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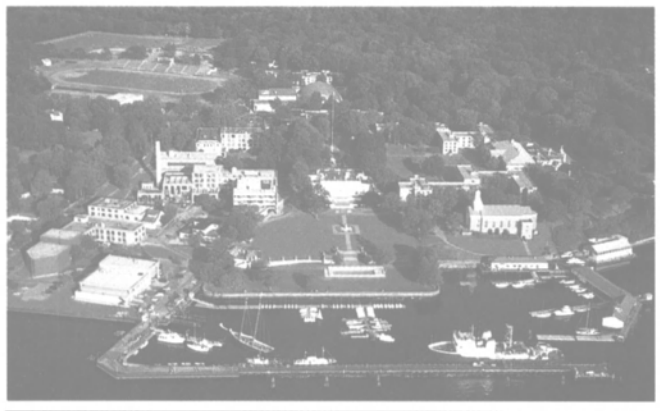

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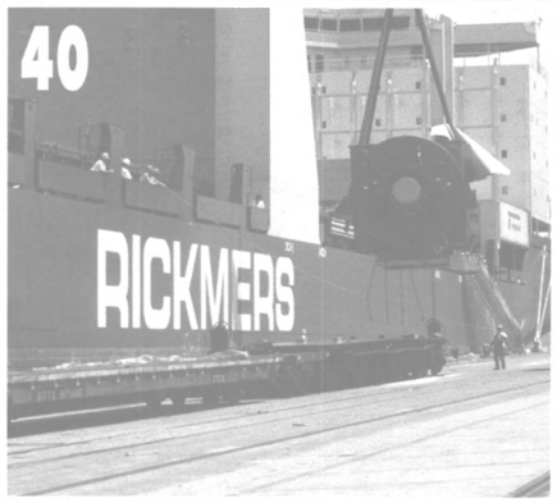

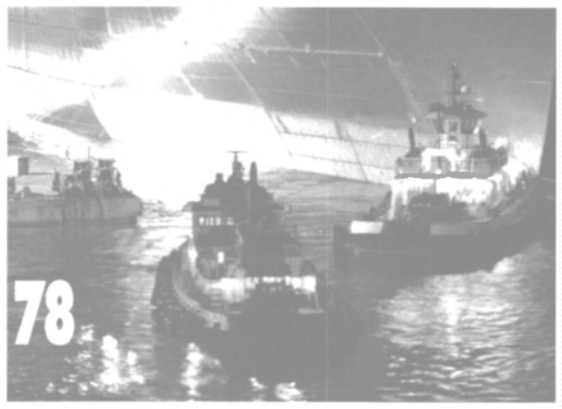

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NEW YORK
118 E. 25th St., New York, NY 10010
Tel: (212) 477-6700; Fax: (212) 254-6271
e-mail: mren@marinelink.com • Web: Internet: www.marinelink.com

FLORIDA
215 NW 3rd St., Boynton Beach, FL 33435

Associate Publisher
Gregory R. Trauthwein • trauthwein@marinelink.com

EDITORIAL

Managing Editor
Regina P. Ciardiello • ciardiello@marinelink.com

Assistant Editor
Jennifer Rabulon • rabalan@marinelink.com

Technical Editor
David Tinsley

Editorial Consultant
James R. McCaul, president, international Maritime Associates

MARKETING

Marketing Manager
Richard Groble • groble@marinelink.com
Tel: (561) 732-1659; Fax: (561) 732-6984

PRODUCTION