5-inch oval speaker. It also features a special battery saver circuit which shuts-off the audio amplifier automatically (producing a battery drain of less than 1 milli-amp) if your HT is squelched more than 10 seconds. The amp turns on the instant the channel becomes active again. An LED indicates the battery saver status.

NORCONTROL

Circle 88 on Reader Service Card

Norcontrol Simulation, Horten, Norway, has recently completed the installation and commissioning of Korea's first ship-handling simulator. It has been delivered to Korea Marine Training and Research Institute in Pusan.

The multimillion-dollar project was completed on time, and the simulator is housed in the institute's new simulation and research building.

Offering both post-graduate courses and certification, as well as other courses, the institute is now using the ship-handling simulator to form the base for their new pilot training and marine research program.

Included in the delivery is a fully equipped bridge, fitted with radar, ARPA, maneuver consoles, steering stand, pelorus, a complete set of real navigation instruments and communication equipment, as well as overhead panel and indicators.

Measuring 20 feet by 23 feet, the bridge itself is mounted on a motion platform, and includes both vibration and sound systems. The visual system, capable of producing day/dusk/night scenes in addition to fog, covers 234 degrees by 26 degrees field of view. The instructor station renders complete control of all parameters, and includes advanced briefing and debriefing facilities as well as a database development work station.

Prepared for the future, the system may also be connected to more own ships' bridges, engine room, ballast and liquid cargo simulators, to form a complete system for training of dual purpose officers.

Norcontrol Simulation, one of the world's largest suppliers of marine simulators, currently has five other ship-handling simulators on order, in addition to a large number of radar and navigation, engine room, ballast, liquid cargo, fishery and instrument simulators.

RH TRADING

Circle 89 on Reader Service Card

RH Trading, a subdivision of Radio Holland USA, Houston, Texas, is marketing a number of new marine electronics products.

A new quality COSPAS/SARSAT 406 MHz EPIRB, Tron 30 S manufactured by Jotron Electronics is a reliable and worldwide-proven EPIRB. It transmits on the COSPAS/SARSAT frequency 406 MHz and homing frequencies 121.5 MHz and 243.0 MHz.

The Tron 30 S features activation by three methods—by seawater contact, by means of pulling a safety pin, or by a "panic switch."

The ruggedly constructed Tron 30 S has long storage time batteries and can be fitted with a float-free or bulkhead-mounted bracket.

Although Tron 30 S has already been fitted aboard various U.S.-owned vessels, FCC approval is still pending.

In addition, RH Trading also markets the new Sailor RT 2048 Simplex/Semi Duplex VHF Radiotelephone, a quality compact unit for low cost. The VHF operates with a continuous output power of 25 watts. Furthermore, the RT 2048 is equipped with all 55 international VHF channels plus a choice of either 10 private channels and full scanning facilities or 40 private channels. Dual watch and a quick channel 16 are standard (selcall optional).

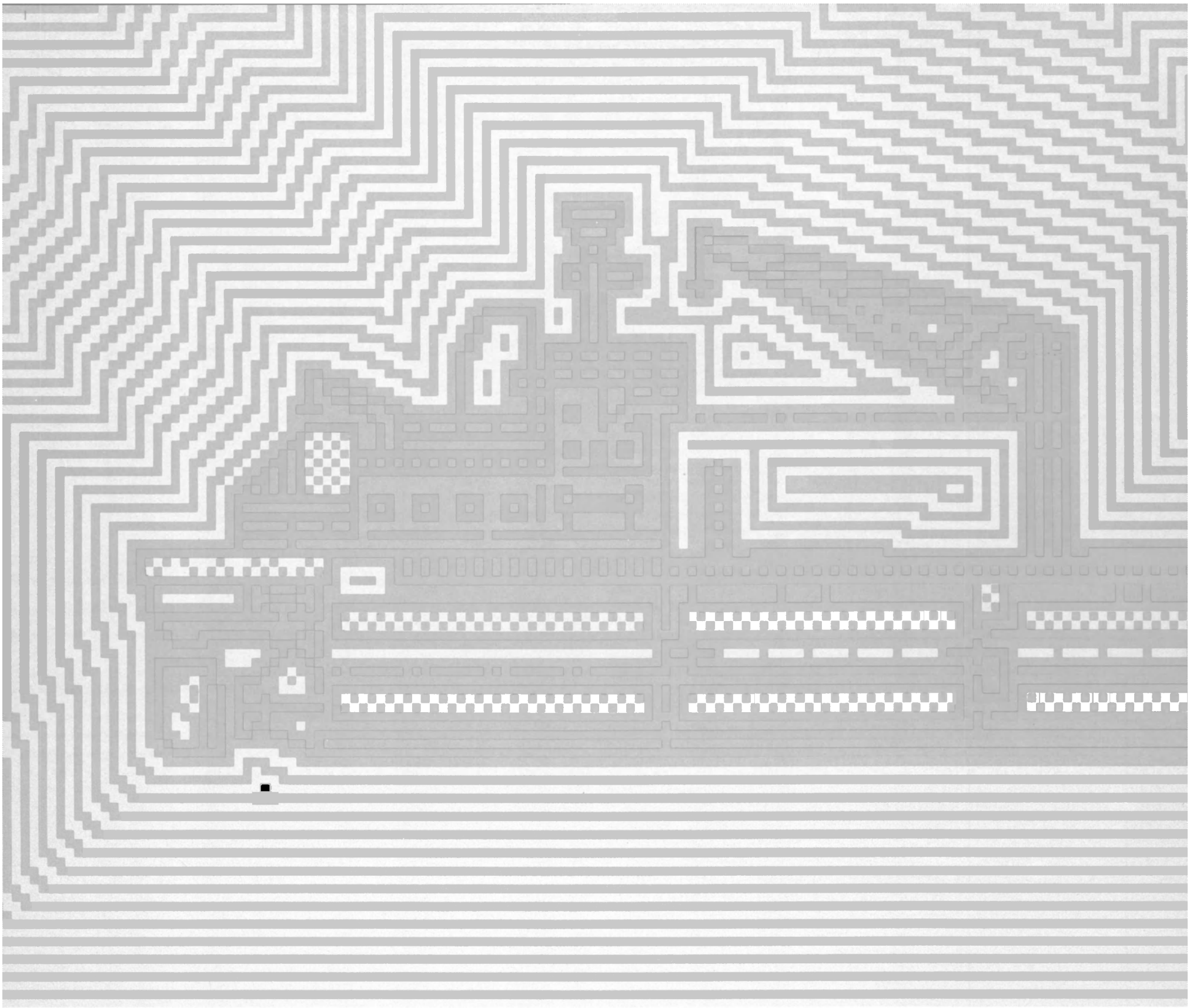
RAYTHEON MARINE

Circle 2 on Reader Service Card

Ratheon's Pathfinder®/ST True Motion/Relative Motion Radars with Electronic Plotting provide a Superior Technology (ST) signal processing system which detects weak targets typically lost in rain and sea clutter. Combined with high-performance transmitters and transceivers, and the latest raster displays, the PATHFINDER/ST provides excellent, high-tech performance. Available with a choice of 34 or 25-cm (16- and 12-inch) displays, the PATHFINDER/ST radar plots six targets simultaneously, and displays calculated speed and heading data for any two selected targets, in ten ranges from 1/4 to 96 miles. Target true wakes highlight speed and direction of moving targets. Presentations can be Relative Motion, showing own vessel as fixed, or True Motion, showing own vessel and other targets moving on the screen.

While the heart of the PATHFINDER/ST performance improvements is the Superior Technology signal processing system, with five separate processing programs, Raytheon's new receiver is also a noticeable improvement. Using more sensitive, low-noise amplifiers, the input sensitivity of this receiver has been increased from 3 to 4 db (two to two-and-a-half times).

Newest among Raytheon radars are the R81/R82/R84 rasterscan radars, 96-mile radars with 14-inch CRTs available with a selection of transceivers: 10 kw X-band (R81); 25 kw X-band (R82); and 10 kw S-band (R84) with a variety of antenna sizes (4 to 10 feet). And, the R70A/R71/R72/R73/R74 radars (pending FCC type acceptance at time of this writing), offering maximum ranges of 48 and 72 miles, depending on the model, with 12-inch CRT screens. The S-band R84 and S-band R74 radars are especially well-suited for use in hostile weather situations.



About being technically competitive.

Our marketing managers are well known, and we hope appreciated, by shipowners all over the world. But even the best marketing man cannot succeed in this harsh and competitive shipbuilding business if he is not backed, among others, by the most appropiate technology.

Did you know that the five 140.000 dwt. tankers under construction include superoptimised hydrodynamic shapes leading to large reductions in installed power over conventional systems?

Did you know that Astilleros is building nine freezers for Del Monte that consume only 124,5 gr bhp/h and can burn fuel up to 6000 Redwood No. 1 at 100°F?

Did you know that through engine room automation, automatic manoeuvring (AUT-PORT notation) and control systems including CRT's for monitoring all spaces, some of our constructions may be operated by between 10% and 22% less crew than in conventional constructions?

While some yards complain about lack of orders, our yards are growing steadily in newbuildings.

Astilleros continues to make a genuine contribution to the expansion of Spain, the fastest growing economy in Europe... Marketing? Technical excellence?

The answer is Astilleros.
Check on us.

ASTILLEROS ESPAÑOLES

For further information: Astilleros Espanoles, S.A.
Padilla, 17
28006 Madrid
Tel. (341) 435 78 40
Telex. 27648 ASTIL-E
Fax. (341) 276 29 56

Circle 153 on Reader Service Card

The Shipbuilders of Spain

Both of these new series are designed with heavy-duty construction throughout. When connected to properly-formatted external navigation receivers, these radars display valuable information on-screen, including own vessel's Lat/Long or TD position and ship speed.

Raytheon added an innovative feature to its SeaGuard zone intrusion alarm in both these radar series. The alarm warns not only of targets entering a designated area, but also of targets leaving preset boundaries.

With Raytheon's R81/R82/R84 radars, the operator can electronically designate and numerically mark up to ten targets on-screen; and, electronic parallel cursor lines greatly facilitate quick plotting.

Other new products introduced by Raytheon include the NWU-53 color video plotter; RAYSTAR-920 GPS navigator; RAY-NAV-780 Loran-C navigator; and NCR 300A navtex receiver.

RAYTHEON SERVICE

Circle 110 on Reader Service Card

Raytheon Service Company, Marine Sales & Service Division, provides a worldwide capability as a one-stop source for sales, service, installation, maintenance, overhaul and supplies for high-quality marine navigation, communications, and monitoring and control equipment and systems from a broad variety of international manufacturers.

The company offers 24-hour, seven-days-a-week service that extends to any area of the world, operating from nine strategically located U.S. port offices/repair centers. Customers include vessel owners, operators, builders and repairers; dredgers, marine constructors, hydrographic surveyors and researchers, and a variety of government agencies.

Conscious of rapid industry-wide changes and new regulations affecting equipment and their operations, Raytheon Service Company designated **Weldon Vogt**, Eastern Area marketing manager, based in the Pennasauken, N.J., headquarters office, to provide information, data and advice on current and future industry trends and regulatory requirements.

Expansion and new personnel have added strength to the company's ability to meet customers' requirements. To better serve the Central/South Florida ports, a ninth Raytheon Service Company facility was opened in Ft. Lauderdale under the direction of **Mark L. Mitchell**, a 10-year veteran with the company.

Robert DeRoche, a 15-year veteran in marine electronic equipment sales and service, was named Gulf service manager, incorporating the Houston and New Orleans offices.

One of the driving forces behind Raytheon Service Company is its innovation and ability in expanded customer service or in the development and production of new equipment—finding a need and filling it. A prime example of this is the recent introduction of the new SITOR 489P Telex System, a user-friendly marine ARQ telex system that employs a computer-driven (PC) interface. This development points to the firm's advances in "systems integration," the ability to utilize top-quality components in the design and production of new and highly useful equipment.

Raytheon Service Company is a separate operating division of Raytheon Company, Lexington, Mass.

RDD

Circle 3 on Reader Service Card

RDD, Inc., an intercommunications specialist with over 20 years' experience in the marine and petrochemical electronics field, recently announced several new manufacturers' representative agreements.

RDD is still the exclusive U.S. distributor for SPT of the U.K., manufacturers of marine sound-powered telephone products. RDD has recently signed an agreement to market and support Newco Safety Tel of Calgary's unique line of explosion-proof and non-explosion-proof push-button intercom systems. **Rheiner Dinges**, president of RDD, said that unlike similar page/party systems, the Newco intercom utilizes latest state-of-the-art design which allows for selective ringing, selective paging, all paging, interfacing with plant or rig PABX systems, and flexible zone configuration.

RDD also announced it has been appointed manufacturer's representative for U.M.E.C. (United Marine Electronics and Communications) of Ottawa, Canada. United Marine is reported to be the largest supplier of internal ships communications systems to the Canadian Coast Guard, manufacturing state-of-the-art integrated ships communications systems including marine automatic telephone, talk-back/intercom/loud hailer/public address/security and audio/video entertainment systems. RDD and U.M.E.C. are in the process of completing the supply and commissioning of two marine automatic telephone systems, type MPBX-200 to Bethlehem Steel for the U.S. Navy T-AGS-39 and -40 projects.

Furthermore, RDD announced an agreement to market a new explosion-proof and weather-proof push-button telephone for Northern Telecom. The new phone is available in touch-tone or pulse dial format and compatible with both PABX and land lines. Other features include last number redial and internal ring relay for external signal devices.

ROBERTSON-SHIPMATE

Circle 4 on Reader Service Card

Robertson-Shipmate, Inc., recently introduced a new microprocessor-controlled pilot, the AP-45, for commercial vessels and passenger boats. Keeping with the Robertson tradition, the AP-45 is simple to use. The set-up is menu-driven and is easily tailored to any vessel's individual steering characteristics.

The AP-45 has a second "automatic" mode. By pressing the "Work" button, the pilot is reprogrammed with an entirely different set of operating characteristics appropriate to different vessel configurations. This "work" mode is used while the vessel is performing activities that require different operating parameters, such as net setting or trawling for fishing vessels, towing for tugs, or single engine trolling.

The AP-45 includes the new RF145 medium-duty waterproof rudder feedback unit, built-in, off-course display and alarm, rate-of-turn control, and operates with virtually any magnetic or fluxgate compass input. Options include hand-held remotes, non-follow-up and follow-up steering levers, and a variety of rudder angle indicators.

S.P. RADIO

Circle 90 on Reader Service Card

Founded in 1946, S.P. Radio A/S of Denmark develops, produces and supplies the worldwide maritime market with a wide range of radio communication equipment. The company's latest introduction to the marine market is the Sailor Compact HF SSB Radiotelephone, the newest member of the Sailor Compact 2000 Program.

The compact Sailor system contains three main units—control unit RE2100, transmitter T2130, and aerial coupler AT2110—which can be mounted separately. The HF SSB Radiotelephone has continuous tuning and complete frequency coverage (RX:100 kHz-30 MHz, TX: 1.6-30 MHz) SSB (USB and LSB) and AM, and simplex/semi-duplex.

The radiotelephone is supplied from 24 VDC, and connection to 12 VDC and 110/127/220/240 VAC is optional.

Each of the three units in the radiotelephone can be replaced without adjustment, and they all have built-in diagnostic test programs.

S.P. Radio reports that the Control Unit RE2100 has straight forward key-in procedure and is incredibly easy to operate. It contains all ITU telephony channels, 100 operator-selected quick-select channels and 10 operator-programmed scanning programs with up to 128 channels in each.

Furthermore, the front panel is provided with adjustable night-time illumination and a bright and readable, highly effective LED-display, in which RX and TX frequencies are read-out at the same time.

The Control Unit RE2100 has BUS-output and input and is thus

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Whether you push, pull, coax or carry, you've got to be in control. That means having confidence in your boat—its power and responsiveness.

For over sixty years Twin Disc has put horsepower to work in tugs, work boats and supply boats. Our experience has led us to the development of marine transmissions in a wide range of capabilities. All matched to specific horsepower requirements to maximize power and control.

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Twin Disc reliability and performance result in low operating and maintenance costs, making us one of the leading suppliers of marine transmissions for all types of workboats.

Every day, day after day, we're put to the test. We wouldn't want it any other way.

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TWIN DISC
POWER TRANSMISSION EQUIPMENT

Circle 275 on Reader Service Card

prepared for DSC (GMDSS), additional remote controls, Duplex, ARQ telex, scrambler, additional loudspeakers, personal computer, etc.

The Transmitter T2130 has 250w PEP output power and built-in power supply for 24 VDC. It is of modular construction, which provides easy installation and service—all connections are carried out to this part of the Sailor Compact HF SSB Radiotelephone.

The Aerial Coupler AT2110 is also a compact, sturdy unit. It is waterproof, highly efficient and features automatic tuning. Because it is light weight, the aerial coupler can be mounted at the base of the aerial. It can be installed up to 100 meters from the transmitter.

SIMRAD SUBSEA

Circle 5 on Reader Service Card

Simrad Subsea A/S has introduced a portable, low-cost Hydroacoustic Positioning System.

The rugged HPR 300P is tailormade for applications such as ROV-tracking, tow-fishing-tracking and other survey operations where quick and easy mobilization is an advantage. The system is also compatible with existing HPR transponder channels.

It is based on the super-short baseline technology used in the well-proven HPR 309 system. Only one small onboard transducer is necessary for positioning. The system has a built-in self-tester.

The portable transducer is omnidirectional with automatic roll and pitch compensation. It is a small, lightweight unit designed for hull installation as well as over-the-side mounting.

Operator's instructions are displayed on the monitor, securing uncomplicated operation. All functions and parameters are controlled by a joystick from a standard color monitor. Standard monitors can be connected and used as remote displays.

SI-TEX

Circle 6 on Reader Service Card

SI-TEX Marine Electronics, Clearwater, Fla., has introduced two new Lorans for 1989. The two different receivers are designed for different levels of Loran-C involvement.

In a micro-compact case, the new XJ-1 features a 99-waypoint memory, 10 instant-position memories, ComPuNav navigation computer, automatic ASF corrections, magnetic compass compensation and four notch filters, plus a backlighted multi-line display and audible alrams for cross-track error, waypoint arrival and anchor-watch.

The new XJ-2 offers a 200-waypoint memory, 20 programmable auto-routes with up to 25 waypoints in each route. Waypoint sequencing can be totally automatic for all waypoints and routes can be run in both directions.

In the TD mode, position display accuracy is to 100th of a microsecond. Automatic ASF corrections are derived from a data base of precision geodetic surveys and magnetic variation is automatically compensated. Twelve RF filters eliminate noise and interference.

Five audible alarms signal waypoint arrival, corss-track error, perpendicular crossing, waypoint advance and anchor-watch drift limits.

Both the XJ-1 and XJ-2 have serial data outputs of NMEA 0180/0183 for interfacing with other electronics onboard.

As a bonus, both the XJ-1 and XJ-2 come complete with "Running The Numbers"—a 30-minute videotape of instructions on how to get the most out of the particular Loran you buy.

SPERRY MARINE

Circle 91 on Reader Service Card

Sperry Marine's revolutionary new RASCAR (RASterscan Collision Avoidance Radar) is a series of radars and ARPAs designed to meet or exceed all SOLAS and type approval requirements for vessels in the 1,600 gt and above range.

All RASCAR models include CAS IV Collision Avoidance features.

The RASCAR model 3400M is a fully compliant, type-approved ARPA. All RASCARs have touchscreen control and very high resolution displays. The controls are logically grouped within the operator's main field of view.

The RASCAR series includes the model 2500C display—one of the first high resolution color displays for the large ship market. Color is used to sharpen the operator's comprehension of the displayed information distinguishing between various displayed features and to present the anti-collision situation clearly for rapid operator assessment.

According to Sperry Marine, the RASCAR follow's the company's new Product Standardization and Integration (PSI) philosophy. It can be installed conventionally as a "stand alone" system or together with other bridge equipment in an aesthetically pleasing Integrated Bridge system without expensive modification.

Sperry Marine reports that the receiver design includes a state-of-the-art "low noise" front end and a Microwave Integrated Circuit (MIC). This gives the receiver twice the sensitivity of previous generations.

The Japanese Ministry of International Trade and Industry recently named Sperry Marine the winner of the "Good Design" Award for its new RASCAR Touchscreen Control Marine Radar/ARPA. The award has been presented annually for the last 31 years to the product which meets the highest standards of quality—appearance, function, safety, value and service.

STANDARD COMMUNICATIONS

Circle 7 on Reader Service Card

Standard Communications, Los Angeles, Calif., describes its new Horizon Infinity VHF marine radio and LH10 loud hailer as "the most water-resistant radio and hailer on the market today."

Available in rich black tones, these additions to Standard Communications full line of electronics offer excellent quality and performance.

The 25-watt Horizon Infinity, in addition to being extremely water-resistant, incorporates an ultra-sensitive GASFET receiver and more advanced scanning and program-

(continued on page 54)

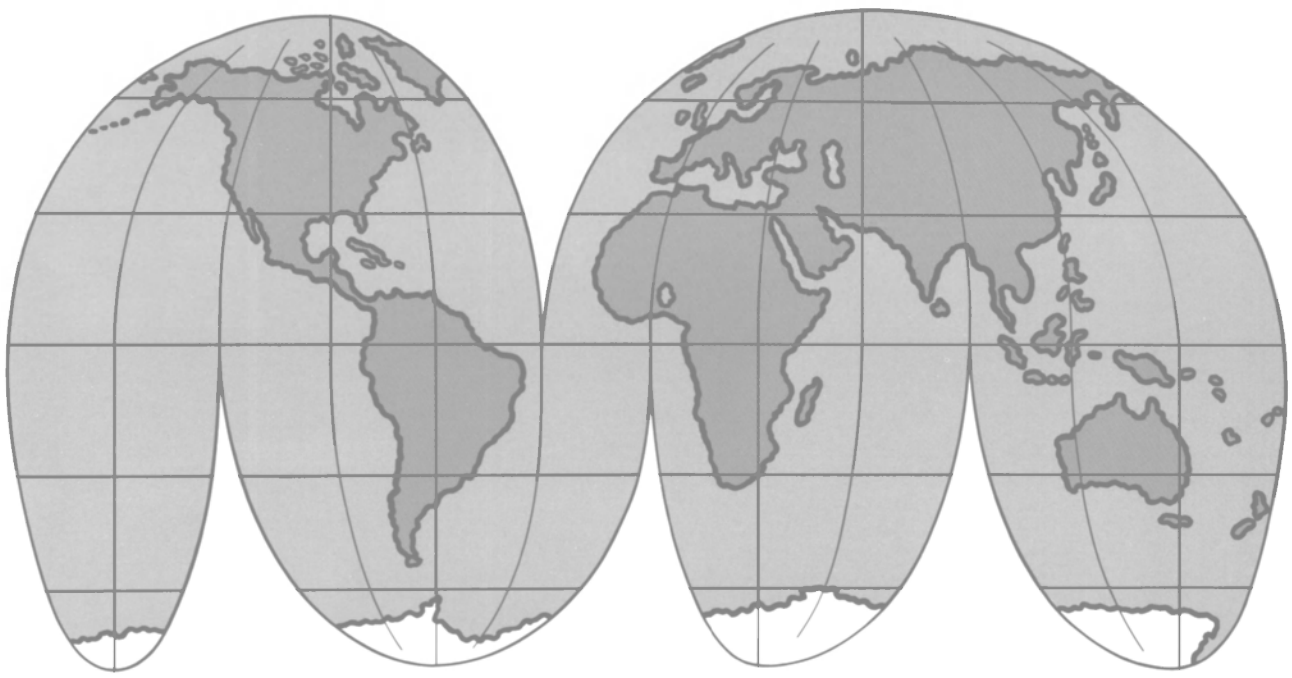
NAVAL TECHNOLOGY & SHIPBUILDING

a special supplement to

MARITIME REPORTER AND ENGINEERING NEWS

MARCH 1989

ALLISON MARINE ENGINES HAVE BEEN PROVEN ONLY IN THE AREAS CAREFULLY MARKED IN BLUE.



Since 1962, Allison engines have been called on for maritime propulsion and to create on-board electrical power in every corner of the globe.

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Allison engines have over 3,000,000 hours of cumulative maritime operating experience and over 100,000,000 hours of aviation and industrial experience. Our engines also have high maintainability plus worldwide support from our extensive parts and service network.

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GM

NAVY—A $35-BILLION ANNUAL MARKET

The Outlook For U.S. Navy Shipbuilding and Ship Repair

by
James R. McCaul, President
IMA Associates, Inc.

Sales of equipment and services to the U.S. Navy continue to be the major source of business for marine equipment manufacturers. The U.S. Navy represents an annual sales market totaling $35.0 billion—excluding aircraft procurement, personnel and other non-relevant expenditures. Despite recent efforts to cut the growth of overall defense expenditures, the Navy maintains a strong position.

There continues to be tremendous opportunities for increased product, sales and market expansion as a result of the huge amount of business generated by the Navy ongoing purchases.

OVERALL DEFENSE BUDGET

In January, President **Reagan** submitted a defense budget request for $315.2 billion in FY 1990 and $330.8 billion in FY 1991. This represents a rate of increase of about 5 percent per year over current spending—or 2 percent per year if inflation is taken into account. Details for budget authority and outlays are shown in Exhibit 1.

President **Bush** will make changes to this budget request, which likely will result in a reduction in proposed overall defense spending and stretch-out of some major programs. These changes are not known at time of publication.

NAVY BUDGET

The proposed Navy budget is $101.7 billion in FY 1990 and $105.1 billion in FY 1991. This would represent a three to four percent increase over current spending. Described below are Navy's plans and budget for major program activities over the next several years.

EXHIBIT 1--PROJECTED DEFENSE SPENDING
(billions of $)

	1989	1990	1991	1992	1993	1994
BUDGET AUTHORITY						
DcD	290.2	305.6	320.9	335.7	350.7	365.6
DoE & Other	8.6	9.6	9.9	10.4	10.7	11.0
TOTAL	**298.8**	**315.2**	**330.8**	**346.1**	**361.4**	**376.6**
OUTLAYS						
DoD	289.8	293.8	304.7	316.2	329.3	343.4
DoE & Other	8.5	9.2	9.7	10.2	10.6	10.9
TOTAL	**298.3**	**303.0**	**314.4**	**326.4**	**339.9**	**354.3**

Source: Department of Defense

SHIPBUILDING

Navy has requested $10.4 billion in FY 1990 to fund construction of 20 new ships and two major conversions. The amount of $9.8 billion is requested in FY 1991 to build 14 ships—including two follow ships in the SSN 21 attack submarine program.

Exhibit 2 shows a ten-year pattern of spending for ship construction. One column shows total obligational authority—the figure which essentially sets the limit on the agency's contractual authority. The other column shows the actual outlays in each year—representing pay-

(continued)

U.S. NAVY

(continued)

ments to contractors for ships and equipment. Outlays best indicate the level of business activity generated by Navy spending.

As shown, outlays will grow from $8.9 billion in FY 1988 to $10.9 billion in FY 1991. **This growth occurs despite the fact that obligational authority is much lower in FY 1991 than FY 1988.**

Exhibit 2

Ten-Year Pattern of U.S. Navy Ship Construction Funding
(billions of $)

	Total Obligational Authority	Outlays
1982	8.6	6.7
1983	16.0	7.5
1984	11.5	8.5
1985	11.0	9.1
1986	9.6	9.5
1987	10.1	9.3
1988	16.0	8.9
1989	9.8	10.5
1990	10.4	10.7
1991	9.8	10.9

Source: IMA Associates, Inc.

Shown in Exhibit 3 is the breakdown of the shipbuilding budget request for the FY 1988-1991 period. Exhibit 4 shows the projected program over the next five years.

A major change in the future program has been the deletion of three SSN 688 submarines originally planned for FY 1991 and 1992. There had been criticism of Navy's plan to overlap construction of the SSN 21 and SSN 688. The current plan is now to end the SSN 688 program in FY 1990. In FY 1991 Navy plans to order two SSN 21's and maintain a construction rate of three per year thereafter.

Navy plans to build DDG 51 Aegis destroyers at the rate of five per year over the next five years. This program is a target for budget cutting—most likely by stretch-out—building fewer ships per year over a longer period.

Other changes from last year's plan include a change in timing for several programs—including the AOE fast combat support ship, LHD amphibious assault ship and TAGOS surveillance ship. Three MCM mine countermeasure ships have been added for FY 1990.

Exhibit 5

ACTIVE FORCES SHIP MAINTENANCE
($ in Millions)

	FY 1988	FY 1989	FY 1990	FY 1991
Ship Depot Level Repair	2,617.5	2,923.4	3,412.5	3,520.6
Depot Level Support	161.7	173.8	193.7	199.9
IMA	348.6	359.4	371.2	423.1
Modernization	959.4	1,101.0	1,034.6	1,047.6
Outfitting	323.0	—	—	—
Inactivations	100.3	107.5	194.1	185.0
Total: Ship Maintenance & Modernization	4,510.5	4,665.1	5,206.1	5,376.2
No. of Ship Overhauls (Units)	22	25	15	12
Ship Overhaul Backlog (Units)[1]	4	3	4	5
# of DMPs (Units)	—	5	4	4
# of SRAs (Units)	87	82	91	81
# of PMAs (Units)	64	62	59	43

[1]The total overhaul backlog includes 3 ships in FY 1988, 2 ships in both FY 1989 and FY 1990, and 1 ship in FY 1991 which are backlogged due to a lack of fleet modernization program (FMP) funding.

Source: Department of the Navy

Exhibit 3—Shipbuilding and Conversion Budget
(in millions of $)

	FY 1988		FY 1989		FY 1990		FY 1991	
	Qty	$	Qty	$	Qty	$	Qty	$
New Construction								
Trident Submarine (SSBN)	1	$1,260.8	1	$1,196.2	1	$1,228.6	1	$1,254.5
Carrier Replacement (CVN)	2	6,225.0	—	—	—	—	—	—
Attack Submarine (SSN 688)	3	1,676.9	2	1,364.6	2	1,520.3	—	—
New Attack Submarine (SSN 21)	—	257.6	1	1,533.0	—	866.0	2	3,161.9
Aegis Cruiser (CG 47)	5	4,100.7	—	—	—	—	—	—
Destroyer (DDG 51)	—	5.5	4	2,826.1	5	3,600.7	5	3,604.7
Mine Countermeasure Ship (MCM)	—	—	—	—	3	341.5	—	—
Coastal Minehunter (MHC)	—	—	2	196.7	3	230.3	3	214.9
Amphib. Landing Craft (LSD 41)	1	258.0			1	229.3	1	232.7
Amphib. Assault Ship (LHD 1)	1	752.9	1	733.1	—	—	—	35.8
Ocean Surveill. Ship (TAGOS)	—	—	3	158.9	1	155.8	—	—
Fleet Oiler (TAO-187)	2	256.4	5	689.9	—	—	—	—
Fast Combat Support Ship (AOE)	—	—	1	363.1	1	356.4	1	357.7
Ocean. Research Ship (AGOR)	—	—	—	—	3	278.1	1	41.9
Landing Craft (LCAC)	—	35.3	(15)	305.5	(9)	219.3	(12)	284.0
Conversion/Acquisition								
Carrier Modernization (CV SLEP)	1	729.8	—	62.7	1	651.2	—	72.6
Crane Ship Conversion (TAC)	2	53.1	—	—	—	—	—	—
Fleet Oiler Lengthening (AO 177)	1	44.1	2	75.0	1	35.7	—	—
Moored Training Ship	—	—	—	—	1	220.0	—	—
Other costs	—	319.6	—	376.8	—	486.4	—	500.7
Total Budget	**19**	**$15,975.7**	**22**	**$9,881.6**	**22**	**$10,419.6**	**14**	**$9,765.4**

Source: Department of the Navy

Exhibit 4—Navy Shipbuilding and Conversion Five Year Plan (FY 1990-1994)

	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1990-94
New Construction						
Trident Submarine (SSBN)	1	1	1	1	1	5
Attack Submarine (SSN 688)	2	—	—	—	—	2
New Attack Submarine (SSN 21)	—	2	3	3	3	11
Destroyer (DDG 51)	5	5	5	5	5	25
Mine Countermeasure Ship (MCM)	3	—	—	—	—	3
Coastal Minehunter (MHC)	3	3	4	4	—	14
Amphib. Landing Craft (LSD 41)	1	1	1	1	1	5
Amphib. Assault Ship (LHD 1)	—	—	1	1	—	2
Ocean Surveill. Ship (TAGOS)	1	—	2	1	2	6
Ammunition Ship (AE)	—	—	—	1	2	3
Fast Combat Support Ship (AOE)	1	1	1	1	1	5
Ocean. Research Ship (AGOR)	3	1	2	2	1	9
Ocean Surveill. Ship (AGOS)	—	—	1	—	2	3
Repair Ship (AR)	—	—	—	—	1	1
Salvage Ship (ARS)	—	—	—	—	1	1
SOF Landing Craft	—	—	—	(1)	(6)	(7)
Landing Craft LCAC)	(9)	(12)	(12)	(12)	(12)	(57)
Total New Construction	**20**	**14**	**21**	**20**	**20**	**95**
Conversion/Acquisition						
Carrier Modernization (CV SLEP)	1	—	—	1	—	2
Fleet Oiler Lengthening (AO 177)	1	—	—	—	—	1
Moored Training Ship	(1)	—	(1)	—	—	(2)
Total Conversion	**2**	**—**	**—**	**1**	**—**	**3**
Total Ships	**22**	**14**	**21**	**21**	**20**	**98**

Source: Department of the Navy

SHIP REPAIR

Expenditures for ship maintenance are projected to increase over the next two years. Navy plans to spend $5.2 billion in FY 1990 and $5.4 billion in FY 1991 for active fleet ship maintenance and modernization. These figures compare with projected spending of $4.7 million for ship maintenance and modernization in FY 1989. Details are shown in Exhibit 5. In addition, $208.0 million is to be spent on reserve fleet ship maintenance in FY 1990—vs. $199.0 million in FY 1989.

Despite the planned increase in funding for ship maintenance, the number of planned availabilities is projected to significantly decline over the next two years. In FY 1989, Navy has scheduled 149 availabilities of active fleet ships. This figure is projected to rise to 154 in FY 1990—and then fall to 128 in FY 1991. The number of ship overhauls will decline from 25 in FY 1989 to 15 in FY 1990 and 12 in FY 1991. Compared to this year, the number of short term planned availabilities will increase somewhat in FY 1990 but decline significantly in FY 1991.

Major factors driving projected ship overhaul spending are two carrier overhauls. A regular carrier overhaul is scheduled in FY 1990. A major refueling overhaul is scheduled for the nuclear carrier Enterprise (CVN 65) in FY 1991. These two work starts will consume a substantial portion of the overhaul budget. As a consequence, a rising budget will not result in corresponding additional work opportunities.

OTHER PROCUREMENT AND ENGINEERING PROGRAMS

Navy spending for "other procurement" is projected to be $4.7 billion in FY 1989. This figure is projected to rise to $5.0 billion in FY 1990 and $5.7 billion in FY 1991. The major reason for the increase is additional funding for communications and electronics equipment. Much of the increase is the result of major initiatives associated with submarine modernization programs.

Funding of research, development, test and evaluation (RDT&E) is projected to grow from $9.3 billion in FY 1989 to $10.2 billion in FY 1990. Much of the increase is associated with increased spending for tactical programs which are entering full scale engineering development.

MILITARY CONSTRUCTION

The Navy budget for military construction will decline from $1.6 billion in FY 1989 to $1.1 billion in FY 1990. The FY 1990 request contains funding for the strategic homeporting initiative—including $30.9 million for developing the New York homeport, $33.5 million for Gulf Coast sites and $20.3 million for the Everett homeport. However, a recent recommendation of the Base Closure Commission will likely result in lowered funding for Gulf Coast sites.

MAJOR NAVY CONTRACTS

Compiled By Maritime Reporter Staff

December 13

Bath Iron Works Corporation, Bath, Maine, was recently awarded a **$610 million** contract for the construction of three DDG-51 Class destroyers, DDG-54, DDG-56, and DDG-58. The work is expected to be completed July 1995. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-2033).

Ingalls Shipbuilding Division, Litton Industries, Pascagoula, Miss., was recently awarded a **$446.5-million** contract for the construction of two DDG-51 Class destroyers, DDG-55 and DDG-57. The work is expected to be completed April 1995. The Naval Sea Systems Command, Washington, D.C., awarded the contract (N00024-89-C-2034).

BFGoodrich Co., Jacksonville, Fla., was recently awarded a **$14-million** contract for sonar rubber domes for destroyers and frigates. The work is expected to be completed September 1993. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-6037).

Textron Marine Systems, New Orleans, La., was recently awarded a **$216.3-million** contract for the construction of 12 Landing Craft, Air Cushion (LCAC) and centrally produced material. The work is expected to be completed June 1994. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-2028).

Avondale Gulfport Marine, Inc., Gulfport, Miss., was recently awarded a **$43.2-million** contract for the construction of three LCACs. The work is expected to be completed June 1992. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-2110).

December 14

General Dynamics, Electric Boat Division, Groton, Conn., was recently awarded a **$400-million** modification to a contract for the construction of one SSN-688 Class submarine and Post Shakedown Availability (PSA) for FY 89. The work is expected to be completed November 1993. The contract was awarded by the Naval Sea Systems

(continued)

UPDATE ON CANADIAN COAST GUARD BUILDING & CONVERSION PROJECTS

Maritime Reporter Staff

Last month, MARITIME REPORTER reported on the Canadian Naval shipbuilding market (see "Promising Future for Canadian Naval Shipbuilding," page 44, February issue), including proposed and ongoing projects. The shipbuilding sectors covered included: nuclear-powered submarines, NATO frigate replacement, MCMs and MCM auxiliaries, ASW patrol frigates, TRUMP, Coast Guard vessels and general purpose, research and support vessels.

The following table further highlights planned Canadian Coast Guard's Major Capital Projects.

Canadian Coast Guard Capital Projects Planned

Vessel (Type)	Homeport	Build Modernization	Project Status
John Cabot (Icebreaker)	St. John's	MOD II	Modernization period JAN 89-APR 89.
Type 310 SAR (ARUN Design-GRP)	Central Region	BUILD	Construction period FEB 89-MAR 90.
Tembah (Navaids tender)	Hay River	MOD	Project approval in progress. Modernization scheduled for early 89.
Provo Wallis (Navaids tender)	Dartmouth	MOD	Project approval in progress. Modernization period MAY 89-MAY 90.
Griffon (Navaids tender)	Prescott	MOD	Project approval in progress. Modernization period AUG 89-DEC 90.
Type 310 SAR (ARUN Design)	Central Region	BUILD	Construction period FEB 89-MAR 90.
Type 310 SAR (ARUN Design)	Various	BUILD	Two units. Construction period APR 89-AUG 90.
Type 310 SAR (ARUN Region)	Central Region	BUILD	Construction period NOV 89-NOV 90.
Type 300 SAR (Lifeboats)	Various	BUILD	Two units. Construction period APR 89-NOV 90.
Nahidik (Navaids tender)	Hay River	MOD	Modernization period OCT 89-MAY 90.
Norman McLeod Rogers (Icebreaker)	Quebec	MOD	Class 'B' estimate due NOV 88. Modernization period OCT 89-SEP 90.
Type 900 (Navaids tender)	Central Region	BUILD	Contract awarded to Cleaver & Walkingshaw for design package. Construction period DEC 89-SEP 91.
Type 300 (Lifeboat)	Maritimes Region	BUILD	Construction period APR 90-NOV 90.
Type 900 (Navaids tender)	Western Region	BUILD	Construction period APR 90-Jan 92.
J.E. Bernier (Navaids tender)	Quebec	MOD	Modernization period MAY 89-JUL 90.
Namao (Navaids tender)	Selkirk	MOD	Modernization period JUN 90-APR 91.
Type 600 SAR (Offshore SAR)	Newfoundland Region	BUILD	Construction period JUL 90-MAR 92.
Nicolet (Sounding vessel)	Quebec	MOD	Modernization period DEC 90-DEC 91.
Type 1000 (Navaids tender)	Maritimes Region	BUILD	Construction period FEB 91-FEB 93.
Bartlett (Navaids tender)	Parry Sound	MOD II	Modernization period JUN 91-APR 92.
Type 900 (Navaids tender)	Laurentian Region	BUILD	Construction period DEC 91-SEP 93.
Type 900 (Navaids tender)	Laurentian Region	BUILD	Construction period JAN 92-OCT 93.
Type 800 (Navaids tender)	Maritimes Region	BUILD	Construction period FEB 92-MAR 93.
Pierre Radisson (Icebreaker)	Quebec	MOD	Modernization period JUN 92-NOV 93.

Major Navy Contracts

(continued)

Command, Washington, D.C. (N00024-88-C-2196).

Newport News Shipbuilding & Dry Dock Co., Newport News, Va., was recently awarded a **$339-million** modification to a contract for the construction of one SSN-688 Class submarine and Post Shakedown Availability (PSA) for FY 89. The work is expected to be completed February 1994. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-2195).

Ingalls Shipbuilding Division, Litton Industries, Pascagoula, Miss., was recently awarded a **$13.2-million** modification to a contract for yard services for DDG-51 Class follow-on ships. The work is expected to be completed December 1993. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-2252).

GTE Government Systems Division, Mountain View, Calif., was recently awarded a **$19.2-million** modification to a contract for materials for the AN/WLQ-4(V)1 electronic countermeasures system. The work is expected to be completed May 31, 1990. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-87-C-5047).

Westinghouse Electric Corporation, Wilkins Township, Pa., was recently awarded an **$11.4-million** modification to a contract for naval nuclear propulsion replacement components. The work is expected to be completed September 1993. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-4030).

Raytheon Co., Wayland, Mass., was recently awarded a **$13.2-million** contract for Aegis weapon systems components. The work is expected to be completed March 1992. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-5129).

General Electric-Aerospace, Moorestown, N.J., was recently awarded a **$32.8-million** modification to a contract for management efforts in developing and qualifying a second source for production of the Aegis AN/SPY-1D radar system. The work is expected to be completed May 1991. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-5175).

December 15

IBM Corporation, Manassas, Va., was recently awarded a **$75-million** contract for materials for the AN/BQQ-5E sonar system. The work is expected to be completed October 1993. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-6049).

General Dynamics Corporation, Electric Boat Division, Groton, Conn., was recently awarded a **$61.5-million** modification to a contract for design agent services in support of the Ohio Class submarines. The work is expected to be completed September 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-2148).

Westinghouse Electric Corporation, Cleveland, Ohio, was recently awarded a **$188-million** modification to a contract for qualification of initial building of MK 50 torpedoes. The work is expected to be completed July 1991. The contract was awarded by the The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-87-C-6378).

General Electric Co., Syracuse, N.Y., was recently a **$26.5-million** modification to contract for Mk 115 MOD 7 antisubmarine warfare control systems for DDG-51 and CG-47 Class ships. The work is expected to be completed February 1990. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-84-C-6362).

Gould Inc., Glen Burnie, Md., was recently awarded a **$4.2-million** contract for the TB-16 towed array sonar and associated support and test equipment. The work is expected to be completed September 1991. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-87-C-6125).

December 19

Raytheon Co., Wayland, Mass., was recently awarded a **$19.6-million** contract for materials for AN/SPS-49(V) radars. The work is expected to be completed April 1992. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-5618).

Raytheon Co., Wayland, Mass., was recently awarded a **$13.2-million** contract for various components for Aegis weapons systems. The work is expected to be completed March 1992. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-5129).

Westinghouse Electric Corporation, Wilkins Township, Pa., was recently awarded an **$11.4-million** modification to a contract for naval nuclear propulsion components. The work is expected to be completed September 1993. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-4030).

GTE Government Systems Division, Mountain View, Calif., was recently awarded a **$19.2-million** modification to a contract for materials for the AN/WLQ-4(V)1 submarine electronic surveillance product improvement model. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-87-C-5047).

General Electric Co., Burlington, Va., was recently awarded **$9.7-million** contract for the Mk 15 Phalanx close-in weapon system's ammunition handling system plus the integration of armament subsystems into various CG and DDG Class ships. The work is expected to be completed September 30, 1990. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-3108).

General Electric Co., Moorestown, N.J., was recently awarded a **$3.8-million** modification to a contract for Aegis installation and test support for DDG-51 Class destroyers. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-84-C-5144).

December 21
Metal Trades Inc., Hollywood, S.C., was recently awarded a **$3.6-million** contract for long lead material for the USS Los Alamos (AFDB-7). The work is expected to be completed May 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-85-H-8686).

Newport News Shipbuilding, Newport News, Va., was recently awarded a **$51.5-million** contract for engineering services for SSN-688 Class submarines. The work is expected to be completed October 31, 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-2032).

General Dynamics Corporation, San Diego, Calif., was recently awarded a **$4.7-million** contract for Tomahawk sea-launched cruise missile all-up-round depot maintenance. The work is expected to be completed December 1990. The contract was awarded by the Cruise Missiles Project Office, Naval Air Systems Command, Washington, D.C. (N00019-89-C-0001).

December 23
Bath Iron Works, Bath, Maine, was recently awarded a **$9.5-million** modification to a contract for yard services for CG-47 Class ships. The work is expected to be completed October 30, 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-88-C-2138).

Southwest Marine, San Francisco, Calif., was recently awarded a **$3.1-million** contract for the Selected Restricted Availability (SRA) of the aircraft carrier USS Carl Vinson (CVN-70). The work is expected to be completed April 21, 1989. The contract was awarded by the Supervisor of Shipbuilding, Conversion and Repair, San Francisco, Calif. (N00024-85-H-8220).

December 28
Leadermar, Inc., Jacksonville, Fla., was recently awarded a **$4.5-million** contract to provide layberth services for the USNS Capella (T-AKR-293) and USNS Antares (T-AKR-294). The work is expected to be completed July 21, 1994. The contract was awarded by the Military Sealift Command, Washington, D.C. (N00033-89-C-4005).

December 30
General Electric Co., Syracuse, N.Y., was recently awarded a **$9.8-million** modification to a contract for the full scale engineering development of AN/SLR-24 sonar. The work is expected to be completed July 31, 1989. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-86-C-6248).

FMC Corporation, Minneapolis, Minn., was recently awarded an **$87-million** contract for Mk 13 Mod 4 guided missile launching systems for FFG-7 Class frigates. The work is expected to be completed January 21, 1992. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-3109).

Seaworthy Systems Inc., Centerbrook, Conn., was recently **$7.2-million** contract to provide maintenance, material readiness and information systems development services for Military Sealift Command ships through shipboard automated maintenance management/engineering administration system. The contract performance period is for one year, with two one-year options. The contract was awarded by the Military Sealift Command, Washington, D.C. (N00033-89-D-3021).

January 5
Orange Shipbuilding Co., Inc., Orange, Texas, was recently awarded a **$4.3-million** contract for the construction of 11 open lighters. The work is expected to be completed November 1990. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-2112).

Canadian Commercial Corporation, Ottawa, Canada, was recently awarded a **$3.9-million** modification to a contract for two A/W42U(V)1 Recovery Assist, Securing and Traversing (RAST) systems for use on FFG-7

(continued)

Major Navy Contracts

(continued)

Class frigates. The work is expected to be completed November 1991. The contract was awarded by the Naval Air Systems Command, Washington, D.C. (N00019-86-C-0114).

January 9

General Dynamics, Electric Boat Division, Groton, Conn., was recently awarded a **$726-million** contract for the construction of the lead ship of the SSN-21 Seawolf Class attack submarine. The work is expected to be completed May 1995. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-89-C-2000).

Hughes Aircraft Company, Fullerton, Calif., was recently awarded a **$13.8-million** modification to a contract for standard information display consoles for Ohio Class submarines. The work is expected to be completed January 1991. The contract was awarded by the Naval Sea Systems Command, Washington, D.C. (N00024-85-C-6259).

Samson Tug & Barge Company, Sitka, Alaska, was recently awarded an **$8.6-million** contract to transport containerized and breakbulk cargo between Seattle, Washington, and the Naval Air Station, Adak, Alaska. The work is expected to be completed January 1992. The contract was awarded by the Military Sealift Command, Washington, D.C. (N00033-88-C-8503).

AT&T Technologies, Inc., Greensboro, N.C., was recently awarded a **$23.9-million** contract for oceanographic services. The work is expected to be completed September 30, 1989. The contract was awarded by the Space and Naval Warfare Systems Command, Washington, D.C. (N00039-89-C-0067).

Electric Boat Commissions U.S. Navy Attack Sub

The Electric Boat Division of General Dynamics, Groton, Conn., recently commissioned the nuclear-powered attack submarine USS Pasadena (SSN-752) at ceremonies at the Naval Submarine Base, New London, Conn.

The submarine is 360 feet long, has a beam of 33 feet, submerged displacement of 6,900 tons, and a speed of more than 20 knots.

Bender Shipbuilding Awarded Contract On USNS Mohawk

Bender Shipbuilding & Repair Co., Inc., Mobile, Ala., was recently awarded a $732,451 contract for the USCG recertification and EMP hardening of the USNS Mohawk (T-AFT 190), a 205-foot by 38.5-foot fleet tug based in Norfolk, Va. The Mohawk is operated by the Military Sealift Command.

ASNE-Mechanicsburg Section To Host Annual Naval Logistics Symposium In Carlisle, Pa., On March 7-9

The Mechanicsburg Section of the American Society of Naval Engineers (ASNE) will host its third annual Naval Logistics Symposium, "Meeting the Challenges for Improved Quality and Reduced Cost," on March 7-9, 1989 at the Embers Convention Center, Carlisle, Pa.

Featuring exhibits from both government and the industry, the symposium, which is sponsored jointly by the Naval Sea Systems Command, Naval Supply Systems Command and Space and Naval Warfare Systems Command, will hear 18 technical paper presentations on topics from current government-industry shared quality upgrades for logistics to specific problems geared to enhance Navy fleet readiness.

Guest speakers for the Logistics Symposium will include: Vice Adm. **Peter M. Hekman Jr.**, USN, Commander, Naval Sea Systems Command; Vice Adm. **S.R. Arthur**, USN, Deputy Chief of Naval Operations (Logistics); Rear Adm. **Robert A. Abele** (SC), USN, Vice Commander, Naval Supply Systems Command; Rear Adm. **J.C. Weaver**, USN, Commander, Space and Naval Warfare Systems Command; and Rear Adm. **Malcolm MacKinnon III**, USN, Vice Commander, Naval Sea Systems Command.

For further information on the symposium, contact: ASNE, 1452 Duke Street, Alexandria, Va. 22314; telephone: (703) 836-6727; and fax: (703) 836-7491.

LOGISTICS SYMPOSIUM PROGRAM

Tuesday, March 7

Noon—Exhibit Hall open. Advance registration desk open.

5 p.m.—Social hour—Exhibit Hall.

Wednesday, March 8

7:30 a.m.—Registration desk open.

8:15 a.m.—Welcome address by Captain **J. Ellis**, USN, Commanding Officer—NAVSEALOGCEN, and Dr. **Alfred Skolnick**, president, ASNE.

8:30 a.m.—Keynote address by Vice Adm. **S.R. Arthur**, USN, Deputy Chief of Naval Operations (Logistics).

SESSION I

Moderator: **Anthony J. Ruffini**, Columbia Research Corporation.
9 a.m.—"The Essence of a Quality Program in Engineering and Logistics," by Capt. **David B. McGuigan**, USN (Ret.)
9:35 a.m.—"Quality Perception—A Comparison between the Navy and the Commercial Environment," by Cmdr. **Charles A. Perkins**, USN.
10:10 a.m.—Break.
10:25 a.m.—"Is Quality Overhead?" by **Vernon C. Graham.**
11 a.m.—"Quality Configuration Data—The Foundation for Logistics Support," by **Kenneth A. Brown.**
11:35 a.m.—Panel Discussion.
12:10 p.m.—Lunch.
Speaker: Rear Adm. **Robert B. Abele** (SC), USN, Vice Commander, NAVSUP.

SESSION II

Moderator: **Dave M. Altwegg**, NAVSEA.
1:30 p.m.— "Afloat Supply Application of Compact Disk Technology," by **E.A. Heberg.**
2:05 p.m.—"ROMIS—The Real Time Outfitting Management Information System," by **Frank J. Smith**.
2:40 p.m.—Break.
2:45 p.m.—"An Information Road Map to Improved Shipboard Support," by **William A. Cross.**
3:30 p.m.—"Integration of Logistics Functions," by **Thomas G. Broussard.**
4:10—Panel Discussion.
4:40 p.m.—Adjourn.
5 p.m.—Banquet at the Embers Convention Center. The speaker will be Vice Adm. **Peter M. Hekman Jr.**, USN, Commander, NAVSEA.

Thursday, March 9
8:15 a.m.—Administrative remarks.
8 a.m.—Keynote address by Rear Adm. **J.C. Weaver**, USN, Commander, SPAWAR.

SESSION III

Moderator: Ronald J. Duddleston, SPCC.
9 a.m.—"Reducing Cost and Improving Quality—The Standard Hardware Program (SHARP)," by **Larry Weaver**.
9:34 a.m.—"Improved Quality/Reduced Cost Through Test Equipment Modernization," by **Paul Gross**
10:10 a.m.—Break.
10:25 a.m.—"RBS, Improved Readiness at Reduced Cost," by **Leonard Burdick**.
11 a.m.—"Management of Total Logistics Cost," by **Hubert C. Upton.**
11:35 a.m.—Panel Discussion.
12:05 p.m.—Lunch. The speaker will be Rear Adm. **Malcolm MacKinnon III**, USN, Vice Commander, NAVSEA.

SESSION IV

Moderator: **Lawrence Hanagan**, NAVSEA.
1:20 p.m.—"Application of 3D Product Model to Ship Maintenance and Logistics (MCM)," by **Jeffrey D. Arthurs.**
1:55 p.m.—"Spare Parts on Demand," by **Lorna B. Estep.**
2:30 p.m.—"Naval Supply Logistics Network," by Lt. Cmdr. **W.A. Potter**, USN.
3:05 p.m.—Closing remarks.
3:45 p.m.—Adjourn.

Newest Navy Crane Ship Christened 'Diamond State' At Tampa Shipyards

The U.S. Navy christened its newest crane ship, the SS Diamond State (T-ACS-7) at ceremonies at Tampa Shipyards, Tampa, Fla. The ship, named for the state of Delaware, will be operated by the Navy's Military Sealift Command.

With a draft of 33 feet 3 inches and deadweight at her loadline of 15,138 long tons, the 668-foot-long by 76-foot-wide Diamond State will join six other crane ships providing improved crane capability for the U.S. Navy. The vessels are designed to unload cargo from other ships at ports where shore facilities are unavailable. The ships can also unload cargo from ships offshore onto barges, floating causeways, or smaller faster craft that can enter shallow-water ports.

Tampa Shipyards converted the Diamond State from a containership under a $43-million, two-ship conversion contract from the U.S. Navy. Modifications to the vessel included the installation of three twin-boom cargo cranes with two 1,640-kw diesel generators to provide electrical power to operate them, a cargo crane control room, changes to the cargo holds, installation of ballast and 32 small craft mooring fittings on the ship's hull above the waterline. Tampa is also currently converting the USS Equality State to a MSC crane ship.

For free literature detailing the shipbuilding, ship-repairing and conversion services of Tampa Shipyards,

Circle 105 on Reader Service Card

John Bartley Named Head Of Welding Engineering At Mare Island Shipyard

John Bartley, vice president of the American Welding Society, has been named head of welding engineering at the Mare Island Naval Shipyard in Vallejo, Calif.

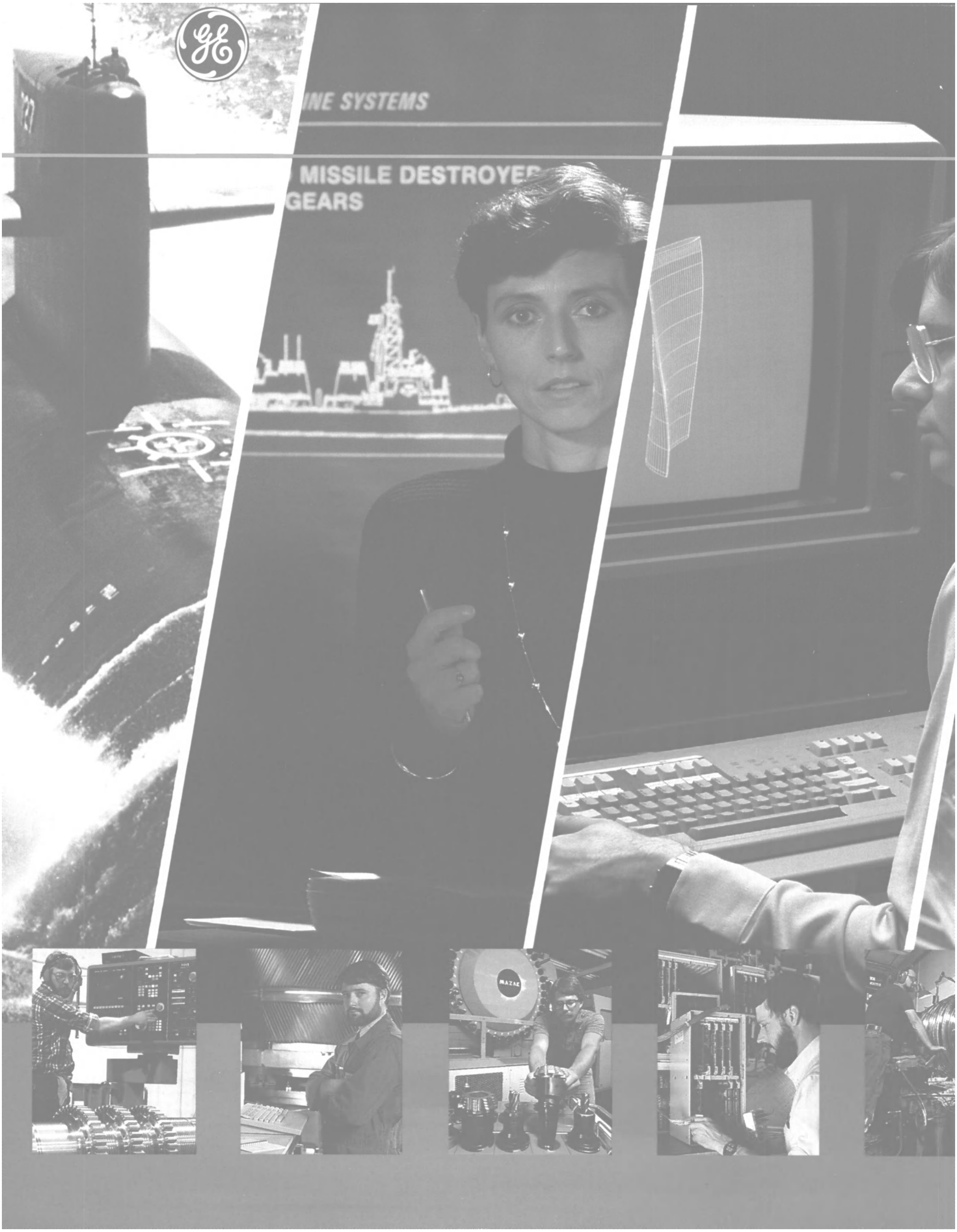
He will be responsible for all welding engineering, including both nuclear and nonnuclear activities, and research and development welding projects.

Previously, he was a consulting engineer, working primarily for CDI Corporation-West, McDonnell Douglas, Westarc Industries, AutoArc, Lion Manufacturing, Beam Engineering and Applied Energy Systems

Mr. **Bartley** is presently completing his first term as a national vice president of AWS and as a member of its executive committee.

Over $29.9 Million In U.S. Navy Contracts Won By A&T, Inc.

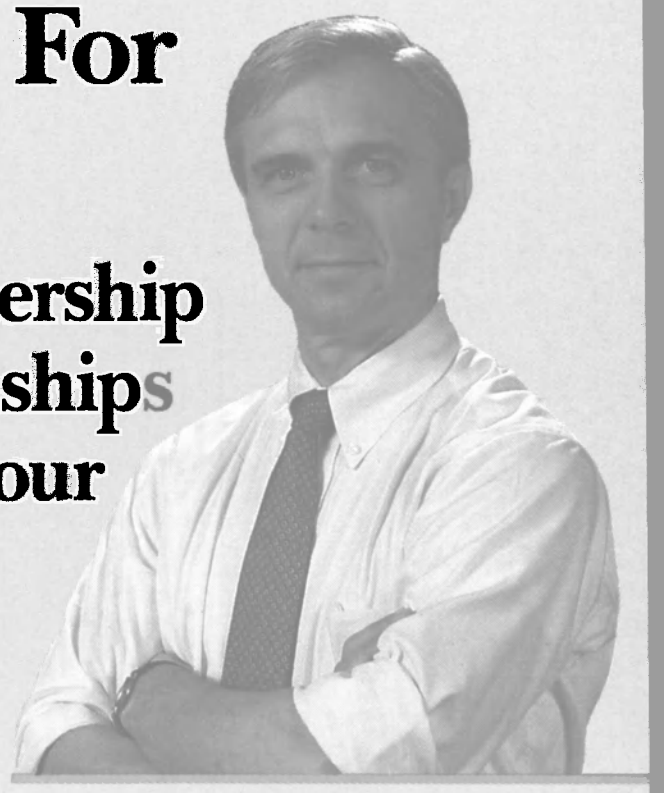
Analysis & Technology, Inc., North Stonington, Conn., a submarine and antisubmarine warfare professional and technical services firm, recently won over $29.9-million in U.S. Navy contracts.


INE SYSTEMS
MISSILE DESTROYER
GEARS
MAZAK

GE Naval & Drive Turbine Systems

Department For The Navy

"Maintaining leadership in propulsion and ships service systems is our primary mission."



L.A. Carlstrom
General Manager
Naval & Drive Turbine Systems

Powering the U.S. Navy. GE has been the Navy's foremost partner in propelling and electrifying her proud ships for more than a century. We are working today to extend this partnership into the Twenty-first Century.

Focus On The Navy

The U.S. Navy is the primary customer of Naval & Drive Turbine Systems. As a critical component of America's third largest defense contractor, our charter is to focus the resources of our 40 billion dollar Company to meet the Navy's need for technology, quality, cost and delivery. We design, manufacture and test all GE shipboard steam propulsion, gear, and ships service power generation systems. In addition, we are developing a number of "futuristic" systems including electric drive.

Electric Drive Propulsion

Recently, the CNO announced an intention to power future Navy surface combatants with electric drive propulsion systems. We were pleased to learn last November that Naval & Drive Turbine Systems was awarded an 89.5 million dollar contract to develop electric drive. On this program, we bring together the capabilities and resources of GE Corporate Research & Development, Drive Systems, Ordnance Systems, and Aircraft Engine Business Group, along with our people in Fitchburg and Lynn, Massachusetts; Bangor, Maine; and Schenectady, New York. Within these organizations, Navy experts will apply their experience, and use some of the world's most modern equipment, to create a state-of-the-art propulsion system that is versatile, quiet and highly efficient. We wish to thank the Navy for entrusting this vital program to GE.

A Proud Tradition

The heritage Edison began with the first shipboard power generation system continues at Naval & Drive Turbine Systems. Today, GE powers the Navy fleet from large aircraft carriers and submarines to small auxiliary ships. Tomorrow, electric drive will broaden the Navy's capability in the Twenty-first Century and enable us to carry-on our primary mission ... to maintain leadership in propulsion and ships service systems for the U.S. Navy.

GE People:
Qualified, Committed, Proud

Circle 223 on Reader Service Card

Southwest Marine Drydocks Two Navy Vessels Simultaneously For Extensive Repair Work

Southwest Marine, Inc., San Diego Division, recently drydocked the Navy vessels USS Thach and USS McCluskey together for extensive repair work. The dual docking occurred in accordance with tight Navy schedules in order that the two vessels could rejoin the fleet as quickly as possible.

Southwest Marine, owner of one of the most technologically advanced floating drydocks ever designed, was the successful bidder for the repair work for the two Navy combatant frigates, which are similar to the USS Stark.

According to Capt. **Richard Ames,** Supervisor of Shipbuilding, Conversion and Repair, U.S. Navy, San Diego, "This dual docking of both ships at once required exceptional cooperation and coordination of efforts between Southwest Marine and the Navy."

Southwest Marine is one of the largest ship repair firms in the U.S., with yards in San Diego, San Francisco, San Pedro and American Samoa.

Navy frigates USS Thach and USS McCluskey were drydocked simultaneously, allowing ships and crew to remain in San Diego.

For free literature containing full information on the facilities and capabilities of Southwest Marine,

Circle 101 on Reader Service Card

Eldec Corporation And Dunlop Limited Form Joint Venture Company

Eldec Corporation, based in Lynnwood, Wash., and Dunlop Limited of England have completed formation of Dunlop-Eldec Electronics, Ltd., a new joint venture company that will operate out of Coventry, England.

The company will design and manufacture electronic equipment and systems for commercial and military aerospace, military ground-based, marine and other high performance markets.

During the start-up phase, Dunlop-Eldec Electronics will manufacture some of the already existing electronics products of Dunlop Aviation, a division of Dunlop, and Eldec. A primary mission of the new company will be to develop new markets and products that benefit from the synergism of both companies' markets and products.

Dunlop Aviation is a leader in aircraft brake control systems, deicing systems and turret position control systems for fighting vehicles. Eldec is an expert in electronic sensing, control and monitoring systems, and power conversion equipment for aerospace and defense.

"The new company will benefit both parent companies," **Max Gellert,** Eldec CEO, said. "For Eldec, a European base is important in gaining better market access and increased participation on European aerospace and defense programs. In turn, Dunlop will benefit from our advanced electronics technology and manufacturing know-how."

Mr. **Gellert** added, "The joint venture expands the capabilities of both companies, and we expect to be better positioned to take part in the emerging industry trend toward integrated systems."

For further information and free literature,

Circle 53 on Reader Service Card

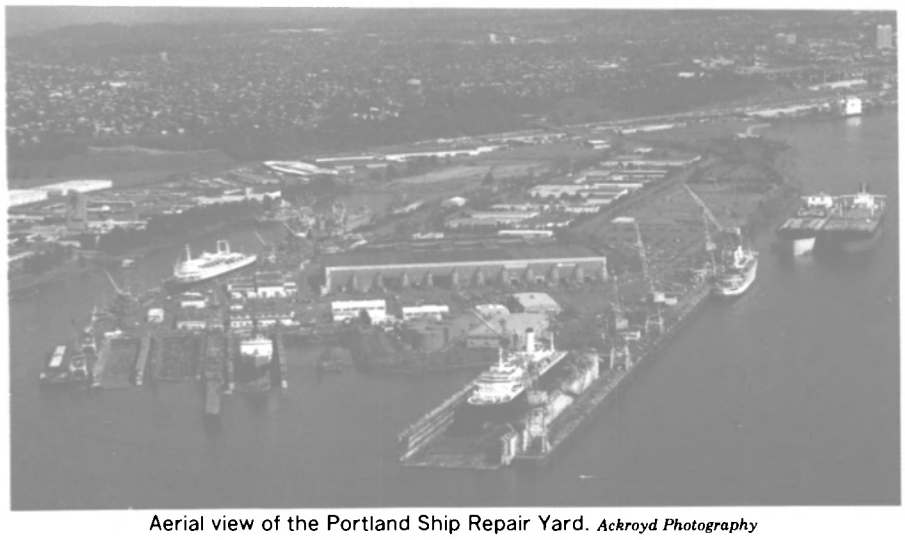
Samson Tug & Barge Awarded Navy Cargo Pact

Samson Tug and Barge Company, Sitka, Alaska, has been awarded a contract for transporting supplies to the Aleutian Island U.S. Naval Base located at Adak, Alaska.

Seaworthy Systems Wins $7.1-Million MSC Contract

The U.S. Navy's Military Sealift Command (MSC) awarded a cost-plus-award-fee contract worth about $7.1 million to Seaworthy Systems, Inc., Centerbrook, Conn., to provide maintenance, material readiness and engineering information systems development services for Military Sealift Command ships in support of the Shipboard Automated Maintenance Management and Engineering Administration Systems (SAMM/EASy Systems). SAMM/EASy is a product of the combined effort of the MSC's Engineering Office and Information Systems Office.

The contract performance period is for one year with two one-year options.



Aerial view of the Portland Ship Repair Yard. *Ackroyd Photography*

Portland Ship Repair Yard Posts Successful Year

Yard, Contractors Report $140 Million In Business

A dozen years ago, the Port of Portland (Oregon) and its tri-county citizens gambled that an $84-million shipyard expansion program—including giant Drydock 4, which was specifically designed to serve the VLCCs in the Alaskan trade—would keep Portland a competitive ship repair center into the next century.

Now, after more than 300 dockings on Drydock 4, Portland's ship repair expansion can be declared a major success.

"There appears to be two reasons for our growth . . .," said **Guy Alvis**, Portland Ship Repair (PSRY) manager. "First, Drydock 4 and the Portland Ship Repair Yard's second-to-none facilities appear to be the 'better mousetrap' that is attracting more and more repair business to Portland.

"Credit should also be given to Portland's quality labor force and the aggressive ship repair contractors at the yard."

PSRY reports that 70 percent of its work lies in the tanker sector, 5 to 10 percent in cruise ship sector, and 25 percent in the military.

West State, Inc., one of the contractors in PSRY, recently docked the 987-foot Exxon Long Beach, the 300th ship to go up on the blocks at Drydock 4. The ship is being overhauled under a $5.5-million contract.

Since it went into service in March 1979, Drydock 4 has been responsible for the creation of 750 jobs per year and earned an estimated $500 million.

Other important additions during the $84-million expansion include: a 3,000-foot-long pier and outfitting berth on the river side of the shipyard; a battery of heavy-lift cranes that serve Drydock 4; and a ballast water treatment plant for handling the oily wastes off ships that come into the yard.

During 1988, PSRY and its three ship-repair contractors, Cascade General, Inc., Northwest Marine Iron Works, and West State, Inc., reported that they did $140 million worth of business. In 1988, PSRY had 86 dockings on its three active drydocks—six more than recorded in 1987.

The amphibious assault ship USS Okinawa (LPH-3) is undergoing a $15-million overhaul at Northwest Marine Iron Works.

Northwest Marine Iron Works, the oldest and largest ship-repair contractors at PSRY, recorded an excellent year. The company, which serves the U.S. Navy, military sealift, cruise ship and tanker repair market, reported that it repaired 197 vessels during a recent 12-month period.

Northwest Marine Iron Works is currently overhauling the U.S. Navy amphibious assault ship USS Okinawa (LPH-3) under a more than $15-million contract.

Cascade General, which purchased the assets of liquidated Dillingham Ship Repair Company in 1987, recently completed an approximately $2.5-million overhaul of the U.S. Coast Guard icebreaker Polar Star.

Business Base Expanded

During 1988, PSRY expanded its

PSRY FACILITIES

Maximum Ship Size In Feet (LOA-Beam)

Land Level Position
475 x 100
810 x 108

Floating Drydocks
650 x 84
550 x 88
810 x 108
1,150 x 181

business beyond traditional ship repair.

Examples of this include layberthing (berthing and mooring ships for long periods of time) and conversion of Ready Reserve Force ships and layberthing large oil tankers that are in between charter assignments. Portland's location, excellent mooring facilities, and the harbor's salt-free fresh water are assets that have attracted shipowners.

Another successful diversification effort has been the fabrication of oil field modules—high job-generating projects PSRY has done continuously since 1984.

A $12-million ARCO Alaska 1989 Sealift module project was recently awarded to Portland. The contract was awarded to Wright Schuchart Harbor Company of Seattle. The company will build five 1,500-ton modules, roughly the height of 11-story buildings.

In addition to PSRY's 24-acre module fabrication site adjacent to the shipyard, to support future work, an additional 30 acres in the Swan Island lagoon are being filled and developed for oil module fabrication projects.

Yard Rehabilitation Nears Completion

A major rehabilitation of the older portion of PSRY that dates back to Henry J. Kaiser World War II shipbuilding is about 75 percent complete, according to Mr. **Alvis**.

Started in 1982, the $10-million rehabilitation project is a "self-help" program to be paid out of shipyard revenues.

The rehabilitated facilities support the Port's Drydocks 1 and 3. The older part of PSRY was not included in the major PSRY $84-million ship-repair expansion program approved by Portland voters in 1976. That program provided Drydock 4, one of the largest of its kind on the West Coast, and its various support facilities and services which became operational in 1979.

"This rehabilitation is a joint effort of the Port (of Portland) and our ship-repair contractors to extend the useful life of the older part of the shipyard from our own revenues, without asking for additional tax," Mr. **Alvis** said.

He explained that four of the eight Washington cranes dating from World War II, manufactured in 1942, have been restored to like new condition. "Even though these cranes have given the Port 40 years of service, after total reconditioning, they are now new pieces of machinery with an expected service life of 20 years or more," he added.

In addition to reconditioning the cranes, the PSRY rehabilitation is making new ship berths out of old ones—with replacement of piling, decks, pavement, new lighting, new and improved utilities and sewer mains, river water systems and sprinkler improvements, new and vastly improved electrical substations, and a compressed air distribution system and enlarged equipment lay-down areas.

For free literature detailing the shipbuilding, repairing and conversion facilities of PSRY and its ship-repair contractors,

Circle 17 on Reader Service Card

Dampa Appoints Hopeman Brothers Sole U.S. Distributor

The Danish firm of Dampa A/S recently appointed Hopeman Brothers, Inc. as sole distributor within the U.S. marine business area.

Hopeman Brothers, Inc. is located at 435 Essex Avenue, Waynesboro, Va. 22980, phone (703) 949-9200. **David Rathburn** will be responsible for the Dampa product range.

Dampa hopes further to strengthen its position as a leading designer and manufacturer of fire rated and decorative marine ceiling systems.

Hopeman Brothers, Inc. has shown an equally future-minded approach toward accommodation outfitting within their field and are, with the Dampa distributorship, continuing their strategy and widening their activities.

For further information and free literature on Dampa products,

Circle 33 on Reader Service Card

Compass Display Protected From Abrasion By Coating —Literature Available

KVH Industries, Inc., designs, manufactures and markets microprocessor-based electronic heading sensors and compass systems for marine, military, communications and industrial applications.

Two recent KVH products are the Azimuth 314 digital compass and the Azimuth 100 digital compass. The Azimuth 314 digital compass is a fluxgate compass designed for powerboats; while the Azimuth 100 is a self-contained, stand-alone compass for small boat owners.

A fluxgate compass, according to KVH Industries, is designed to read the earth's magnetic field. In simple terms, the earth's magnetic field interacts with a magnetic field created by a sensor in the compass. The interaction of these two magnetic fields allows a determination of direction.

When manufacturing began on the Azimuth 314 compass, manufacturing manager, **Jim Welsh,** discovered "the completed compasses often had scratches on the LCD display window. We don't ship compasses with scratched face plates." As a result, at the beginning of the production run on the Azimuth 314, the company had to scrap several hundred face plates.

After investigation, Mr. **Welsh** decided that Vueguard 901® WC, manufactured by Panelgraphic Corporation, West Caldwell, N.J., was the solution. This product is a surface treatment that is applied to a variety of substrate materials.

According to **Bob Millano,** product manager for Panelgraphic Corporation, "Vueguard 901 not only makes those substrate materials steel wool abrasion resistant, but also resistant to many chemicals, solvents and cleaners."

The use of Vueguard on the display windows of KVH products has, according to the company: reduced glare and improved readability; allowed the use of tough polycarbonate, instead of glass; and lessened crazing or cracking from harsh cleaners.

For free literature detailing KVH products,

Circle 80 on Reader Service Card

For further information on Vueguard 901 WC from Panelgraphic Corporation,

Circle 81 on Reader Service Card

ABS Forms Corporate Quality Assurance Group

The American Bureau of Shipping has established a Corporate Quality Assurance Group to better address its internal QA concerns. The work of this group is separate from the established, external QA programs of ABS in which surveyors assess the quality of the production operations of builders, manufacturers, and fabricators worldwide.

This new internal QA Group pulls together procedures formerly conducted within the ABS divisions into a single, independent structure. The responsibilities of the group are to develop and coordinate corporate quality policy; assist departments, divisions, and regions in developing and implementing QA programs; identify and solve any shortcomings in ABS services; assess corporate training needs; and assist in the development of rules, guides, and internal instructions related to quality assurance.

In addition, the QA Group is responsible for quality audits of ABS management, systems, products, and services.

The internal QA program of ABS is administered by **Michael Wheatcroft,** director of Quality Assurance, who reports directly to the CEO. His efforts will be reinforced and monitored by an independent oversight team consisting of three well-known experts with many years of QA experience: Rear Adm. **William Benkert,** USCG (ret.), Vice Adm. **Robert Price,** USCG (ret.), and retired Bethlehem Steel QA manager **Dexter Olsson.**

The American Bureau of Shipping is the first classification society to have such an independent QA oversight team.

For further information,

Circle 100 on Reader Service Card

Imperial Immersion Suits Save Lives; Survivors Get Club Membership

Joe Gilbert, Peter Goldstern, and **Gary Marlar** are just three members of an exclusive 400-member group, the Penguin Club, who have survived life-threatening storms and accidents at sea with the use of Imperial Immersion Suits.

Mr. **Gilbert** survived more than 20 hours of exposure after Hurricane Juan wiped out the oil drilling platform on which he was working several years ago.

Mr. **Goldstern** survived more than 10 hours after his plane went down in stormy seas in the North Atlantic. After abandoning his boat, Mr. **Marlar** survived 5 hours in the water before he was rescued.

"Of course, 400 is undoubtedly a small percentage of those who have had occasion to use Imperial suits in the 18 years they've been available," said Parkway/Imperial's president, **Frank Sanger**. Often the only motivation for speaking up about an incident is a survivor's request for a replacement storage bag for his suit—the bags are almost always lost overboard when the suits are needed in an emergency.

Parkway/Imperial honors anyone who documents an incident in which their life was saved through the use of an Imperial Immersion Suit by issuing a Penguin Club membership card, plaque, and replacement of their storage bag.

The South Amboy, New Jersey-based company reports it supplies well over half of the immersion suits sold in the U.S. The Imperial Immersion Suit was one of the first to receive the U.S. Coast Guard's approval under new rule-makings (IMO/SOLAS 73/84).

Immersion suits, formerly called "exposure" or "survival" suits, are required on certain inspected vessels (ships, tankers, MODUs) and are recommended by the Coast Guard on uninspected vessels.

The Imperial 1409A Immersion Suit features one-piece sealed construction with attached hood, boots, and gloves. A detachable hi-rider buoyancy ring with advanced inflator design reinforces built-in buoyancy of the neoprene material. The suit protects against hypothermia and will not sink even if flooded.

Parkway/Imperial also produces high-quality drysuits, wetsuits, and other related equipment.

To submit information to Parkway/Imperial about survival at sea using the Imperial Immersion Suit, and for membership in the Penguin Club, contact: Parkway/Imperial, 241 Raritan Street, South Amboy, NJ 08879; telephone: (201) 721-5300; fax: 201-721-4016; telex: 844568.

For free literature detailing Parkway/Imperial Immersion Suits,

Circle 10 on Reader Service Card

Wescol International Opens Office In New York City

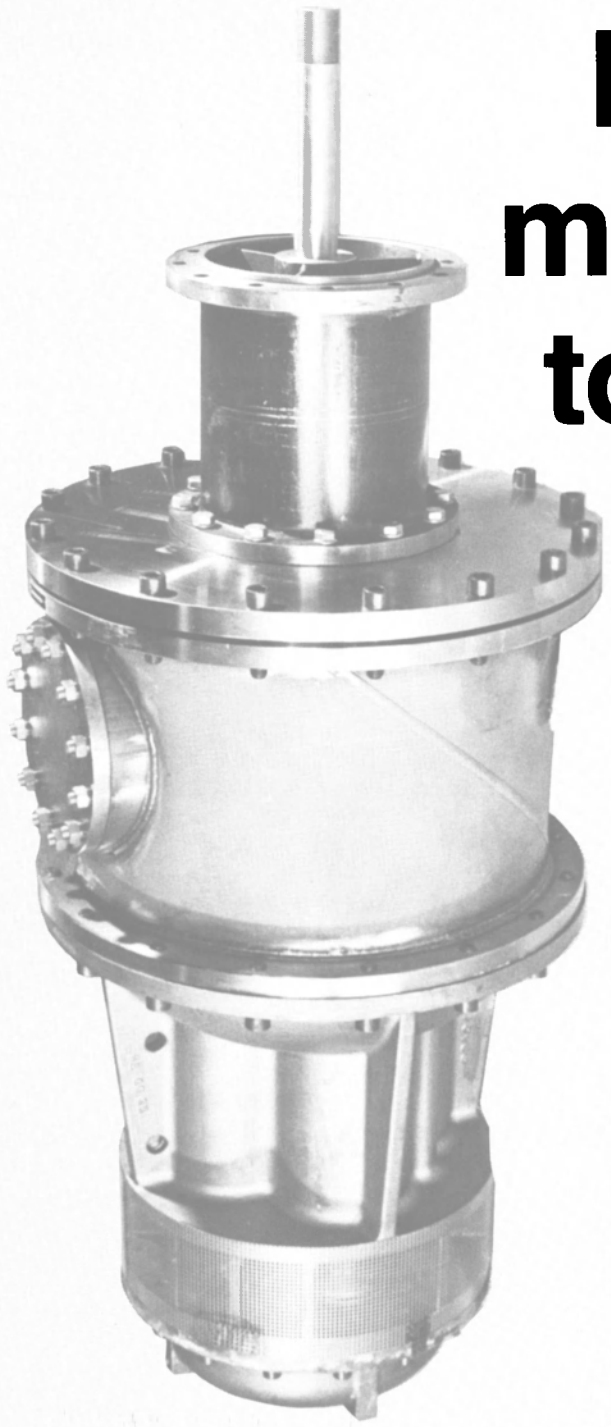
Wescol International Marine Services Inc. recently announced the opening of their New York City office at 527 Madison Avenue.

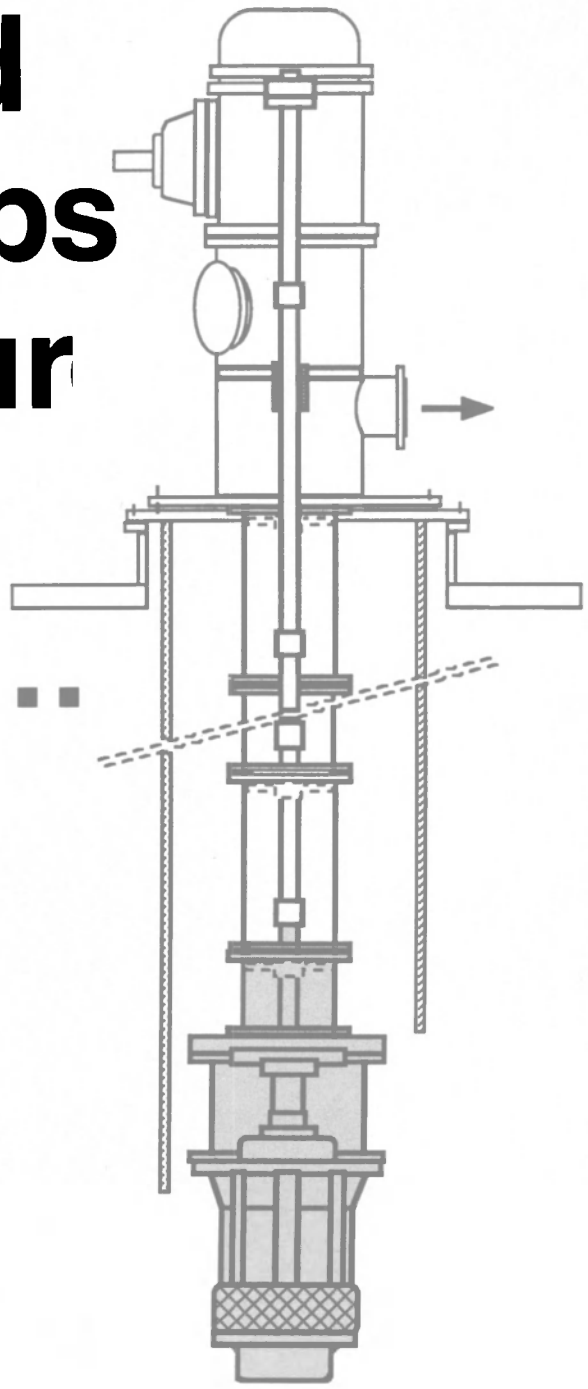
The office will be active in all aspects of commercial shipping, with particular emphasis on project-related business. Additionally, the office will provide U.S.-based clients with direct access to an extensive array of shipping services offered by the Wescol Group of companies.

K.J. McNelis, after 10 years in Tokyo, returns to New York to head up the office. Formerly with Teh Tung Steamship and the P & O Group in Japan, he brings with him a solid background in international shipping activities.

The company's full address is as follows: Wescol International Marine Services Inc., 527 Madison Avenue, 10th Floor, New York, N.Y. 10022, phone: (212) 605-9797, fax:(212) 421-1424.

Engineered marine pumps to solve your special problems...





The Leistritz five-rotor, single-flow screw pump on the left was specially designed to unload asphalt and #6 fuel oil from an ocean-going barge.

The pump is one of two we designed and built for an East Coast barge operator. These pumps, each with a capacity of approximately 5000 BPH, are the largest of their type ever installed aboard a U.S. vessel.

The diesel-driven pumps operate at 145 PSIG, at a viscosity of 3000 SSU and temperatures to 340° F.

The entire pump assembly, including the column assembly and discharge head, is shown in the schematic at right.

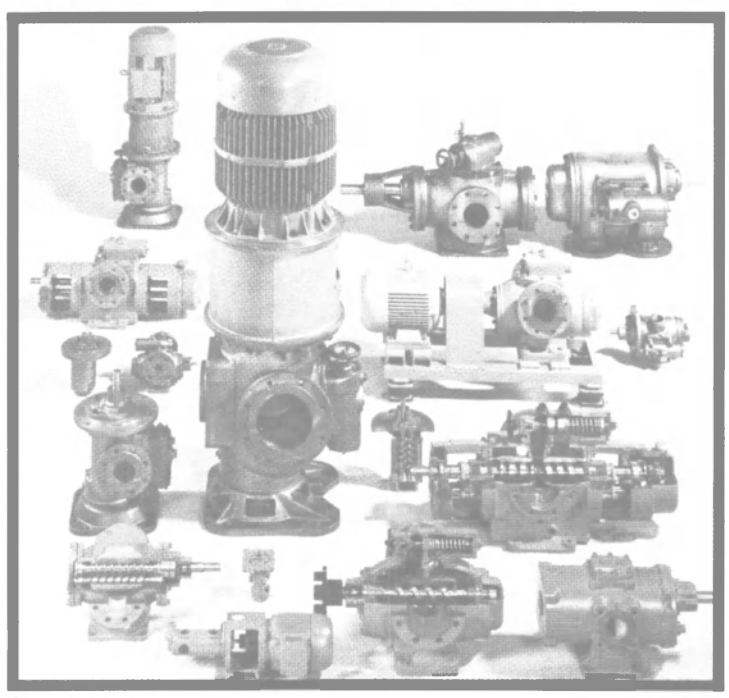
plus a full line of standard units.

While engineering and manufacturing marine pumps to solve all kinds of fluid-handling problems has been a Leistritz specialty for more than 60 years—we make a full line of *standard* pumps, too.

The line includes two, three and five-screw pumps for lube-oil service, fuel-oil service, hydraulics, sludge handling, cargo loading and unloading. And these pumps serve both shipboard and offshore applications worldwide.

So whether you have a special pumping problem to be solved, or an application that a standard pump can handle, you can count on Leistritz for a pump design that will—without compromise—meet your exact pumping requirements. And at the same time, you'll get the quality, reliability and efficiency that Leistritz is known for.

To find out more about Leistritz pumps and services for the marine industry, call Sven Olson at 201-934-8262, or write Leistritz Corporation, 165 Chestnut Street, Allendale, New Jersey 07401.



Leistritz

Circle 180 on Reader Service Card

SSE Launches New Class Corvette For Singapore Navy

The RSS Valour, the first Singapore-built vessel of a new missile corvette class, was recently launched by Singapore Shipbuilding & Engineering, Ltd., for the Republic of Singapore Navy.

The Jurong shipyard of Singapore Shipbuilding & Engineering Ltd. (SSE) recently launched the first domestically built vessel of a new missile corvette (MCV) class for the Republic of Singapore Navy.

Christened the RSS Valour, the 203-foot vessel will be powered by four MTU diesel engines to speeds in excess of 30 knots. Her hull is constructed of light gauge steel and her superstructure of marine grade aluminum alloy.

The first of six to be built at the yard, the RSS Valour will be fitted with Harpoon missiles, an OTO Melara 76-mm rapid firing gun, torpedoes, sonar, surveillance and fire control radars and other sophisticated electronics which make up a complete weapon system.

The lead ship of the MCV Class was built by Fr. Luerssen Werft, West Germany.

For free literature detailing the shipbuilding services of SSE,

Circle 26 on Reader Service Card

MSC Awards Leadermar $4.5-Million Contract For Layberth Services

The U.S. Navy's Military Sealift Command (MSC) awarded a firm-fixed-price contract in the amount of nearly $4.5 million to Leadermar, Inc., Jacksonville, Fla., under a Small Business set-aside program. Leadermar will provide layberth facilities and services in Jacksonville for two Fast Sealift Ships, the USNS Capella (T-AKR-293) and the USNS Antares (T-AKR-294).

The contract performance period is five years, beginning July 22, 1989.

L&C Associates Offers Brochure On Marine Dehumidification Service

L&C Associates, Inc. of North Hampton, N.H., an industry leader in the design and installation of dehumidification, sealing and monitoring systems for the marine market, is offering a free six-page fold-out brochure titled "The Complete Marine Dehumidification Service."

The publication discusses L&C's complete marine dehumidification service that keeps vessels in lay-up shipshape and ready to reactivate. L&C's passive rather than active lay-up method reduces labor and energy costs because a dehumidified vessel in passive lay-up can be left unattended.

The program, as explained in the brochure, includes ship survey and design of a system to meet the specific needs of the vessel; supply of all system components by L&C; providing dehumidification equipment manufactured by Cargocaire Engineering Corporation, a leader in the C/H field since 1939; dry air distribution to designated controlled spaces around the vessel; control alarm and monitoring system that includes a series of humidistats and humidity-recorders strategically placed throughout the vessel to control and monitor the humidity level in all controlled spaces; and the Protective Sealing System, a durable strippable vinyl plastic seal providing a weather resistant, tough and seamless skin that will last the duration of the lay-up.

L&C's Protective Sealing System meets the Navy and Maritime Administration's approval to be used in long and short-term lay-ups.

For further information and a free copy of the brochure from L&C Associates,

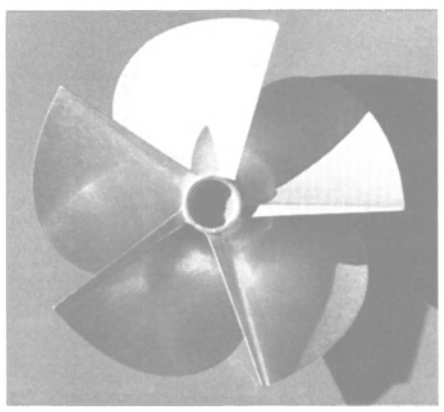
Circle 79 on Reader Service Card

OMI Appoints deSostoa Senior VP, Finance

OMI Corp., New York, N.Y., recently announced the appointment of **Vincent deSostoa** as senior vice president, finance.

Before joining OMI, Mr. **deSostoa** was associated with A.T. Kearney, Inc., management consultants. From 1985 to mid-1987, he served as chief financial officer of the New York City Transit Authority, prior to which he was a partner of Peat Marwick, Mitchell & Co., Washington, D.C.

Rolla's New Five-Bladed REXP5 Propeller Represents Breakthrough In Design



The new REXP5 5-bladed propeller from Rolla.

Rolla SP Propellers, Novato, Calif., internationally known for designing and producing a wide selection of advanced technology and high-performance wheels, has introduced a fast new 5-bladed geometry stainless steel propeller, the REXP5, intended for transcavitating, supercavitating and surface piercing applications.

The REXP5 propeller represents a revolutionary breakthrough in propeller design, also made possible by the investment casting process.

With inedited cambered sections, extreme radial pitch variance, annexed trailing edge along with 120-degree BAR, the last tests of the REXP5 propellers on a 7-plus deep-V hull with twin 450-hp diesels and propellers in surfacing condition gave a speed of 60+ knots and overall performance as to planing time, cruise condition, reverse and off design conditions that, according to the manufacturer, can be considered remarkable.

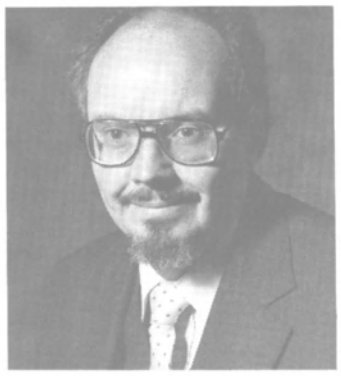
Investment cast in 17-4-PH stainless steel or ERO (a new stainless steel developed by Rolla for propellers which are both strong and completely resistant to marine environments) up to 22.6-inch-diameter and 1.36 PD ratio, the REXP5 is the first of a completely new family that will cover the future needs of very fast vessels.

Technical specifications are as follows: propeller, REXP5; type, FL5 RH/LH and OS50/51 RH/LH; construction materials, stainless steel 17-4-PH and ERO; number of blades, 5; description, 15-degree cleaver; diameter, up to 22.6 inches; pitches, 30-31 inches; any bore; splines, Z-25, Z-26, Z-31; applications, transcavitating, supercavitating and surface piercing; design, Rolla SP Propellers; construction, Rolla SP Propellers.

For further information and free literature from Rolla SP Propellers,

Circle 77 on Reader Service Card

Grow Appointed Materials Manager, Bethlehem Steel Baltimore Marine Division



H. Allen Grow

H. Allen Grow has been appointed manager of Bethlehem Steel Corporation's Baltimore Marine Division, Sparrows Point, Md., according to **David Watson**, division general manager.

Mr. **Grow** was promoted from the position of materials section chief at the shipyard.

Mr. **Grow** joined Bethlehem Steel 1968. He was assigned to the Sparrows Point yard in December 1987 as a senior buyer, a position he held until his promotion to materials section chief.

Chantier De L'Atlantique To Build Dredge For Port Authorities Of Chittagong

The Port Authorities of Chittagong, Bangladesh, have ordered a dredge with a capacity of 2,500 m^3 from Alsthom's Chantiers de l'Atlantique shipyard.

In addition to delivery of the vessel in early 1991, the contract provides for training of the required operating and dredging personnel at Chittagong and Saint Nazaire.

The order represents 400,000 hours of work and was financed with a major loan granted to Bangladesh by the French Government. It further strengthens the Saint-Nazaire shipyard's position in the dredging vessel market, following the recent delivery of two dredges for the Government of Mexico.

For free literature giving full details on the facilities and capabilities of Chantier de l'Atlantique,

Circle 73 on Reader Service Card

Cargocaire Introduces Marine Dehumidifier —Literature Available

Cargocaire Engineering Corporation, Amesbury, Mass., a leader in the development and manufacture of desiccant dehumidification systems for 50 years, recently introduced its new industrial HoneyCombe® dehumidifier model HC300. Designed to eliminate the problems of mold, mildew, bacterial growth and corrosion to product manufacturing and storage, the HC300 offers unique safety and cost control benefits for the marine offshore industry.

Cargocaire HC300 controls excessive humidity and provides safe dry storage conditions to protect archives, raw materials, finished goods and other hygroscopic materials from moisture damage.

Featuring state-of-the-art Honeycombe wheel construction, the HC300 dehumidifier provides maintenance-free, energy-efficient desiccant performance for water treatment plants, dry storage, unheated warehouses, injection molding machines, laboratories and film and archival storage.

A major advantage of the Cargocaire HC300 is that it can operate effectively at virtually any temperature without freezing-up like refrigeration-type equipment. According to the company, it also requires less energy to operate than other desiccant-type dehumidifiers.

The HC300 provides a cost-effective, reliable solution to uncontrolled humidity problems with the additional benefits of continuous or humidity-controlled drying performance; no desiccant settling, erosion or attrition; and no bacteria growth.

For free literature detailing the HC300 dehumidifier from Cargocaire,

Circle 111 on Reader Service Card

Marinette Marine Tests MCM-2 Propulsion Plant

The USS Defender (MCM-2), built by Marinette Marine Corporation, Marinette, Wis., recently underwent propulsion trials. She is fitted with four 600-bhp Waukesha main diesel engines, Hansome Electric propulsion motors, and Bird-Johnson shafting and controllable-pitch propellers.

Marinette Marine Corporation, Marinette, Wis., recently conducted a successful pre-operational trial of the mine countermeasures ship USS Defender (MCM-2).

The primary purpose of the trial was to test the propulsion plant under full power and to perform essential combat systems alignment.

The wooden-hulled Defender is equipped with four 600-bhp Waukesha main diesel propulsion plants, one 350-hp Omnithruster bowthruster, two 200-hp low-speed Hansome Electric propulsion motors, and two Bird-Johnson controllable pitch propellers. The 224-foot vessel will be deployed by the U.S. Navy worldwide to sweep and neutralize mines.

Marinette Marine Corporation, as one of two U.S. shipbuilders selected to build the MCM vessel, is a fully integrated shipyard capable of implementing all of the program objectives. Marinette's 70,000-square-foot ship erection building was specially designed and built to accommodate the construction of MCM Class ships. This massive facility is totally dedicated to the construction of minesweepers, and enables Marinette to produce two MCMs simultaneously in an environmentally controlled area.

For free literature detailing the shipbuilding capabilities of Marinette Marine,

Circle 25 on Reader Service Card

Riley-Beaird Changes Name To Beaird Industries —Literature Available

Riley-Beaird, Inc., whose divisions manufacture such marine products as seawater desalinators, heat exchangers, condensers, deaerators and the Maxim® silencer, recently announced that the company has changed its name to Beaird Industries, Inc., Shreveport, La. The move involves no management or operational changes, and the company continues to be owned by Ashland Oil, Inc.

For free literature detailing Beaird Industries' marine products,

Circle 104 on Reader Service Card

New Generator Line From Marathon Electric —Literature Available

Marathon Electric Mfg. Corp. of Wausau, Wis., has introduced a new line of generators to its already existing generator product offering.

According to the company, innovation, reliability, and flexibility describe the new generator MagnaPlus® line of generators. Combining the best features of both the highly respected Lima SER and Marathon MagnaMax® generator lines, the MagnaPlus provides powerful performance, easy installation and servicing for any application with nine models to choose from, ranging from 70 to 280 kw. A top performer in every respect, MagnaPlus features provide a real choice in reliable power generation and make it the ideal generator for marine installations, commercial buildings, hospitals, construction/rental fleets, or systems where all or part of the load is nonlinear.

Committed to electrical and mechanical innovation and specialization, Marathon Electric is dedicated to the design and manufacture of the highest quality electrical products. The company has been manufacturing fractional and integral horsepower motors and generators for over 75 years.

For more information and free literature from Marathon Electric,

Circle 34 on Reader Service Card

Fjellstrand Shipyard Bought By Kvaerner

The Omastrand shipyard of of Norwegian shipbuilder Fjellstrand was recently purchased by Norway's Kvaerner Industrier for about $14.3 million, according to an announcement by the company.

Fjellstrand is one of the leading suppliers of high-speed catamaran vessels for passenger and cargo carriage.

Upon completion of the acquisition, Kvaerner indicated that it intends to merge Fjellstrand's activities with its own.

For free literature detailing the high-speed catamarans built by Fjellstrand,

Circle 92 on Reader Service Card

Kuwait To Reflag Some Of U.S.-Flag Fleet

The Maritime Administration (MarAd) has received a formal request from Kuwait to transfer back to its own flag two huge crude carriers that were transferred to the U.S. flag during the Persian Gulf crisis.

MarAd has received a formal request to transfer the 290,133-dwt Townsend and the 294,739-dwt Middletown from the U.S. flag to the Kuwaiti flag.

The Defense Department indicated that the Kuwaitis also plan to transfer the four 47,471-dwt LPG carriers, the Gas King, Gas Queen, Gas Princess, and Gas Prince, from the U.S. flag to the Kuwaiti flag.

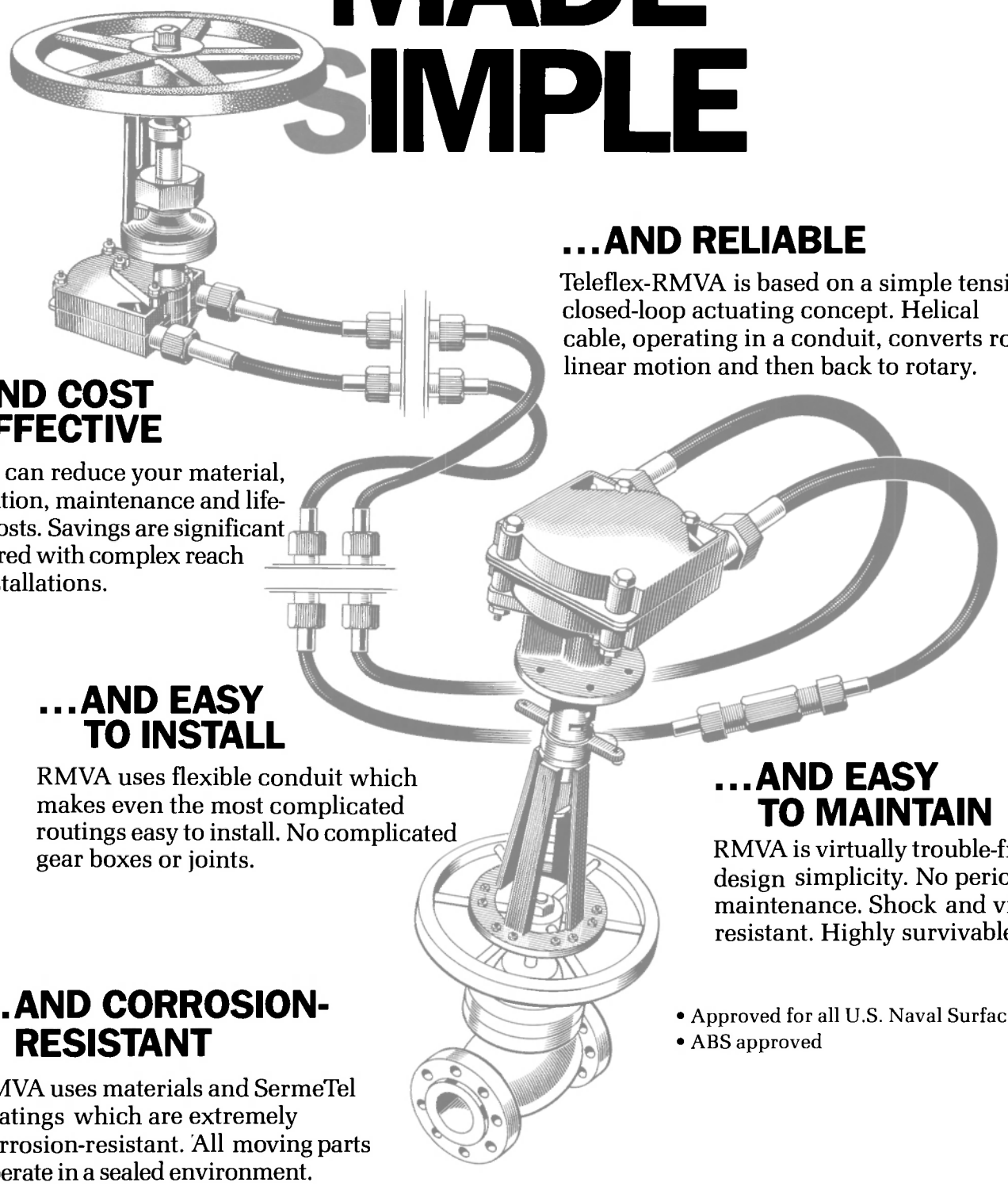
The remaining five vessels, the Bridgeton, Chesapeake City, Surf City, Sea Isle City and Ocean City will stay U.S.-flagged.

At present, these vessels are in the process of complying with U.S. manning requirements. The ships, which have been operating under an exemption, have been given a February 11, 1990 deadline to comply.

HHI To Build Four Containerships For Senator Line

The Ulsan shipyard of South Korean shipbuilder Hyundai Heavy Industries (HHI) recently received an order from the West German shipping company Senator Line to build four 2,000-TEU containerships. The ships will be delivered between June and August 1990.

REMOTE VALVE ACTUATION MADE SIMPLE



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Circle 159 on Reader Service Card

Pan American Hovercraft Offers Color Brochure On New Design Hovercraft

Pan American Hovercraft Corporation, Melbourne, Fla., recently announced it signed licensing agreements with Slingsby Aviation, Ltd., York, England, to market an innovative passenger hovercraft in the U.S., Canada, Latin America and the Caribbean.

Pan American Hovercraft is offering a full-color brochure detailing the 23-passenger SAH 2200 hovercraft. The hovercraft features a hull made of durable, lightweight composite materials with kevlar, and is powered by an air-cooled Deutz MWM diesel engine. The hovercraft has a range of 500 miles, can reach speeds of up to 40 knots, and has removable benches and canopy for customized interiors.

The company reports that the Maryland State Police, Department of Natural Resources, are currently utilizing the SAH 2200 on Chesapeake Bay.

Part of Pan American Hovercraft's agreement with Slingsby is that the U.K. firm will assist, via technology transfer, in the training of Pan American pilots, engineers, marketing and scientific personnel in the U.S. and abroad. Pan American plans to introduce 60- and 120-passenger models in 1989.

For a free copy of the color brochure from Pan American Hovercraft,

Circle 27 on Reader Service Card

Norwegian Shipper Buys Eight Chemical Carriers For Over $200 Million

One of the world's largest chemical tanker operators, Odfjell Westfal-Larsen, Bergen, Norway, recently bought eight chemical tankers from the John Frederiksen Group for over $200 million.

The eight vessels, the Fort Cheetah, Fort Leopard, Fort Lion, Fort Puma, Northern Falcon, Northern Panther, Northern Wolf, and Northern Eagle, will delivered shortly and operated worldwide by Odfjell Westfal Larsen.

Australian Shipbuilding To Construct Three Cargoships For Stateships

Australian Shipbuilding Industries of Perth is to construct three new 302-foot cargoships for Stateships of Western Australia at a cost of $41 million. The vessels will be used for trade to northwestern Australia and Southeast Asia.

The three cargoships, which have more efficient design, smaller crews and lower fuel consumption than current ships and give more flexibility of deployment, will replace larger and less economic vessels.

VPSI Completes Crankshaft Contract

Versatile Pacific Shipyards Inc. (VPSI), one of Canada's largest ship repairers and Sulzer service representatives, recently completed the installation of a new after-section of the crankshaft in the Sulzer 7RD 76 main diesel engine of the bulk carrier Tai Shing.

The 28,387-dwt vessel, owned by Taiwan Navigation, suffered main engine crankshaft failure while transiting the Pacific Ocean en route to the Pacific Coast of North America at the end of last May. She was towed to Victoria on Vancouver Island.

VPSI was awarded the contract valued at C$1.55 million. The new half crankshaft was manufactured by IHI in Japan and delivered to VPSI's Victoria Division during November last year, with final installation and successful trials completed in December.

For free literature detailing the shipbuilding and ship-repairing services of VPSI,

Circle 20 on Reader Service Card

AWO Acclaimed For Quick, Decisive Action To Combat Drought Effects

During last year's drought crisis, the AWO won high praise from the Secretary of Transportation for its efforts to help the barge and towing industry.

"I want to officially commend the American Waterways Operators for an outstanding job in helping to alleviate the transportation impact of the summer's record-breaking drought," wrote the Secretary. "While most media attention was still being focused on the loss of Midwestern crops, your organization began to alert the nation to the enormous impact the drought could have on our country's transportation system. As the drought became more severe, you took the lead in organizing a highly effective joint working group between the industry, the U.S. Coast Guard and the Corps of Engineers. Finally, amidst a groundswell of demands from all sectors of the economy for drought relief, you have stood alone in refusing to turn to the federal treasury to solve your hardship," the Secretary wrote.

The story of the Drought of '88, plummeting water levels due to diminished winter snow and spring rains caused numerous tows to run aground, or be otherwise delayed, particularly on the lower Mississippi. By June, the Coast Guard closed the Mississippi in a number of places, and nearly 2,000 barges were stranded near the confluence of the Ohio and Mississippi Rivers, despite tireless efforts by the Army Corps of Engineers to dredge out bottlenecks. National media attention riveted on the industry's plight. All of a sudden, the low-profile barge and towing industry on the inland waterways was in an extraordinary struggle with nature, and doing so on network television.

For a brief period last summer, the Drought of '88 choked some of the key arteries of water commerce. The Corps of Engineers worked hard. The Coast Guard worked hard. The barge industry worked hard. However, there was little coordination. The three entities remained organized for normal operations, not the rapidly unfolding crisis. This is the story of how this very bad situation got very much better.

On June 21, with water levels falling, AWO urged the Drought Task Force to examine using diverted water from the Great Lakes to raise the level on the Illinois Waterway and the lower Mississippi, "so that a national catastrophe can be averted," should the drought deteriorate to that crisis point. AWO received coverage on network television and in major newspapers for its proposal. Soon thereafter, AWO telegrammed its midcontinent member barge lines, requesting estimated financial losses and seeking information on operating conditions to help the Association respond to inquiries from the Executive and legislative branches, and from the media.

As the situation worsened, Assistant Secretary of the Army **Robert W. Page** requested that AWO staff accompany him on an aerial inspection of the most hard hit areas, to assist in formulating appropriate emergency measures, and on June 28, the White House Task Force agreed to AWO's request that the government clarify its legal authority for releasing water from the Great Lakes. The White House also asked AWO to provide it with preliminary economic impact data, with a summary of operating problems, and with other suggestions to mitigate the increasingly devastating drought.

By June 29, the Ohio River was closed at the approach to the Mississippi, as was the Mississippi River at Memphis, Greenville and Vicksburg. Groundings and blockages were occurring almost hourly, and the Coast Guard and Corps of Engineers struggled relentlessly to keep up with the effects of the rap-

idly falling water. Every dredge available to the Corps of Engineers was deployed. The Coast Guard imposed limits on tows of 16 barges, and a draft restriction of 8.5 feet—a hundred tons of cargo less than normal. System-wide, cargo was taking more than twice its usual time.

At an emergency meeting of 45 inland barge lines in St. Louis, in a historic and unprecedented move, at AWO's urging, industry leaders elected seven of their colleagues to form the River Industry Executive Task Force (RIETF), to work with the highest levels of the Corps and Coast Guard to cut red tape, cross jurisdictional lines, and otherwise make major business policy decisions for the entire industry. They established a FAX-based industry communications network for instantaneous communications. AWO also contacted the Congressional Drought Task Force and provided information on the drought's impact on water transportation.

Just two days later, AWO brought together in Memphis the RIETF with the highest level Corps and Coast Guard officials. At AWO's urging, the three entities formed a joint, top-level ad hoc group to manage the effects of the drought on America's great inland river system.

Almost immediately, things began to improve vastly.

A system-wide communications network was established that provided accurate operational information to all involved. AWO's formation of the RIETF and its work to convince the government too participate in such a joint high-level policy group was a key to the success of the effort. At the same time, AWO's efforts to secure an Associated Press wire story on the formation of the RIETF helped to centralize and channel media inquiries to AWO's offices.

On July 11, AWO informed the White House about the Joint RIETF/Corps & Coast Guard Committee and designed an economic impact study. The firm of Booz-Allen Hamilton was commissioned to receive and organize the data, and AWO requested that a large sample of its membership submit fully confidential economic revenue loss information. AWO members were immediately responsive.

AWO testified before the Senate Subcommittee on Merchant Marine on July 14, outlining preliminary economic industry losses, noting the work of the RIETF, and pressing for support of AWO's call to clear the legal decks for Great Lakes water diversion. Assistant Secretary of the Army **Robert W. Page,** and co-chair of the White House Drought Task Force wrote AWO that "your organization's initiative to form a group of senior-level executives from the barge and towing industry to interface with federal agencies involved in drought management is on target."

Similarly, Maj. Gen. **Thomas A. Sands** wrote that "the group will be of much benefit to the Army Corps of Engineers and the U.S. Coast Guard ... and I particularly applaud the effort of the industry to form a group of industry executives who will speak for the industry." Adm. **Paul A. Yost,** Commandant of the USCG, wrote that "our joint industry/government relationship will keep the rivers open throughout the summer."

The Joint RIETF/Corps & Coast Guard Committee met again in St. Louis on July 15 and successfully settled a number of major policy problems including the operation of special convoys and improvements in the system-wide electronic communications network. Soon thereafter, on July 18, a letter from the chairman of the White House Task Force assured AWO that all aspects of AWO's proposal to clear away legal obstacles to diversion of Great Lakes water to the Mississippi were being fully explored.

In a conference call with the Association's Executive Committee on July 27, AWO advised its members that the Booz-Allen Hamilton study indicated that the economic losses would be as high as $150-$200 million between June 15 and the end of September. Even so, the Association decided not to seek federal drought relief. At a heavily attended news conference in August 1, AWO revealed the economic impact information and its decision to reject federal aid. AWO president **Joe Farrell** said at the news conference: "This is the free enterprise system, sometimes you succeed; sometimes you don't. When you don't, you

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shouldn't turn to the federal government to bail you out."

As crisis management continued to improve, the Joint RIETF/Corps & Coast Guard Committee met again in St. Louis on September 1 and made the decision to remove mandatory navigational and operational restrictions on industry. Less than one month later, AWO received a letter from Assistant Secretary of the Army **Robert W. Page** noting that " ... without the intense, devoted cooperation of you and your people in bringing together a consolidated effort, I am sure we would have reached a point that there would have been a national catastrophe."

On October 18, the Joint RIETF/ Corps & Coast Guard Committee met to engage in long-range planning to prepare for the spring navigation season. In that second industry summit, the industry decided to maintain the RIETF as a high-level emergency response policy group.

And on February 22, 1989, the first RIETF meeting took place in St. Louis to prepare an operations plan and coordinate industry, Corps and Coast Guard preparedness. This year, the industry and AWO will be ready for the worst, and praying for the best.

Overall, AWO members worked in an unprecedented cooperative effort during the Drought of 1988. Much more important than how difficult the last summer was, is the story of how successful the barge industry was in surmounting the operational and commercial obstacles brought about by the drought, and how successful the barge industry was in turning what could have been an operational and public relations disaster into a shining success.

CABOTAGE: IN THE INTEREST OF NATIONAL DEFENSE AND COMMERCE

By Joseph Farrell, President
American Waterways Operators

Joseph Farrell

The cabotage laws of the United States...essentially the Jones Act...are rooted in national security considerations. Even though they inescapably have economic consequences, those consequences follow the primary purpose of the Jones Act, which is to form a part of the U.S. defense in a time of a limited (non-nuclear) war. This is best illustrated by quoting from the first section of the Merchant Marine Act of 1920, which embodies the Jones Act, entitled "purpose and Policy of the United States," which states, "It is necessary for the national defense and for the proper growth of its foreign and domestic commerce that the United States shall have a merchant marine of the best equipped and most suitable type of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency, ultimately to be owned and operated privately by citizens of the United States."

Therefore, the Jones Act should be viewed by us as American citizens first, then from the narrower perspective of barge and towing industry executives whose vision is understandably distorted by seeing the Jones Act through commercial spectacles.

AWO has a venerable policy to oppose any attempt to retreat from the Jones Act. There is some irony here because AWO's policy is no doubt rooted in the economic or commercial interests of AWO's members. However these interests are divided. No wonder there is confusion: people whose bottom line depends in some measure on the Jones Act strongly defend a statute which was enacted principally for national defense.

With respect to national defense, it is sometimes argued that the barge and towing industry's vessels are not material to the Jones Act because they aren't fit to travel across oceans and perform a service in combat. This argument usually refers to inland river barges. But, it ignores a policy decision of the United States fundamental to its security...embedded in its cabotage laws...that supplying the war effort within the United States (coal to electric generating stations, coking coal, feedstocks for plastics and munitions, jet fuel, and so on) must not depend upon alien vessels, alien crews, and the like. Such services are surely more in demand during a conventional crisis, whether that is global or in a region like the Middle East. Thus, in this larger context, we understand why the Jones Act has no geographic boundaries. It does not apply any more or less to coastal equipment than it does to inland river equipment. All marine assets are deemed necessary to the effort, and are included under the Jones Act.

Those facts framed AWO's work on the Jones Act issues in 1988, and point to the challenges in 1989 and beyond.

In September of 1986, AWO first began efforts to close a loophole in the Jones Act which allowed the city of New York to construct four barges in Singapore for the disposal of sewage sludge 106 miles off the coast of New Jersey. Because this material has no value, and the disposal site was considered a point in the United States, this movement, according to the U.S. Customs Service, which has enforcement authority for the Jones Act, did not come under the jurisdiction of the cabotage statute. Legislation introduced late that year to correct the situation was not acted upon, but was reintroduced in the next Congress in early 1987. The road to enactment of this legislation was long and tumultuous, but finally was cleared by both the House and the Senate and signed by the President on June 7, 1988.

On other Jones Act issues, AWO, despite considerable pressure, rei-

terated its vehement opposition to proposals which would allow foreign-flag vessels to transport commodities such as timber and coal.

Without question, the greatest threat to the Jones Act which emerged in 1988 was the purchase by Japanese entities of an American corporation with an inland barge line subsidiary. This purchase has caused an explosion of litigation, and regulatory and legislative activities. If this precedent is allowed to stand, it would blow a huge hole in the Jones Act. Stating a complex case in simple terms, the Japanese owners of the inland barge line propose to operate that barge line as a full U.S. citizen, permitted complete freedom to compete with U.S.-owned companies for commercial cargoes. Their reasoning is based upon their magical interpretation of an amendment to the Jones Act (the so-called Bowater Amendment) which permits narrow exceptions to the U.S. cabotage law, far more restrictive than the Japanese propose.

As of now, this issue is unresolved, and is being contested in five forums: the courts, the Congress, the Coast Guard, the Customs Service and the Maritime Administration. AWO is active in all five, as an amicus curiae in the court case, and as a leader in the other four. AWO's goal is to see to it that the law is upheld with the foreign-owned inland barge line limited in its operation to proprietary carriage, as was Congress's intent in enacting the Bowater Amendment, and to dissolve any ambiguity in the statute which might exist in order to keep the Jones Act impervious to these magical assaults.

As long as the United States "Jones Act Trade" remains seductive to foreign interests, we can expect all forms of imaginative attempts to breach it. AWO must and will counter these foreign forays with determination, skill and energy, and with an objective eye to the changing world within which we exist.

SUCCESS ON TAX FRONT DOMINATED 100TH CONGRESS

by Dena L. Wilson
Vice President - Legislative Affairs
American Waterways Operators

The federal budget deficit, a problem of enormous scope and magnitude, has led tax administrators at all levels of government to create new and innovative ways to increase revenues. The tug and barge industry has been particularly hard hit. The states, to make up funds no longer provided by the federal government, are becoming increasingly more aggressive in taxing waterway operators. In addition to navigation user taxes, we have been confronted with a wide array of state and federal fuel taxes and general corporate tax requirements. The tug and barge industry, in simple terms, is in a blizzard of taxes.

AWO focused much of its efforts in 1988 to reversing federal tax initiatives. One of the association's goals for 1989 is to increase its visibility and effectiveness on issues within the jurisdiction of the tax-writing committees of Congress—the House Ways and Means Committee and the Senate Finance Committee. AWO will be closely monitoring deficit reduction proposals in all forums which could impact water carriers. Additionally, the AWO Board has directed the staff to pursue legislative relief from discriminatory state taxation. Such legislation would extend to water carriers the protections afforded to the rail, aviation and motor vehicle industries.

In 1988, the industry found itself in a particularly difficult bind. As a result of a budget bill Congress passed in late 1987, in part aimed at blunting the shock of the October market crash, tug and barge operators found themselves paying millions of dollars in taxes they did not owe. The Act included a provision requiring all off-highway users of diesel fuel to pay, at time of purchase, 15.1 cents per gallon in highway taxes and then apply for an interest-free refund of those taxes from the Internal Revenue Service. This provision, effective April 1, 1988, imposed a staggering cash flow burden on the waterways industry. As a result, AWO generated one of the largest outcries of grassroots outrage and targeted media coverage in its history. Although this upfront payment requirement ceased as of January 1, 1989, it proved to be a bureaucratic as well as economic nightmare.

Dena Wilson

For Congress to suddenly require off-highway users of diesel fuel to pay taxes they do not owe is attributable to the federal deficit. By having this tax collected upfront from all users of diesel fuel, the federal government was able to claim this windfall as income and count it toward deficit reduction. It was an unfair and inequitable way to force waterway operators and others to float an interest-free loan to the government.

AWO worked hard to get the 1987 law changed. In January 1988, AWO immediately began contacting its friends on Capitol Hill seeking repeal. As other industries became aware that they too were required to pay this tax—farmers, the construction industry, drilling contractors, coal miners, quarry operators—a strong coalition began to form. AWO was one of the coalition's most active participants.

In February 1988, AWO initiated

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the first in a series of carefully targeted education efforts aimed at bringing the situation to the attention of (1) members of the tax writing Ways and Means and Finance Committees with waterway constituents; and (2) members of Congress not on these committees but representing waterway districts or states. Industry response to this initiative was unprecedented. As Congressional constituents sent letters by the hundreds, optimism grew. Members of the Senate Finance Committee became more outspoken in their opposition to the provision they had passed several months before. Senator **Lloyd Bentsen** (D-TX), Finance Committee Chairman, in March reported out legislation intended to allow all off-highway users to purchase diesel fuel tax free. However, without action by Ways and Means Committee Chairman **Dan Rostenkowski** (D-IL), the Senate Finance Committee bill was stalled.

To complement its legislative activities, AWO mounted a public affairs program both in Washington and at the grassroots level. As a result, many articles and editorials appeared in newspapers throughout the country, calling on Congress to change this unfair law. AWO took action to assure that members of Congress were aware of the media attention this issue was generating.

Finally, in mid-summer, the House moved a bill making technical changes to certain tax laws. Included in the bill was the relief we were seeking: off-highway users of diesel fuel would be allowed to purchase that fuel tax free.

The senate Finance Committee once again endorsed the diesel fuel tax fix several weeks later, and it was soon approved by the full Senate.

A great deal of work still remained to secure the fix. Other provisions of the House and Senate bills were contentious, and members of the House and Senate assigned to develop a compromise bill seemed unable to resolve these differences. Negotiations frequently broke down and agreement on a final package came down to the final hours of the 100th Congress. But the hard work paid off, and President **Reagan** on December 13, 1988, signed into law legislation to allow tax-free purchase of diesel fuel beginning January 1, 1989.

On another tax front, one of the more publicized "reforms" of the 1986 Tax Reform Act was elimination of 100 percent deductibility for business meals and entertainment—the so-called "three martini lunch." However, Congress drafted this provision so broadly that it inadvertently applied to meals provided to crew members on vessels. The House technical corrections measure mentioned above included language to restore full deductibility for crew meals as a result of AWO's work. However, there was no companion provision in the Senate. AWO and a maritime industry coalition concentrated efforts on members of the House and Senate who would be negotiating a compromise bill. Despite the strenuous objections of the Treasury Department, the final bill allows 100 percent deductibility of meals provided to crew members on vessels.

AWO was also involved in many legislative areas other than tax issues, of course. The whole issue of cabotage, and the industry's work in the environmental arena played a major role as well. These two key areas are covered in-depth elsewhere in this special *Maritime Reporter* AWO Annual edition.

A brief review of some of the other legislative matters which commanded the attention of both AWO's members and staff might be useful. At least one mark of a good trade association is its ability to juggle a considerable number of matters of interest to its members.

As part of its war on drugs, the Reagan Administration instituted a new policy called "zero tolerance." This policy allowed immediate seizure of a commercial vessel or recreational boat if any amount of drugs are discovered on board, regardless of whether or not the vessel owner or operator is aware of the drugs. While AWO member companies strictly prohitit drug use, immediate vessel forfeiture, with no defense, places tug and barge operators at great risk.

AWO worked closely with the House Merchant Marine and Fisheries Committee to amend this flawed policy to protect the rights of the innocent owner while not frustrating the legitimate efforts of law enforcement agencies. The language ultimately adopted by Congress as part of the omnibus drug bill provide limited protection for a vessel owner/operator who is "innocent" of knowledge that drugs are present. While it does not permit seizure of a vessel, it does provide expedited procedures for securing return of the vessel. Election year politics and the fear of appearing "soft on drugs" caused many members of Congress to shy alway from supporting a more reasonable approach to zero tolerance.

In another area, the 100th Congress returned to a two-year cycle of authorizing water resources projects by passing and sending to the President S.2100, signed into law in November. In comparison to the 16-year stalemate over water project construction and funding which culminated in the 1986 enactment of landmark legislation, P.L. 99-662, development of the 1988 bill was a much smoother process. The Administration worked closely with Congress on this new bill to assure adherence to the principles of P.L. 99-662: non-federal cost sharing and specific eligibility criteria for projects. This legislation, now P.L. 100-676, authorizes construction of the Olmsted project, which will replace Locks 52 and 53 on the lower Ohio River. The Olmsted project is considered a priority by the Inland Waterway Users Board, an advisory group of waterway carriers and shippers established under P.L. 99-662 at the urging of AWO. The Users Board is empowered to advise Congress and the Administration on inland waterway funding priorities.

In the area of international trade, AWO is monitoring the ongoing negotiations aimed at reaching a new international GATT (General Agreement on Tariffs and Trade) agreement. AWO members have reason to be concerned about the impact of these trade negotiations on its future. In the summer of 1987, the U.S. trade officials attempted to bargain away domestic cabotage laws in negotiations on a U.S.-Canada Free Trade Agreement (FTA). Despite the outrage by a united maritime industry and by Congress, trade officials refused to remove maritime services from the scope of their negotiations. Ultimately, the industry prevailed. But once again, U.S. negotiators refuse to remove the industry from the GATT agenda. Industry and Congress are gearing up for what could be a major confrontation.

WORKING TOWARD CLEAN AIR AND CLEAN WATER

By Thomas A. Allegretti
Vice President-Operations
American Waterways Operators

AWO has long been a responsible leader in the environmental effort to achieve clean air and clean water in the United States. One might first be surprised by that statement, but thinking about it for a moment, those who know AWO well will emerge with the image of an industry and its association which have consistently sought and supported laws and regulations designed to enhance environmental quality. That tradition continued in 1988, and will go on, a commitment by those whose lives depend upon America's precious water resources.

Thomas Allegretti

AWO's record of environmental support traverses a wide range of issues with which the industry has dealt, from those easily identified as environmental matters to those which first appear to be purely maritime. What one must never forget is the fact that the barge industry's operations are conducted squarely in the marine environment. Therefore, each effort this industry makes to strengthen licensing requirements, upgrade training of its personnel, rid the system of intoxicants, or enhance marine safety is every bit as much an environmental initiative as seeking to curb oil spills, prohibit the disposal of plastics and solve the ozone attainment dilemma. The barge industry's consistent position on all these matters has been to strongly support those practices and requirements which will make meaningful contributions to marine safety and environmental protection.

For example, AWO's Task Force on Vapor Emissions continued to provide broad leadership in the federal, state, and local government debates on appropriate ways to address the intractable nature of ozone pollution. AWO pursued three primary objectives in its activities on this subject in 1988.

The objective of perhaps most urgency was to stop premature efforts by the states to impose vapor recovery requirements on marine loadings in advance of federal standards for safety and uniformity. These state efforts had the clear potential to create very dangerous operations which could lead to catastrophe.

AWO conducted extensive advocacy campaigns in New Jersey, Louisiana, and the San Francisco Bay area to bring to the attention of both regulators and the public—through the media—the foolishness of imposing vapor recovery regulations before federal safety standards are in place. In all three locales, that effort was successful in assuring that federal safety regulations will be in effect for at least a year before recovery regulations become operative, to allow time for final equipment design and installation.

The second major goal AWO pursued in 1988 was to achieve the development of federal standards which fully meet the need to assure safety and uniformity, but which do not unduly limit system flexibility or establish unreasonable equipment burdens. That objective was in jeopardy on more than one occasion during the year. However, the combination of providing information which illustrated the need to maintain system flexibility, demonstrating the lack of need for automated shutdown systems, and effective participation by AWO members, resulted in adoption of safe, uniform, and reasonable standards by the Chemical Transportation Advisory Committee late last year.

The third and final objective is well underway, but undone, and will occupy the industry into 1989 and beyond. It is the effort to turn state regulators and their federal superintendents in EPA away from regulation for regulation's sake, and towards regulations based on a comprehensive record which will have a material and beneficial effect on the ozone problem. AWO's experience in each of the states considering regulation reveals that the regulators are driven to regulate without first demonstrating the need to regulate. Moreover, research conducted by Booz-Allen and Hamilton for AWO's Vapor Emissions Task Force which shows that regulation of this industry will not contribute to meeting federal ozone standards has been largely ignored by the states as they attempt to demonstrate to EPA good faith efforts to meet the standard and thereby avoid federal sanctions.

The ultimate answer to this unguided regulatory situation in the states is to preempt their jurisdiction over marine loadings and substitute in its place federal responsibility for the development of regulations which have first been shown to be safe, appropriate and necessary.

On another environmental front in 1988, AWO strongly supported the start up of Annex V of the International Convention for the Prevention of Pollution by Ships which essentially prohibits the overboard discharge of plastic materials and specifies the distance from shore that all other materials may be discharged. The proposed regulations apply to all marine craft on the navigable waters of the U.S. and within 200 miles of its shores.

AWO has long supported this initiative. Anticipating regulations to implement the Annex, our Board of Directors voiced strong support for its objectives in 1987, asking the Association to examine the proposed rulemaking to assure that its provisions are practical. In addressing the Annex with the Coast Guard, AWO strongly supported both the objectives of the Annex, and the manner in which the Coast Guard sought to assure that they be attained.

In the area of tankermen regulations, AWO's members have contin-

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ued to urge the Coast Guard to move forward with the new federal regulations governing the training and certification of tankermen. Most feel that many of the cargo spills which take place during transfer operations are the result of human error. Better training and more rigorous certification standards therefore seem to be a proper way to address this problem, and the barge industry has been at the vanguard of calling for a regulatory project that does so. As a result, the Coast Guard has agreed to move this project forward as a priority matter and a regulatory proposal is expected early in 1989.

In the Congressional area, AWO has long supported legislation to establish an oil spill cleanup and compensation fund to replace the four existing specialized funds. The predicate for that support is the preemption of state requirements, the provision of reasonable limits of liability, and the compensation of legitimate victims of oil spills. That position continued in earnest in 1988.

While there is strong support in the Congress, in environmental quarters and industry for enactment of comprehensive oil spill legislation, the components of the proposal remain contentious and diverse. As we did in 1988, AWO will continue to promote balanced legislation which enhances the protection of the marine environment without robbing consumers of the benefits of low cost barge transportation.

Related to environmental concerns, certainly, is the transport and handling of hazardous material. As part of the nation's concern for the environment, transportation systems used to move hazardous materials are receiving increased attention. Congress, in 1989, will consider legislation intended to impose additional regulation on hazardous material transportation. It is essential that AWO inform federal and local lawmakers of the emphasis the tug and barge industry places on safety, and the highly specialized and regulated equipment used to transport these cargoes.

An industry and a trade association with an enviable record of environmental protection? Absolutely. Examine the industry's position on any matter of direct or indirect environmental consequence any time in recent memory. The environmental conscience of this industry—its support for the preservation of the waters on which it operates—is unmistakable.

Does that mean that our position aligns consistently with that of purely environmental organizations that claim to carry the mantle of clean air and clean water? No, not any more than the position of the pure environmentalists always coincides with the industry's point of view. Debate and balance; those are the keys to sane environmental policy. The longstanding position of care for the environment in which we work remained a hallmark of AWO in 1988. It will continue to guide us this year and beyond.

WHY YOU SHOULD JOIN AWO

The American Waterways Operators AWO) is the only association representing the national interests of the domestic inland and coastal tug and barge industry. Reflecting its national character, AWO's 300-plus member companies are located along the banks of all major U.S. waterways, and on the shores of the Atlantic, Pacific, and Gulf Coasts. AWO represents an industry that operates a massive fleet of over 7,500 coastal tugboats and inland river towboats, and over 32,000 barges. The association's network of influence spans the United States from Florida to Alaska, and from Minnesota to Louisiana.

Since AWO's founding in 1944, it has worked to define, support and promote its members' interests and operations. This association of the nation's tug and barge industry leaders also directs its efforts toward achieving a greater public awareness of the marine transportation industry's contribution to the American economy. AWO considers as its primary task to function as an informed and persuasive voice to the federal government, in the media, and when necessary, before the courts, speaking for the collective interests of its membership.

The membership of AWO includes segments of the inland and coastal barge and towing industry, including tugboat, towboat, and barge operators, and the shipyards that build and repair the industry's vessels. The association's ever-growing Affiliate membership is comprised of suppliers, manufacturers, insurers, bankers, and other associations and businesses concerned with the marine industry.

The association's members meet regularly, at least three times a year at national conventions, and also on a regional basis. Clearly, AWO is not just another "chowder and marching society," but instead is comprised of industry leaders who meet to discuss, deliberate, and act in an effective and productive way that will enhance the industry's business position. AWO is a tough, no-nonsense organization of allied businesses joined together with the purpose of collectively promoting, protecting and defending their industry.

As the leader of the barge and towing industry, AWO assumes the responsibility not only for monitoring and interpreting actions which may affect the association's members, but also of anticipating important developments and responding to them in a timely and effective manner. AWO provides its members with up-to-date reports on issues of concern, speaks out, during the key developmental stages, on legislative and administrative proposals affecting the industry. The association's main objective is to demonstrate to national policy makers and the general public that barge commerce is a safe, fuel-efficient and cost effective method of transportation that plays a vital role in the nation's integrated transportation system.

Those interested in learning more about membership in AWO, the nation's tug and barge industry association, should contact: The American Waterways Operators, 1600 Wilson Boulevard, Suite 1000, Arlington, Va. 22209; Telephone: (703) 841-9300; and fax: (703) 841-0389.

AWO Annual Meeting To Be Held In Washington, D.C. April 6-7

The Annual Meeting and Spring Convention of the American Waterways Operators (AWO) will be held April 6-7, 1989, at the Washington Court Hotel, Washington, D.C. Hundreds of AWO members will attend the meeting for the election of association officers and for close interaction with decision-makers in Washington.

This year, the annual meeting and spring convention is comprised of a full agenda of business and social events. On Thursday, April 6, AWO Committees meet in morning and early afternoon sessions to discuss and debate key industry issues. These meetings include the following committees: Regulatory; Legislative; Public Affairs; Corps of Engineers Liaison; and Health, Safety and Training. AWO emphasizes that attendees do not have to be members of the respective committees in order to participate in the meetings. On Thursday afternoon, AWO will elect its officers and directors for 1989 and, following that meeting, will host a cocktail reception in honor of the Honorable **Sam Skinner**, the new Secretary of the Department of Transportation.

Friday, April 7, kicks off at a 7:30 a.m. breakfast with an address by **Hobart Rowen**, chief economics correspondent for *The Washington Post*. Mr. **Rowen** is one of the premier economics writers and analysts in the world, and his opinions and projections are closely watched by decision-makers everywhere. He will be providing AWO members with his perspective on the economic outlook under the President **Bush**.

Following breakfast, the AWO board of directors meeting gets under way with an extremely full agenda including discussions and debate on strengthening and maintaining the Jones Act, a review of new pro-environmental initiatives taken by the tug and barge industry, and discussion of the Department of Transportation's drug testing policy, to name a few key issues.

This 1989 annual meeting and spring convention will provide an excellent opportunity for members to be brought up to date on current issues of the association and to become involved in the efforts of AWO. All directors, designated representatives and alternates, committee members, directors emeritus, American Waterways Shipyards Conference members, and other individuals from AWO member companies are encouraged to attend. For further information on the meeting, call (703) 841-9300.

Muller Appointed Assistant VP-Operations At Moran Towing

William P. Muller has been appointed assistant vice president of operations of Moran Towing & Transportation Co., Inc., according to **Thomas E. Moran**, chairman and chief executive officer of the company.

Mr. **Muller**, who will be based in company headquarters in Greenwich, Conn., is a graduate of the State University of New York, Maritime College, Fort Schuyler, Bronx, N.Y.

An executive with the Moran organization since 1977, Mr. **Muller** started with the company in the New York sales office. He also held positions in operations, special projects, labor relations and subsidiary management. In 1980, he was appointed assistant vice president of Florida Towing Co., and in 1982 he became vice president and general manager. Moran's Jacksonville operating company has since been renamed Moran Towing of Florida, Inc.

While in Jacksonville, Mr. **Muller** was active in both maritime and civic affairs. He served as president and member of the board of directors of the Jacksonville Marine Institute, an organization for disadvantaged youth. He also was an active member of the Propeller Club and the Chamber of Commerce.

Key Appointments At Great Lakes Dredge

Witt Barlow, president of Great Lakes Dredge & Dock Company, an Oak Brook, Illinois-based dredging and marine construction firm, recently announced the appointments of three vice presidents and an assistant chief engineer.

The Board of Directors of Great Lakes Dredge & Dock has elected **Richard M. Lowry, Bruce J. Biemeck,** and **Steven F. O'Hara** to the office of vice president.

In addition, the company announced the appointment of **John F. Karas** to assistant chief engineer.

Literature Available On Circle Seal's Plastic Inline Check/Relief Valves

The new BIVCO 6000 Series Inline Check Valves from Circle Seal Controls, Anaheim, Calif., utilize chemically inert, all-plastic bodies and poppets to provide long, dependable service in corrosive liquid or gas systems.

The choice of body materials for the new series includes Teflon®, PCX, Kynar®, and Polypropylene. The materials offered make these valves ideal for applications in systems carrying such corrosive fluids as hydrochloric acid, deionized water, sulphuric acid, chlorine gas and liquid. The valve bodies can be supplied reinforced with metal bands and jackets to provide service with fluid pressures to 500 psi.

The BIVCO 6000 Series operating principles require minimum cracking pressure to provide instant response. A variety of Teflon-coated, 316 stainless steel springs are available for cracking pressures from 0.5 (standard) to 150 psi.

These valves are available in sizes for 1/4-inch to 2-inches NPT female pipe. They can also be supplied with 150-pound, raised face flanges for line sizes of 1-inch, 1-1/2-inches and 2-inches. BIVCO 6000 Series valves may be installed in any position when springs are installed.

For more information and free literature from Circle Seal Controls,

Circle 58 on Reader Service Card

New Commuting Service Begins Between New Jersey And New York

TNT Hydrolines, Inc., Wayne, N.J., recently took delivery of an 80-foot, high-speed catamaran, TNT Express I, to be used for commuting and excursions in New York Harbor. The vessel, one of the first catamarans to be used for commuting in the area, will carry passengers to and from Monmouth Country, N.J., and New York, and can be used for excursions and private parties during midday hours and on weekends.

Seating capacity of the TNT Express is 220 passengers, which expands to a total of 265 when outdoor seating is utilized.

Built by Gladding-Hearn Shipbuilding, The Duclos Corporation, TNT Express I was designed by **Philip Hercus** of International Catamarans Pty., Ltd. of Sydney, Australia. It is powered by two 12-cylinder Deutz MWM diesel engines which give it a 29-knot capability. The twin hulls are designed to provide a near wakeless ride and great stability in all kinds of weather.

TNT Hydrolines, Inc. is a subsidiary of TNT Limited, the worldwide transportation group.

For free literature giving full information on the facilities and capabilities of Gladding-Hearn Shipbuilding,

Circle 68 on Reader Service Card

For more information and free literature on Deutz MWM diesel engines,

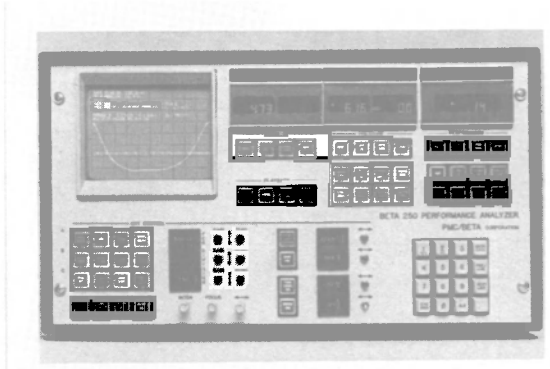
Circle 69 on Reader Service Card

Korean Yard Receives $36-Million Order To Build Two Feeders

South Korean shipbuilder Dong Hae Shipbuilding recently received an order estimated to be worth $3 million to build two feeder containerships for Regional Container Lines (RCL).

The two ships, which will be delivered at the end of this year and the beginning of 1990, respectively, will each have a capacity of 1,248 TEUs, and will be deployed on RCL's Singapore-to-Thailand route.

New Engine Analyzer Reduces Fuel Costs On Marine Diesels —Literature Available



The BETA 250 Engine Analyzer helps an operator determine the condition and efficiency of main propulsion engines and ship service diesel generators.

The new BETA 250 from PMC/BETA Corporation, Natick, Mass., is a dedicated, microprocessor-based marine engine analyzer that enables an operator to determine the condition and efficiency of main propulsion engines and ship service diesel generators. The company reports this can result in 5 to 15 percent lower fuel costs, reduced maintenance costs and increased engine output.

The data furnished by the BETA 250 enables more accurate loading and tuning of engine cylinders to improve operating efficiency. Also, the early detection of mechanical flaws such as broken or cracked rings and improperly operating valves permits corrective action before such flaws cause needlessly expensive repairs and reduced efficiency.

Cost benefits are accrued through: (1) determination of cylinder combustion efficiency by evaluating cylinder pressure versus crank-angle diagrams and by measuring cylinder HP, MEP, peak pressure and angle of peak pressure; and (2) evaluation of the output of vibration and ultrasonic transducers versus crank-angle to determine mechanical condition.

A four-trace CRT displays cylinder pressure versus volume diagrams, pressure versus crank-angle diagrams, and vibration or ultrasonic versus crank-angle.

In addition to the CRT displays, five digital panel meters display such cylinder performance information as rpm, peak pressure, angle of peak pressure, horsepower and mean effective pressure.

An instant replay capability lets users capture, store and playback, one frame at a time, the pressure data from the 16 most recent engine revolutions. Thus, the P-V curve of a particular engine revolution can be displayed and analyzed as in real time.

For free literature detailing the BETA 250,

Circle 93 on Reader Service Card

American United Marine Wins Achievement Award For TFC Compactor Sales

Show above during presentation of the Top Achievement Award in 1988 are, left to right: **Peter Lombard**, president, and **John Lombard,** vice president, AUMC, and **Larry Kline,** national accounts manager, TFC Corporation.

American United Marine Corp. (AUMC), Saugus, Mass., has been awarded the Top Achievement Award in 1988 by TFC Corporation, Minneapolis, Minn., for sales of Pollution Packer waste compactors to the maritime industry.

The award was presented to **Peter** and **John Lombard**, principals in The Saugus firm.

The TFC Corporation has been involved in maritime compactor applications for nearly two decades with installations in U.S. Navy and Coast Guard ships as early as 1974.

Subsequent maritime sales for these compactors have included offshore oil rigs and U.S. foreign merchant ships. The worldwide popularity of the Pollution Packer line is due, in part, to these machines' ability to cube, bag, and box wet and dry wastes in sealable packages and to bale cardboard wastes as well.

Recent design advances in the maritime models feature a rugged, "heavy seas" Door Stop and also a "Sea Legs" package to facilitate deck installations.

The AUMC firm has its headquarters in Saugus and operates sales and service offices in New York City and Baytown, Texas.

For more information and free literature from AUMC,

Circle 50 on Reader Service Card

South Seas Catamaran To Build Two Passenger Catamarans For Use In U.S. Virgin Islands

Boatbuilder South Seas Catamaran, Inc., Cape Coral, Fla., which specializes in the construction of U.S.-designed catamarans, has received an order to build two 53-foot passenger catamarans for the Virgin Grand Hotel, St. John, U.S. Virgin Islands.

The catamarans, which will each have a beam of 16 feet 6 inches and draft of 3 feet, will be used for multipurpose shuttle, dive and dinner service. The two vessels, the M/V Grand Style I and M/V Grand Style II, will have U.S. Coast Guard Certificate of Inspection for 96 passengers, as well as international SOLAS Certification.

Each vessel will be powered by two Detroit Diesel 6-71 TI diesel engines, supplied by John & Towers, driving through Capitol 1.5:1 ratio down-angle gears. Powered by the 430-hp low-fuel-consumption engines, the catamarans will be able to reach speeds of over 25 knots.

For free literature fully detailing the boatbuilding services of South Seas Catamaran,

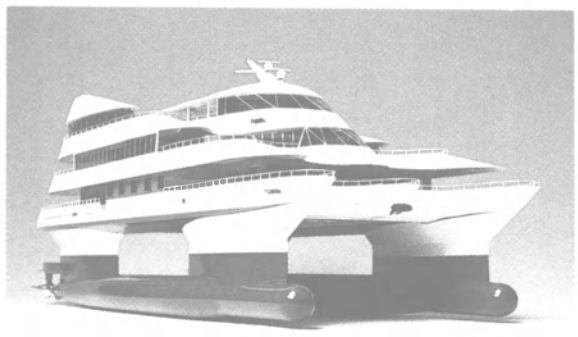
Circle 21 on Reader Service Card

"GRAND STYLE CLASS" CATAMARANS

Main engines (2)	Detroit Diesel
Gears	Capitol
Propellers	Michigan Wheel
Engine controls	Morse
Steering systems	Hynautic Marine
Radar	Furuno
VHF radio	ICOM
Loran	Furuno
Depth sounder	Furuno
Compasses	Ritchie
Sewage treatment	Sealand
Bilge pumps	Rule
Anchor windlass & capstan	Galley Maid
Anchors	Danforth

First U.S. Commercial SWATH To ABS Class Under Construction —Color Brochure Offered

Maritime Reporter Staff



Model of the possible final configuration of the Navatek I.

The first U.S. commercial SWATH (Small-Waterplane Area Twin-Hull) vessel, the 500-passenger ferry Navatek I prototype, to American Bureau of Shipping Class is being built by Pacific Marine, Honolulu, Hawaii, at Thompson Metal Fab shipyard in Vancouver, Wash.

According to **Michael Schmicker**, vice president-business development, Pacific Marine, the 140-foot vessel was scheduled to be launched last month. Sea trials with a temporary "mini-superstructure" and wheelhouse were scheduled for late this month.

According to **Ken Plyler**, construction manager, Pacific Marine, the temporary superstructure, which was prefabricated by Northwest Marine Iron Works, Portland, Ore., in conjunction with Thompson Metal Fab, consists of the anchor bow, bulwarks, wet deck with resilient mounts, and bulkheads with staterooms. A prefabricated pilothouse from Singapore will be placed atop the temporary superstructure.

After trials, Pacific Marine plans to operate the vessel on a number of cruises and demonstration rides on the West Coast before sailing her to Hawaii. Final determination of her superstructure will be based on her ultimate use.

The Navatek I prototype is 140 feet long, has a beam of 53 feet, displacement of about 365 tons, and variable draft ranging from 8 to 12 feet. She will be powered by two Deutz MWM 16V-816CR diesel engines with a continuous rating of 1,350 hp each. She will be fitted with Ulstein reduction gears driving Ulstein controllable-pitch, four-bladed propellers. Auxiliary power will be provided by two GM 6-71-powered generators rated at 99 kw each.

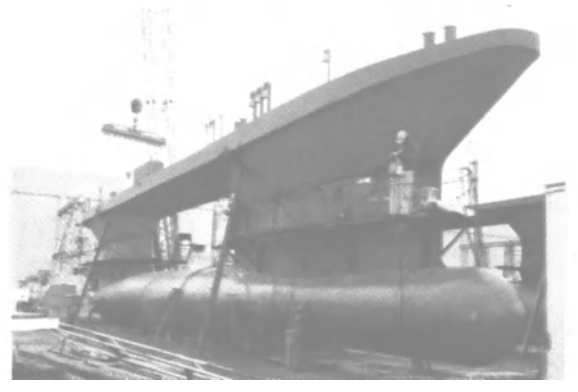
The vessel is classed by ABS, +A1 Ferry Hawaiian Interisland Service, +AMS. The structural design of the vessel consists of two demi-hulls, connected by a cross-structure consisting of two box beams. There are two vertical struts per side which connect the lower hulls to the upper structure. The lower hulls have hemispherical endcaps at the bow. Aft of this are two cylindrical lengths of hull of circular cross section. The deckhouse is mounted on flexible mounts.

At present, Singapore Slipway & Engineering Co., Singapore, has a non-exclusive license to market the patented Navatek designs in Asia. Pacific Marine is negotiating with an Australian company interested in obtaining a technology license for the design.

For a free brochure detailing the new Navatek design from Pacific Marine,

Circle 114 on Reader Service Card

The uniquely shaped lower hull of the SWATH vessel Navatek I, being built by Pacific Marine, Honolulu, Hawaii, at Thompson Metal Fab, Inc., Vancouver, Wash.



Unitor Ship's Hospital, Safety And Maintenance Equipment Chosen For 'Royal Viking Sun'

Unitor Ships Service was the main supplier of specialized hospital equipment for the recently built Royal Viking Line luxury cruise ship Royal Viking Sun. She is the fifth cruise vessel to be equipped with Unitor hospital equipment since the firm introduced its product line in 1987.

The hospital package delivered to the Royal Viking Sun consisted of X-ray and X-ray developing equipment, instruments, laboratory apparatus, first-aid equipment, stretchers, operation lamp and table, anasthesia, O_2 and N_2O central gas system, hospital beds, defibrillator, EKG, disposable equipment and nursing equipment.

In addition, Unitor's fire, rescue and safety products were selected for onboard portable firefighting equipment. Maintenance support is provided through Unitor's FRS Service operation in Miami, Fla. Unitor also delivered gas and electric welding equipment for onboard maintenance.

Unitor's management reported that its service to the cruise industry has experienced a steady upward growth. Unitor's network of supply and service stations in major North American cruise ports and around the world is a key contributing element to why cruise ship operators have selected Unitor's products and services.

For free literature detailing the full product line as well as special services offered by Unitor Ships Service,

Circle 22 on Reader Service Card

FOR MORE INFORMATION
ON
EQUIPMENT AND SERVICES ADVERTISED IN THIS ISSUE

CIRCLE THE APPROPRIATE NUMBER ON READER SERVICE CARD OPPOSITE →

ADVERTISER	EQUIPMENT /SERVICE	CIRCLE NO.
ALDEN MARINE	MARINEFAX	181
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ALLIED SIGNAL, FIBERS DIV.	ROPE	295
ASTILLEROS ESPANOLES	SHIPBUILDING/REPAIR	153
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Navigation Review

(continued from page 22)

ming. The unit features an easy-to-read LCD display, built-in intercom and P/A and includes all U.S., international and Canadian channels.

Standard's Horizon LH10 loud hailer has an output of 30 watts of power and features listen-back, four fog horns, a four-station intercom, and other alarm signals. Attractive optional flush-mount systems are available for both units.

RACAL MARINE

Racal Marine introduced one of the world's first production type-approved color ARPAs, the model 2690 BT, which provides a 16-inch PPI equivalent scan on a 26-inch diagonal TV-type display.

Well-suited for deepsea vessels, the 2690 BT series ARPA and TM/AC display are easy to operate with large, individual function control buttons. The basic radar controls on the upper panel follow standard Racal-Decca layout used in thousands of Master series 20-inch color radars already in use at sea.

The clear advantages of this system are its exceptionally bright color presentation of radar video, synthetic graphics and tote information on a 26-inch DSC display. The 26-inch Racal Decca marine display has been specially designed to meet the requirement for a presentation that can be interpreted quickly and surely under all conditions.

Switchable color coding minimizes eyestrain by day or night and allows the display to be viewed conveniently under a variety of lighting conditions.

This easy-to-operate ARPA has a 20-track capacity with manual or automatic target acquisition. The unit's ARPA controls are located on the lower panel, arranged according to function in a logical layout.

In addition to their standard suites of eight video maps, the Racal-Decca 2690 BT series ARPAs can be supplied with an NMEA 0183 proprietary interface to a navigation system such as the Racal-Decca MNS 2000 or Decca Navigator Mark 53. This interface enables the operator to show on the ARPA range scales (1-1/2 to 24 nm) a graphic presentation of the voyage plan.

The same interface also enables the ARPA to receive from the associated navigation system a defined position in latitude and longitude, preset to correspond to the reference point around which one or more of the video maps in the ARPA memory has been constructed. The ARPA can calculate the range and bearing of this point from the ship's position and thus provide automatic alignment of the video map.

Circle 8 on Reader Service Card

VESSEL MANAGEMENT SYSTEMS

Vessel Management Systems Company, Jeffersonville, Ind., has developed the Vessel Management System, an onboard and shore-side computerized tool for evaluating and improving towboat performance.

The Vessel Management System™ (VMS) is comprised of a set of components that all interface, or may each work independently. One of the basic on-board components is the VMS module. It measures depth, engine rpms, shaft rpms, gallons per hour, speed over ground, speed through water, and other data, and computes cost per mile. Then, using the same data, it calculates optimal gallons per hour. The captain then sets his throttles for that consumption rate and, according to the company, fuel costs fall.

There is another module (DEMA) that can automatically monitor up to 1,500 internal engine functions, alerting engineers to problems...and averting needless scheduled maintenance.

There is the Traffic Applications Processor—a personal computer and programs for on-board paperwork. When linked with WATERCOM™, an inland marine industry direct-dial telephone system, it can give boat and home office modem communications capabilities. WATERCOM also offers credit card calling, reduced nighttime and weekend rates, and consolidated billing.

There is the Traffic and Dispatch Manager software package, which—on a computer screen—takes barge type, shape, size, draft, pickup and drop-off points, towboat horsepower and other information, and helps managers design more efficient, more profitable tow configurations.

And there is the Towboat Operations Evaluation System, which collects, processes and analyzes trip information. It can provide facts about the performance of a single boat, a fleet—even the entire company.

Vessel Management Systems Co. is a joint venture of Dundics Enterprises and Waterways Communications Systems, Inc., and was formed to market the Vessel Management System.

Circle 112 on Reader Service Card

Warren Offers Free Screw Pump Brochure

An eight-page, four-color brochure detailing Warren's screw pump line is now available from the manufacturer. Designed for easy readability, the brochure contains data on 5 series in the line, including information on capacities, discharge pressures, and materials of construction, as well as product photographs.

Warren's screw pumps are ideal for a wide range of applications, including OEM, power, marine, petroleum refining, and chemical and petrochemical processing services. Typical applications include cellulose acetate, spinning dope, coal tar, viscous polymers, corn syrup, hydraulic oil, barge unloading, and cargo pipe flushing. For unusual applications, Warren can develop special screw pump designs.

Warren Pumps is a leading manufacturer of rotary, reciprocating, and centrifugal pumps. Located in Warren, Mass., the company specializes in engineered pumps for the power, marine, chemical, and petroleum processing industries. Warren is also a leading manufacturer for the U.S. Navy.

For a free copy of the new screw pump brochure from Warren,

Circle 57 on Reader Service Card

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 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) 477-6700.**

AIR CONDITIONING AND REFRIGERATION—REPAIR & INSTALLATION
Adrick Marine Corp., 320 Cantor Ave., Linden NJ 07036
Cospolich Refrigerator Co., 949 Industry Rd., Kenner LA 70062
Stal Refrigeration AB, Butangsgatan 16, S-60187 Norrkoping SWEDEN

BALLAST
Genstar Stone Products, Executive Plaza IV, Hunt Valley, MD 21031
Mineral Research & Recovery Inc., 4565 S. Palo Verde, Ste 203, Tucson AZ 85714

BARGE BUILDING
HBC Barge, Brownsville PA 15417

BARGES—Leasing
McDonough Marine Service, P.O. Box 1825, Parkersburg WV 26101

BASKET STRAINERS
Beaird Industries, P.O. Box 31115, Shreveport, LA 71130

BEARINGS—Rubber, Metallic, Non-Metallic
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Kingsbury Inc., 10385 Drummond Rd, Philadelphia PA 19154
Lucian Q. Moffitt, Inc., P.O. Box 1415, Akron, OH 44309

BOILERS
Combustion Engineering, Inc., Windsor, CT 06095

BOILER CLEANING
Asea Stal, 50 Chestnut Ridge Rd., Montvail N.J. 07645

BROKERS
Captain Astad Company, Inc., P.O. Box 350486, Ft Lauderdale FL 33335; P.O. Box 1093, Houma, LA 70360
Bergeron & Associates, P.O. Box 726, Chalmette LA 70044
Jack Faulkner Inc., 2419 Caddy Lane, P.O. Box 371, Flossmoor IL 60422
Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960
Ocean Marine Brokerage Services, P.O. Box 1257, Port Canaveral, FL 32927

BULKHEADS
The Waugh Co./Rockment (TNF), 5111-6 Baymeadows Rd., Suite 394, Jacksonville, FL 32217

CARGO ACCESS EQUIPMENT
Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E. Chestnut Ave., Santa Ana CA 92701

CARGO HANDLING SYSTEM
Skarpenord A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906

CHAIN
Baldt Inc., P.O. Box 350, Chester PA 19106
Crandall Dry Dock Engineers Inc./Marit Chain, 21 Pottery Lane, Dedham MA 02026
Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020

CHOCKING COMPOUND
Philadelphia Resins Corp., 130 Commerce Dr., Montgomeryville, PA 18936

COMPACTORS
ICI Multi-Pak Inc., 14719 Carolcrest, Houston TX 77079
TFC Corp., 9819 Logan Ave., So., Minneapolis MN 55431. Sales Agents: American United Marine, 5 Broadway, Rte 1, Saugus MA 01906

COMPUTERIZED INFORMATION SYSTEMS
TIMSCO, P. O. Box 91360, Mobile AL 36691

CONDENSERS/SEPARATORS
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130
Wright Austin Co., 3250 Franklin St., Detroit MI 48207

CONTROL SYSTEMS—Monitoring
ASEA, Inc., 4 New King St., White Plains, NY 10604
Eldec Corporation, 16700 13th Ave. West, P.O. Box 100 Lynnwood, WA 98036
Imo-Delaval, Inc., Gems Sensors Division, One Cowles Rd., Plainville CT 06062
Indikon Division, Metravib Instruments Inc., 26 New St., Cambridge, Ma 02138
NAMCO Controls, 7567 Tyler Blvd, Mentor OH 44060
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Valmet Automation A.S., P.O. Box 130, N-3430, Spikkestad, Norway
WABCO, 1953 Mercer Rd., Lexington KY 40511

CRANES—HOISTS—DERRICKS—WHIRLEYS
ASEA-Hagglund, Inc., 50 Chestnut Ridge Rd., Montvale NJ 07645
The Crosby Group, Inc., P.O. Box 3128, Tulsa OK 74101
Del Gavio Marine Hydraulics Inc., 207 W. Central Ave., Maywood NJ 07607 telex: 132610 DELMARINE
Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235
Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E Chestnut Ave., Santa Ana CA 92701
J.D. Neuhaus, Hebezeuge, D5810, Witten Heven, West Germany
Pettibone-Tiffin Corp., 235 Miami St., Tiffin, OH 44883
Westmont Industries, 10805 Painter Ave., Santa Fe Springs, CA 90670

DECK MACHINERY—Cargo Handling Equipment
Braden Carco Gearmatic, P.O. Box 547, Broken Arrow, OK 74013
Gearmatic—see 'Braden Carco Gearmatic' above.
Markey Machinery Co., Inc., 79 S. Horton St., Seattle, WA 98134
McElroy Machine & Mfg. Co., Inc., P.O. Box 4455, Biloxi MS 39535
Morgan Crane Co., Inc. (Hiab SeaCranes and QMC Trident, Ferrari, Fassi marine cranes), 1009 E Chestnut Ave., Santa Ana CA 92701
Schoellhorn-Albrecht, P.O. Box 22110, St Louis MO 63116

DIESEL ACCESSORIES—CYLINDER LINERS
Acurex Corporation, Autodata Division, 555 Clyde Ave., P.O. Box 7042, Mountain View, CA 94039
Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
Diesel America Inc., 5217 River Rd., New Orleans LA 70123
FCS Inc., 22 Main St., Center Brook CT 06409
General Thermodynamics Corporation, 210 South Meadow Road, P.O. Box 1105, Plymouth, MA 02360
Kiene Diesel Accessories, 325 S. Fairbanks St., P.O. Box 386, Addison IL 60101

DIESEL ENGINE—Spare Parts & Repair
Bergen Diesel A/S, P.O. Box 924, N-5001 Bergen NORWAY
Bergen Diesel Inc., 2701 Delaware Ave., Kenner LA 70062
Colt Industries Inc. Fairbanks Morse Engine Div. 701 Lawton Ave., Beloit, WI 53511
Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005
Goltens, 160 Van Brunt St, Brooklyn NY 11231
MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1, Federal Republic of Germany
MAN B&W Diesel, 50 Broadway, 18th Fl., New York, NY 10004
Markisches Werk GmbH, P.O. Box 1442, D-5884 Halver 1, Federal Republic of Germany
Sims Pump Valve Co., Inc., 1314 Park Ave., Hoboken NJ 07030
Sulzer Brothers Inc., 200 Park Ave., New York, N.Y. 10166

DIVING & SALVAGE
H.J. Merrihue, P.O. Box 23123, New Orleans LA 70183
Muldoon Marine Services, P.O. Box 3221, Terminal Island, CA 90731
Parker Diving Service Inc., Berth 69, Los Angeles Harbor, P.O. Box 5272, San Pedro CA 90733

ELECTRICAL EQUIPMENT
Eldec Corporation, 16700 13th Ave West, P.O. Box 100, Lynwood WA 98036
L. F. Gaubert & Co., Inc., P. O. Box 50500, New Orleans LA 70150
Ward Leonard Electric, 31 South St., Mt. Vernon, NY 10550
Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201

ELECTROMAGNETICS
Sentel Corp., 6713 Robinia Rd., Camp Springs MD 20748

ELECTRONIC INFORMATION SYSTEMS
Inventory Locator Service, Inc., 3965 Mendenhall Rd., Suite 10, Memphis TN 38115

ELECTRONIC SYSTEMS
Marine Electric RPD, Inc., 666 Pacific St., Brooklyn, NY 11217 TX: 125327

ENGINE TEST EQUIPMENT
General Thermodynamics Corp., P.O. Box 1105, 210 S. Meadow Road, Plymouth, MA 02360

EQUIPMENT—Marine
Thomas Coudon Associates, 6655 Amberton Dr., Baltimore, MD 21227
Dynabrade, 72 E Niagara St., Tonowanda NY 14150
Maritime Power Corp., 200 Henderson Street, Jersey City, NJ 07302
Space Machine & Engineering Corp., 2346 16th Ave North, St Petersburg FL 33713

EVAPORATORS
Equipment Engineering, 666 Baker St., #265, Costa Mesa CA 92626
MECO (Mechanical Equipment), 861 Carondelet St., New Orleans LA 70130
Beaird Industries, P.O. Box 31115, Shreveport, LA 71130

FANS—VENTILATORS—BLOWERS
Carling Turbine Blower Company, 10 Nebraska St., P.O. Box 88, Worcester MA 01613
Flebu A/S, US Agent: American United Marine Corp., 5 Broadway, Rte 1, Saugus MA 01906
Jon M. Liss Associates, Inc., 411 Borel Ave., P. O. Box 5554, San Mateo, CA 94402

FASTENERS
Action Threaded Products Inc., 6955 S. Harlem, Bedford Park, IL 60638
Band-It Division, Houdaille Industries Inc., P.O. Box 16307, Denver CO 80216
Hardware Specialties Co., Ships Division, 48-75 36th St, Long Island City NY 11101
Lee Brass Company, P. O. Box 1229, Anniston AL 36202
Mapeco Products, Inc., 725 Glen Cove Ave., P.O. Box 6, Glen Head NY 11545
Non-Ferrous Bolt & Mfg Co., 4085 Nevso Dr., Suite C, Las Vegas NV 89103
Okabe Co., Inc., 175 Lively Blvd., Elk Grove Village, IL 60007

FENDERING SYSTEMS/BUOYS—Dock & Vessel
Intertrade Ltd., Marine Products Div., 15301 Transistor Lane, Huntington Beach CA 92649
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Milligan Marine Supply Inc., 5832 Harvey Wilson, Houston TX 77020
Seaward International, Inc., Clearbrook Industrial Park, P.O. Box 98, Clearbrook VA 22624

FILTERS
Parker Filter Division, 16810 Fulton County Rd., #2, Metamora, OH 43540

FUEL ADDITIVE
U.S. Borax, Industrial Chemicals, 3075 Wilshire Blvd., Los Angeles CA 90010

GALLEY EQUIPMENT
Gaylord Industries, 10900 S W Avery St, P.O. Box 1149, Tualatin, OR 97062

GANGWAYS, LADDERS
A.L. Don, 1 Don Plaza, Dock St., Matawan NJ 07747
National Specialty Products, 5727 Heffernan St., Houston TX 77087
Rampmaster Inc., 9825 Osceola Blvd., Vero Beach, FL 32960
Westmont Industries, 10805 Painter Ave., Santa Fe Springs, Los Angeles, CA 90670
Wooster Products Inc., 1000 Spruce St., P.O. Box 896, Wooster, OH 44691

HEAT EXCHANGERS
Alfa Laval Inc., 2115 Linwood Ave., Fort Lee NJ 07024
ITT Standard Heat Transfer Technology, Buffalo, NY 14240
MECO (Mechanical Equipment), 861 Carondelet St., New Orleans LA 70130
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

HORNS/WHISTLES
Kahlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241

HYDRAULICS
Aeroquip Corporation, 300 South East Ave., Jackson, MI 49203
Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken NJ 07030
Del Gavio Marine Hydraulics Inc., 207 W Central Ave., Maywood NJ 07607; telex: 132610 DELMARINE
Parker Hannifin Corporation, 17325 Euclid Avenue, Cleveland, OH 44112

INCINERATORS
Teamtec A/S, P.O. Box 100, N-4912 Gjeving, NORWAY
A/S Vesta, 27 Skudehavnsvej, DK-2100 Copenhagen DENMARK. US Agent: American United Marine, 5 Broadway, Rte 1, Saugus MA 01906

INSTRUMENTATION
Technical Services Group, 2900 Main St., Alameda CA 94501

INSULATION—Cloth, Fiberglass
Soundcoat, One Burt Drive, Deer Park NY 11729

JOINER—Watertight Doors—Paneling—Ceiling Systems
Astech, 3030 S. Red Hill Ave., Santa Ana, CA 92711
Johnson Construction Specialties, Inc., 3420 Rusk, P.O. Box 1360, Houston, TX 77251
Walz & Krenzer Inc., 1390 Mt. Read Blvd., Rochester NY 14606

KEEL COOLERS
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Kohlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
The Walter Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307

LIGHTING EQUIPMENT—Lamps, Fixtures, Searchlights
Carlisle & Finch, 4562 W. Mitchell Ave., Cincinnati OH 45232

LINE BLINDS
American Piping Products Inc., Box 1056, New Hyde Park, NY 11040
Stacey/Fetterolf, P.O. Box 103, Skippack, PA 19474

LOGISTICS
VL Logistic Consultants, Inc., 3008-C Bienville Blvd., Ocean Springs MS 39564

LUBE-OIL CENTRIFUGES
Hamworthy Engineering Ltd., Fleets Corner, Poole, Dorset, BH17 7LA ENGLAND; Hamworthy USA, 744 Roble Rd, #190, Allentown, PA 18103

MACHINERY MAINTENANCE, REPAIR, OVERHAUL, AND TESTING
AMT, Inc., 2400 NW 39th Ave., Miami FL 33142
Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DELMARINE
Goltens, 160 Van Brunt St., Brooklyn, NY 11231
In-Place Machining Co., 1929 North Buffum St., Milwaukee WI 53212

MARINE LUMBER
McCausey Lumber Company, 36325 Harper Ave., P.O. Box 46129, Mt Clemens MI 48046

METAL LETTERS
Johnston Brothers Enterprises, Inc., P.O. Box 1138, Patterson, LA 70329

NAVAL ARCHITECTS, MARINE ENGINEERS, SURVEYORS
Advanced Marine Enterprises, Inc., 1725 Jefferson Davis Hwy., Arlington, VA 22202
Aero Nav Laboratories, Inc., 14-29 112 St., College Point, NY 11356
American Professional Captains Association, P.O. Box 350398, Ft. Lauderdale FL 33316
American Systems Engineering Corp., P.O. Box 8988, Virginia Beach, VA 23452
Amirikian Engineering Co., P.O. Box 15210, Chevy Chase MD 20815
B.C. Research, 3650 Wesbrook Mall, Vancouver, B.C. Canada V6S 2L2
CDI Marine Co., 900 Regency Square Blvd., Suite 203, Jacksonville, FL 32211
C.T. Marine, 18 Church Street, Georgetown, CT 06829
Childs Engineering Corp., Box 333, Medfield, MA 02052
Crandall Dry Dock Engrs., Inc., 21 Pottery Lane, Dedham, MA 02026
Crane Consultants, 15301 First Ave S., Seattle WA 98148
C.R. Cushing, 18 Vesey St., New York, NY 10007
Arthur D. Darden, 3100 Ridgelake Dr., Suite 101, Metairie LA 70002
Design Associates Inc., 14360 Chef Menteur Highway, New Orleans, LA 70129
Designers & Planners, 2011 Crystal Dr., Arlington VA 22202
E.Y.E. Marine Consultants, Belmont House, 33 Alderney Dr., Suite 350, Dartmouth, NS CANADA B2Y 2N4
Encon Management & Engineering Consultant Services, P.O. Box 7760, Beaumont, TX 77706
GHM Inc. (Industrial Measurement Consultants), P.O. Box 1836, Newport News, VA 23601
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., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104
Morris Guralnick Associates, Inc., 620 Folsom Street, Suite 300, San Francisco, CA 94107
C. Raymond Hunt Associates, 69 Long Wharf, Boston MA 02110
Hydrocomp, Inc., 45 James Farm-Lee, P.O. Box 865, Durham, NH 03824
Intramarine, Inc., P.O. Box 53043, Jacksonville, FL 32201
JJH Inc., No. 4 Executive Campus, Culbert Blvd. & Route 70, P.O. Box 5031, Cherry Hill, NJ 08034
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
James S. Krogen, 1515 NW 7th St., Suite 124, Miami FL 33125
Rodney E. Lay & Associates, 13891 Atlantic Blvd., Jacksonville, FL 32225
Clyde Leavitt Inc., 13901 Puerto Dr, Ocean Springs MS 39564
K.P.G. Integrated Engineering Pty Ltd., P. O. Box 525, Cairns, Qld. 4870 AUSTRALIA
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535-4454
John J. McMullen Associates, Inc., 1 World Trade Center, New York, NY 10048
MacPherson Maritime Services, 141 Jefferson Ave., Westfield NJ 07090
Fendall Marbury, 9 Neal Street, Annapolis MD 21401
Marine Management Systems Inc., 102 Hamilton Ave., Stamford CT 06902
Marine Power Associates, 1010 Turquois St., Ste 217, San Diego, CA 92109
Maritime Design, Inc., 2955 Hartley Rd., Jacksonville, FL 32217
R.J. Mellusi & Co., 71 Hudson St, New York, NY 10013
Nelson & Associates, Inc., 610 Northwest 183rd St., Miami, FL 33169
Nord Marine Inc., P.O. Box 305, Fair Haven NJ 07701
Northern Marine, P.O. Box 1169, Traverse City, MI 49685
Ocean Oil International Engineering Corp., 3019 Mercedes Blvd, New Orleans LA 70114
Capt. H.L. Olsen, Marine Surveyors Company, P.O. Box 283, Port Jefferson NY 11777
Q.E.D. Systems Inc., 4646 Witchduck Rd., Virginia Beach, VA 23455
M. Rosenblatt & Son, Inc., 350 Broadway, New York, NY 10013 and 667 Mission St., San Francisco, CA 94105
Sargent & Herkes, 225 Baronne St., Suite 1405, New Orleans LA 70112
Sea School, 3770 16th Street North, St. Petersburg, FL 33704
Seaworthy Systems Inc., P.O. Box 338, Essex, CT 06426; 17 Battery Pl., New York, NY 10004; P.O. Box 205, Solomons MD 20688; 2 Skyline Pl., 5203 Leesburg Pike, Falls Church VA 22041.
Seaworthy Electrical Systems, 17 Battery Pl. N.Y. N.Y. 10004
George G. Sharp, Inc., 100 Church St., New York, NY 10007
R.A. Stearn, Inc., 253 N. 1st Ave., Sturgeon Bay, WI 54235
Systems Engineering Associates (SEACOR), 200 East Park Dr., Suite 600, Mt Laurel NJ 08054
TIMSCO, P. O. Box 91360, Mobile AL 36691
VSE Corporation, 1417 No Battlefield Blvd, Chesapeake VA 23320

NAVIGATION & COMMUNICATIONS EQUIPMENT
Comsat Maritime Services, 950 L'Enfant Plaza SW, Washington DC 20024
Furuno U.S.A., 271 Harbor Way, S. San Francisco, CA 94080
General Electric Company, Mobile Communications Division, Lynchburg, VA 24502
Harris Corporation, RF Communications Group, 1680 University Ave., Rochester NY 14610
Henschel Corporation, 9 Hoyt Dr., P.O. Box 30, Newburyport MA 01950
ITT Mackay, 441 U.S. Highway #1, Elizabeth, NJ 07202
Kelvin Hughes Ltd., New North Rd., Hainault, Ilford, Essex 1G6 2UR England
Mackay Communications, 441 US Hightway #1, P.O. Box 331, Elizabeth NJ 07207
Marine Electric RPD Inc., Galbraith Pilot Marine Div., 666 Pacific St., Brooklyn NY 11217
Naval Electronics, 5417 Jetview Circle, Tampa FL 33634
Norcontrol Simulation A/S, Bekkajordet 8A, P.O. Box 1024, N-3191 Horten NORWAY

Petroleum Communications Inc. (Petrocom) Head Office: 5901 Earhart Expwy., New Orleans LA 70123; 556 Jefferson St., Suite 100, Lafayette LA 70501; Allied Bank Plaza, Suite 5440, 1000 Lousisian St., Houston TX 77002
Racal Marine Inc., 70 Jackson Dr., Cranford NJ 07016
Radio-Holland USA, Inc., 6033 South Loop East, Houston, TX 77033
Raytheon Marine Company, 46 River Rd., Hudson NH 03051
Raytheon Service Company, 5760 Northampton Blvd., Ste 102, Virginia Beach VA 23455
Sperry Marine Inc., 1070 Seminole Trail, Charlottesville VA 22906
Telesystems, 2700 Prosperity Ave., Fairfax, VA 22031 USA
Watercom Communications Systems, 453 E. Park Place, Jefferson IN 47130

OILS—Marine—Additives
B P North America Petroleum, 555 US Route 1, So. Iselin, NJ 08830
Burmah-Castrol Inc., Raritan Plaza II, Raritan Center, Edison NJ 08837
Chevron USA, 575 Market St., San Francisco, CA 94105
Exxon Company International, 200 Park Ave., Bldg 222, Room A279, Florham Park NJ 07932
Texaco, International, 2000 Westchester Avenue, White Plains NY 10650

OIL/WATER SEPARATORS
Alfa Laval Inc., 2115 Linwood Ave., Fort Lee NJ 07024
Centrico, Inc. (Westfalia Separators), 100 Fairway Court, Northvale, NJ 07647
Microphor, Inc., 452 E Hill Rd., P.O. Box 1460, Willits, CA 95490

PAINTS—COATINGS—CORROSION CONTROL
American Abrasive Metals Co., 460 Coit St, Irvington NJ 07111
Armorica Sales Inc., 2 Marineview Plaza, Hoboken NJ 07030
CTI Industries, 10 Sasco Hill Rd., Fairfield CT 06430
International Paint, P. O. Box 920762, 6001 Antoine Dr., Houston TX 77292
Palmer International, P.O. Box 8, Worcester, PA 19490
Unitor Ships Service, Unitor Marine Chemicals Division, 3 High St., Rickmansworth, Herts, WD3 1SW UNITED KINGDOM
White Metals Inc., 6300 Midvale, Houston TX 77087

PIPE-HOSE—Cargo Transfer Clamps, Couplings, Coatings, Supports
Aeroquip, 300 South East Ave., Jackson, MI 49203
Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248

PORT SERVICES
Port of Iberia, P.O. Box 897, New Iberia LA 70561

PROPULSION EQUIPMENT—Bowthrusters, Diesel Engines, Gears, Propellers, Shafts, Turbines
ASEA Brown Boveri, 1460 Livingston Ave., North Brunswick NJ 08902
Bird Johnson Company, 110 Norfolk St., Walpole, MA 02081
Bergen Diesel A/S, P.O. Box 924, N-5001 Bergen NORWAY
Bergen Diesel Inc., 2701 Delaware Ave., Kenner LA 70062
Boston Metals Co., 313 E. Baltimore St., Baltimore, MD 21202
Burmeister & Wain Alpha Diesel AS, DK-1400 Copenhagen K, Denmark
Caterpillar In., Engine Division, 100 N E Adams, Peoria IL 61629
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
Colt Industries Inc. (Fairbanks Morse Engine Div.), 701 Lawton Avenue, Beloit, WI 53511
Combustion Engineering, Inc., Windsor, CT 06095
Cummins Engine Company, Mail Code 60011, Box 3005, Columbus, IN 47202-3005
Deutz Corp., 7585 Ponce de Leon Circle, Atlanta, GA 30340
Fincantieri, Diesel Engines Division—GMT, Bagnoli della Rosandra 334, Trieste, ITALY
GE Naval & Drive Turbine Systems Department, 166 Boulder Dr., Fitchburg MA 01420
General Motors, Allison Gas Turbine, P. O. Box 420, U-6, Indianapolis IN 46206
KHD Canada Inc., 180 Rue de Normandie, Boucherville, Quebec J4B 5S7, Canada
KaMeWa, P.O. Box 1010, S-681 01 Kristinehamn, SWEDEN
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Krupp MAK Maschinenbau GmbH, P.O. Box 9009, D-2300 Kiel 17, WEST GERMANY
Lips Propellers, 3617 Koppens Way, Chesapeake, VA 23323
Marine Gears, Inc., P.O. Box 689, Greenville MS 38707
Markisches Werk, Halve, P.O. Box 1442, D-5884 Halver WEST GERMANY
MAN B&W Diesel, 50 Broadway, New York, NY 10004
MAN B&W Diesel A/S, Ostervej 2, DK-4960 Hoelby, Denmark
MAN B&W Diesel A/S, Alpha Diesel, Niels Juels Vej 15. DK-9900 Frederikshavn Denmark
MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-8900 Augsburg 1 Germany
MAN High Performance Diesels (Nurnberg), 160 Van Brunt St., Brooklyn NY 11231
Michigan Wheel Corp., 1501 Buchabab Ave., SW, Grand Rapids MI 49507
Morrison-Knudsen Company, Power Systems Division, P.O. Box 1928, Rocky Mount NC 27801
MTK Magnetek Inc., 11111 Santa Monica Blvd., Los Angeles CA 90025
North American Marine Jet P.O Box 1232 Benton, AR 72015
Northwest Marine Services Corp., 6452 So. 144th St., Tukwila WA 98168
Schottel-Werft, Josef Becker GmbH, KG, D-5401 Spay, WEST GERMANY
Stewart & Stevenson, 1400 Destrehen, P.O. Box 8, Harvey LA 70059-0008
Sulzer Brothers, Dept. Diesel Engines, CH-8401 Winterthur, Switzerland
Sulzer/Escher Wyss, Ravensburg WEST GERMANY
Twin Disc, 1328 Racine St, Racine WI 53403
Ulstein International A/S, N-6065 Ulsteinvik, NORWAY
Ulstein Maritime Ltd., 96 North Bend Street, Coquitlam BC CANADA V3K 6H1
J.M. Voith GmbH, Marine Division, Postfach 1940, 7920 Heidenheim/Brenz, WEST GERMANY Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck, NY 11021
Wagner Engineering Ltd., 40 Gostick Pl., No Vancouver BC CANADA V7M 3G2
Wartsila Power Inc., 5132 Taravella Rd., P.O. Box 868, Marrero, LA 70072
ZF of North America, Marine Sales, 500 Barclay Blvd, Lincolnshire IL 60069

PUMPS—Repairs—Drives
Del Gavio, 207 W. Central Ave., Maywood, NJ 07607. Telex: 132610 DEL-MARINE
Goltens, 160 Van Brunt St., Brooklyn, NY 11231
Imo-Delaval, Inc., IMO Pump Division, Box 447, Monroe NC 28810
Jim's Pump Repair, 48-55 36th St., Long Island City NY 11101
Leistritz Corporation, 165 Chestnut St., Allendale NJ 07401
Megator Corporation, 562 Alpha Drive, Pittsburgh, PA 15238
Vita Motivator, 99 W Hawthorne Ave., Suite 622, Valley Stream NY 11580
Wilden Pump & Engineering Co., 22060 Van Buren St., P.O. Box 845, Colton, CA 92324

ROPE—Manila—Nylon—Hawsers—Fibers
Allied Signal Inc., Fibers Division, 1411 Broadway, New York, NY 10018
E.I. DuPont de Nemours, Shipboard Cable, Room G-51549-NE, P.O. Box 80029, Wilmington DE 19880-0029
Samson Ocean Systems, 2090 Thornton St., Ferndale WA 98248

SANITATION DEVICES—Pollution Control
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
Microphor, Inc., 452 E Hill Rd., P.O. Box 1460, Willits CA 95490
Research Products/Blankenship (Incinolet), 2639 Andjon, Dallas, TX 75220

SCALE MODELS
Sturgeon Bay Model Shop, 187 N Ninth Ave., Sturgeon Bay WI 54235

SCUTTLES/MANHOLES
L.S. Baier & Assoc., 7527 NE 33rd Dr., Portland OR 97211
Juniper Industries, 72-17 Metropolitan Ave., Middle Village, NY 11379
Mock Manufacturing Inc., 777 Rutland Rd., Brooklyn, NY 11203

SHIPBREAKING—Salvage
The River Smelting & Refining Co., 4195 Bradley Rd Cleveland OH 44109
The Zidell Explorations, Inc., 3121 S.W. Moody St., Portland, OR 97201

SHIPBUILDING EQUIPMENT
Eckold Ltd., CH-7203 Trimmis, SWITZERLAND
M.A.N.—GHH, Sterkrade Werfsrabe 112 D-4100 Duisburg 18, West Germany
MAN—GHH, P.O. Box 110240, D-4200 Oberhausen 11, West Germany
NEI Syncrolift, Inc., 8970 S W 87th Ct., Miami FL 33176
Offshore Industries, Inc., 144 Railroad Ave., Suite 206, Edmonds WA 98020
Portable Gun Drilling Systems Inc., P.O. Box 123, Auburn WA 98071

SHIPBUILDING—Repairs, Maintenance, Drydocking
Aluminum Boats Inc., 304 Midway Dr., River Ridge LA 70123
Astilleros Espanoles S.A., Padilla 17, 28006 Madrid, SPAIN
Avondale Industries Inc., P.O. Box 50280, New Orleans LA 70150
Bay Shipbuilding Corp., 605 N. 3rd Ave., Sturgeon Bay, WI 54235
Blount Marine, Box 368, Warren RI 02885
Brodosplit Shipbuilding Industry, Put Udarnika 19, P.O. Box 17, 58000 Split YUGOSLAVIA
Burmeister & Wain Skipsvaerft A/S, P.O. Box 2122, Refshaleoen, DK-1015 Copenhagen, DENMARK
Colonna's Shipyard, Inc., 400 E Indian River Rd., Norfolk VA 23523
Curacao Drydock (U.S.A.) Inc., 26 Broadway, Suite 741, New York, NY 10004
Equitable Shipyards Inc., Trinity Marine Group, Box 29266, New Orleans LA 70189
Fincantieri SpA Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY
Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530
Hyundai Corporation, ShipSales Dept., 140-2 Kye dong, Chongro-ku, Soeul, KOREA
Hyundai Mipo Dockyard Ltd., 456 Cheonha-Dong, Ulsan, KOREA
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
Paul Lindenau GmbH, & Co., Schiffswerft u. Maschinenfabrik, D-2300 Kiel-Friedrichsort, West Germany
Lisnave, Apartado 2138, 1103 Lisbon, Codex PORTUGAL
Lockheed Shipbuilding and Construction Co., 2929 16th Avenue, S.W., Seattle, WA 98134
M.A.N. GHH Sterkrade, P.O.B. 110240, D-4200 Oberhausen 11, West Germany
Marco, Inc., 2300 W Commodore Way, Seattle, WA 98199
T. Mariotti, Calata Chiappella, 16126 Genoa (Port) ITALY
Munson Manufacturing, 150 Dayton, Edmonds WA 98020
Newport News Shipbuilding, 4101 Washington Ave., Newport News, VA 23607
Northwest Marine Ironworks, P. O. Box 3109, Portland OR 97208
SeaArk, P.O. Box 210, Monticello AR 71655
Service Marine Industries, P.O. Box 3606, Morgan City LA 70381
Skipperliner Shipyards, 621 Park Plaza Dr, Dept 21, LaCrosse WI 54601
Southwest Marine, Inc., P.O. Box 13308, San Diego, CA 92113
3 Maj Associates Shipbuilding Industry, P. O. Box 117, 51001 Rijeka YUGOSLAVIA
Trinity Marine Group, Box 29266, New Orleans LA 70189
Wartsila Marin Industri AB, P.O. Box 1090, SF 00101 Helskini, FINLAND
Zidell Explorations, Inc., 3121 S.W. Moody Street, Portland, OR 97201
Zodiac of North America Inc., Thompson Creek Rd., P.O. Box 400, Stevensville, MD 21666

SHIP MANAGEMENT
Texaco Marine Servcies Inc., P. O. Drawer 1028, Port Arthur, TX 77641

SIMULATOR TRAINING
Marine Safety International, Marine Air Terminal, LaGuardia Airport, NY 11371

SILENCERS
Riley-Beaird, P.O. Box 31115, Shreveport, LA 71130

STUFFING BOXES
Johnson Rubber Co., Duramax Marine Div., 16025 Johnson St., Middlefield, OH 44062
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241

SURVIVAL EQUIPMENT
Parkway/Imperial, 241 Raritan St., So. Amboy, NJ 08879
Viking Life Saving Equipment (America) Inc., 38 NW 11th St., Miami FL 33136

TANK CLEANING
Houston Ship Repair, 1621 Woods Dr., P.O. Box 489, Channelview, TX 77530

TANK LEVELING INDICATORS
Imo-Delaval, Inc., Gems Sensors Division, One Cowles Rd., Plainville CT 06062
King Engineering Corp., P.O. Box 1228, Ann Arbor MI 48106
MMC International (Marine Moisture Control), 60 Inip Dr, Inwood NY 11696
Saab Tank Control, 201 W Passaic St., Rochelle Park NJ 07662

TORSIONAL VIBRATION SPECIALISTS
T.W. Spaetgens, 156 W. 8th Ave., Vancouver, Canada, V5Y 1N2

TOWING—Barges, Vessel Chartering, Lighterage, Salvage, etc.
Jack Faulkner, 1005 W. Harimaw Ct., Metairie, LA 70001
McAllister Bros., Inc., 17 Battery Pl., New York, NY 10004

VALVES AND FITTINGS
Aeroquip, 300 South East Ave., Jackson, MI 49203
Cajon Co., 9760 Shepard Rd., Macedonia, OH 44056
Chemiquip Products Co., Inc., 3 W. 18th St., New York, NY 10011
Circle Seal Controls, Brunswick Corporation, P.O. Box 3666, Anaheim, CA 92803
Cla-Val Co., P.O. Box 1325, Newport Beach, CA 92663
Crawford Fitting Company, 29500 Solon Road, Solon, OH 44139
Deutsch Metal Components, 14800 S. Figueroa, Gardena, CA 90248
Elliott Manufacturing Co., Inc. (Remote Valve Operating Equipment), P.O. Box 773, Binghamton, NY 13902
Stanley G. Flagg Co., 1020 W High St, Stowe PA 19464
Lexair Inc., Airmatic/Beckett, 299 Gold Rush Rd., Lexington KY 40503
Loeffler Machine, US #1 & Robbins Ave., Penndel PA 19047
Nupro Co., 4800 E. 345th St., Willoughby, OH 44094
PBM Inc., RD 6, Box 387A, Sandy Hill Rd, Irwin PA 15642
Parker Hydraulic Valve Division, 520 Ternes Avenue, Elyria, OH 44035
Parker Actuator Division, 9948 Rittman Road, P.O. Box 450, Wadsworth, OH 44281-0450
Parker Systems Division, 651 Robbins Drive, Box 3500, Troy, MI 48007-3500
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Swagelok Company, 5171 Hudson Dr., Hudson, OH 44236
Teleflex Inc., 771 First Ave., King of Prussia, PA 19406
Whitey Co., 318 Bishop Road, Highland Heights, OH 44143
Williams Valve Corp., 38-52 Review Ave., Long Island City NY 11101

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DLI Engineering Corp., 253 Winslow Way West, Bainbridge Island, WA 98110
T. W. Spaetgens, 156 W 8th Ave., Vancouver BC CANADA V5Y 1N2
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Eldec Offers Line Of Electroluminescent Flat Panel Displays

Eldec's electroluminescent displays are designed for application to a variety of aerospace and defense systems.

Eldec Corporation, Lynnwood, Wash., offers a line of rugged thin-film electroluminescent (TFEL) flat panel displays designed for application to a variety of aerospace and defense systems.

Initial products are a family of 256 x 512 (4-inch by 8-inch viewing area) displays that range in complexity from display heads to simple monitors. All units include drive electronics, control, input interface, and power supply ready for adaptation to the host equipment.

Applications to date include significant ground-based military, airborne and shipboard programs.

For further information and free literature from Eldec Corporation,

Circle 63 on Reader Service Card

'Customized' Hydraulic Presses From Wallace Coast —Literature Available

Wallace Coast Machinery Company, Bellwood, Ill., is offering free literature on their new line of economical "custom engineered" hydraulic presses built to meet specific customer requirements and available with multiple platens for higher production.

In addition to metal forming, typical applications include die spotting, plastic molding, and laminating. These presses are available in both vertical and horizontal configurations.

For more information and a free copy of the literature on Wallace Coast's custom engineered hydraulic presses,

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Welding Consultants USA, 10399 Paradise Blvd. #101, St. Petersburg, FL 33706

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Gearmatic—see 'Braden Carco Gearmatic' above.
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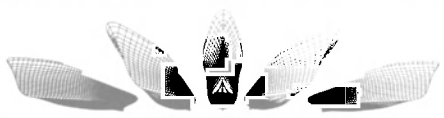

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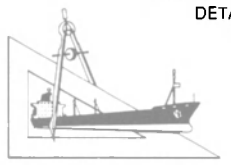

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Aluminum Boats Delivers 150-Passenger Excursion Boat To Maryland Tours

The Cummins-powered Baltimore Sentinel is 63 feet in length, with a 20-foot beam, and a 3-foot draft.

Aluminum Boats, Inc. of Crown Point, La., recently delivered the Baltimore Sentinel, a 63-foot-long by 20-foot beam, 150-passenger excursion boat, to Maryland Tours, Inc. of Baltimore, Md.

The new vessel made the 2,000-mile delivery trip from its south Louisiana shipyard " ... absolutely trouble-free, without even a minor problem," general manager of Aluminum Boats **Salvador J. Guarino,** said.

The Baltimore Sentinel is the latest addition to Maryland Tours' fleet of six excursion boats that offer tours of Baltimore Harbor, Fort McHenry, and other points of interest along Maryland's eastern shore.

The main deck enclosed cabin configuration with additional topside open-air seating gives the boat added flexibility for private charters.

The vessel is powered by two Cummins 6BTA engines with a ZF combination clutch and "V" drive gear arrangement equipped for keel cooling. A Cummins 30-kw generator supplies the electrical power as well as providing power for the bowthruster.

The pilothouse features a single station Wagner hydraulic steering system and Morse engine controls. Incorporated in the main console is an electronics package which includes a Regency VHF, a Datamarine Fathometer, and a Bogen entertainment system.

BALTIMORE SENTINEL
Equipment List

Main engines	Cummins
Generator	Cummins
Combination Clutch	ZF
Steering System	Wagner
Engine Controls	Morse
VHF	Regency
Fathometer	Datamarine
Entertainment system	Bogen

Passenger viewing is enhanced by large aluminum-framed safety plate sliding windows, and six tons of Ruud air conditioning and heating make the boat suitable for all seasons operations.

The boat's builder, Aluminum Boats, Inc., was recently acquired by Trinity Industries, Inc. of Dallas, Texas, which owns and operates the Trinity Marine Group.

For more information and free literature on the facilities and capabilities of Aluminum Boats, Inc.,

Circle 49 on Reader Service Card

Alfa Products Introduces New Boat Bilge Cleaner —Literature Available

Alfa Products Co., Fort Lauderdale, Fla., recently introduced a new boat bilge cleaner product, "De-Skum," that represents a new and different concept for the removing of oils and organic material from the bilge.

De-Skum boat bilge cleaner is a complex enzyme product that digests and biodegrades oils and organic material present in bilge water. De-Skum actually removes the oil by turning it into carbon dioxide and water. The enzyme formulation is a protein-based catalyst that is similar to a septic tank or stomach enzyme.

De-Skum slowly biodegrades oils and organics leaving no residue, sediment or by-product to remove. The bilge discharge will not produce an oil slick or foam if the digestion time and dosage are adequate. De-Skum can be used as a cure or preventive using about one ounce per 100 gallons of bilge water for a cure and half that amount for a preventive.

According to the manufacturer, De-Skum is nontoxic, 100 percent biodegradable, nonallergenic, nonflammable and will not harm human beings, skin, wood, plastic, vinyl, rubber, metal or other material. De-Skum itself and its by-products are nontoxic to fish and aquatic plant life.

For more information and free literature on De-Skum boat bilge cleaner from Alfa Products Co.,

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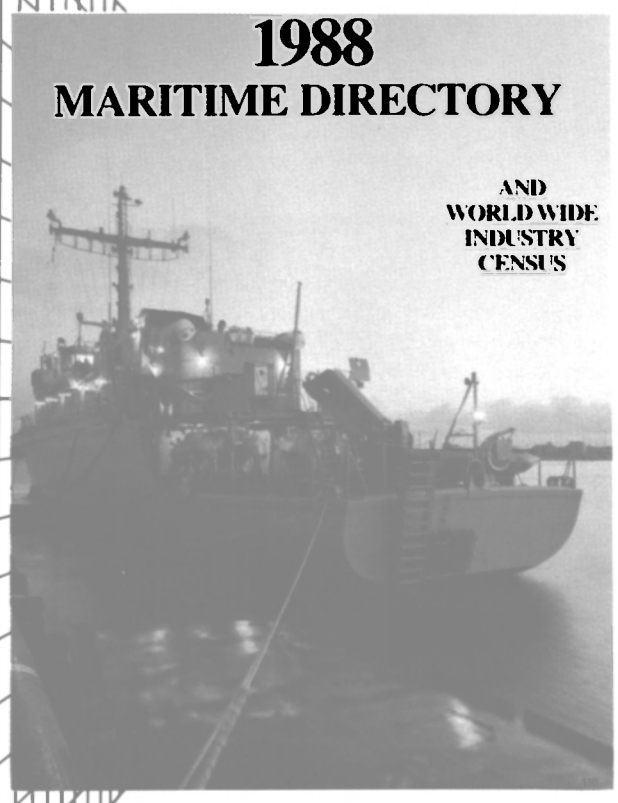

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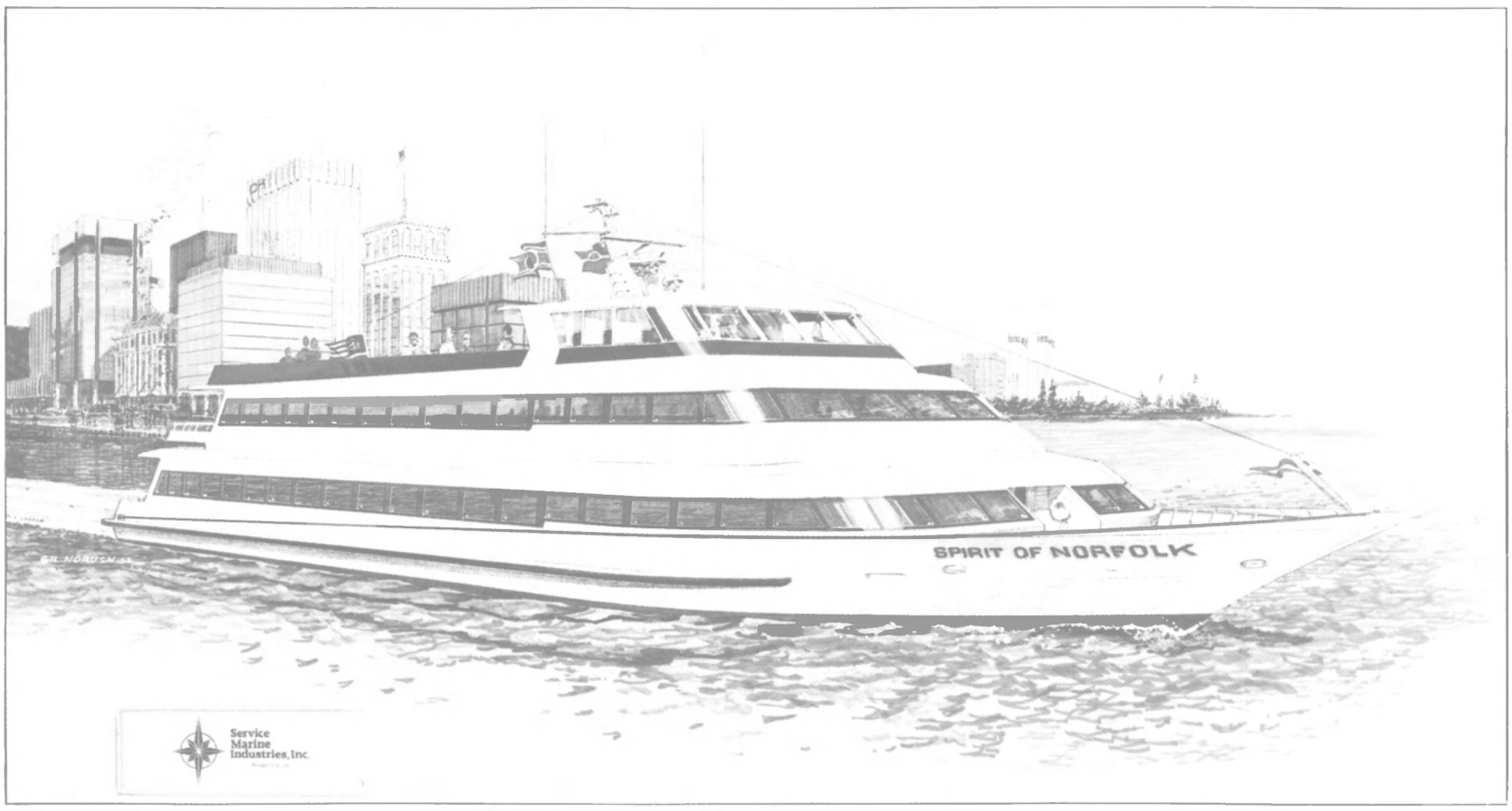

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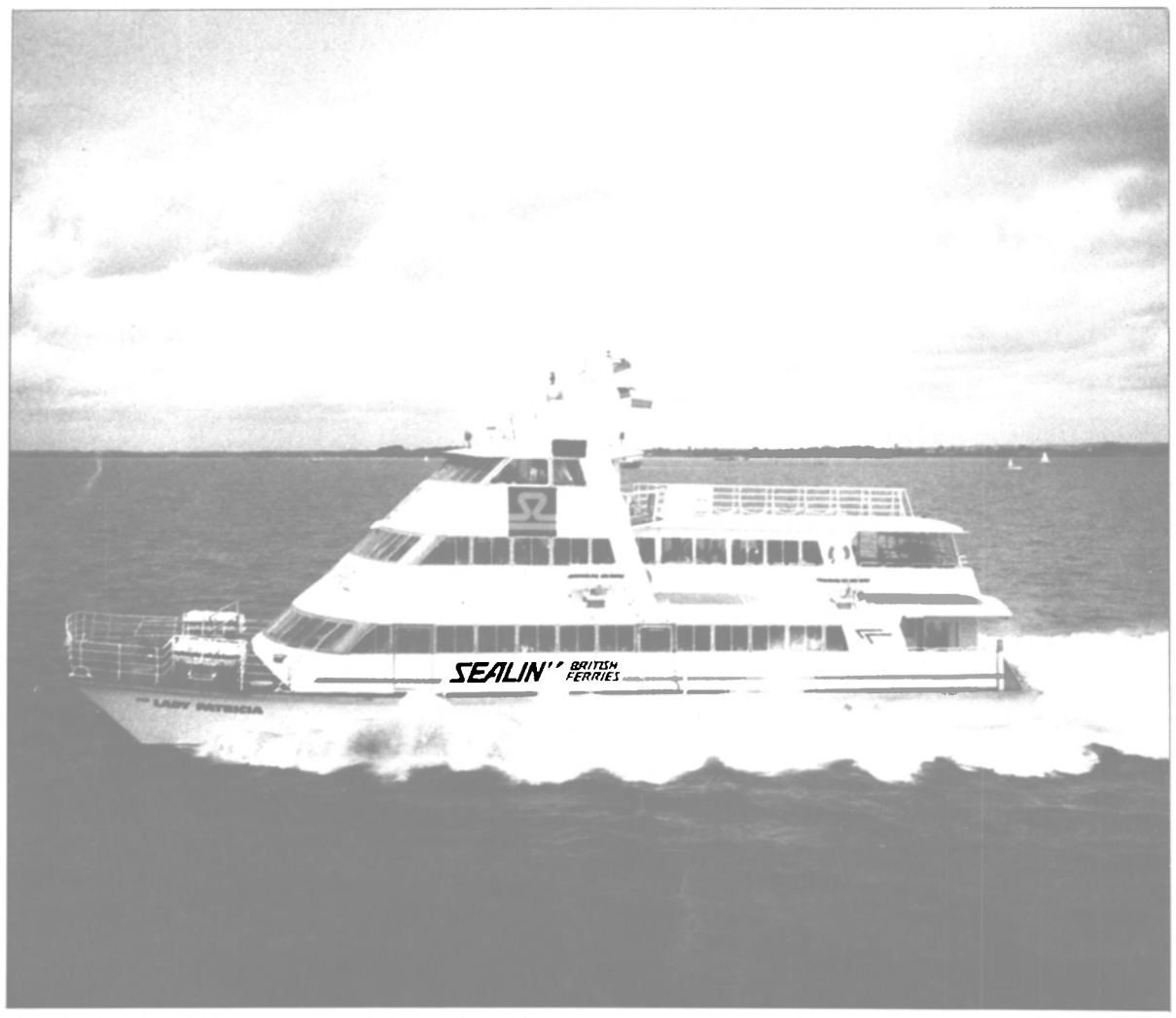

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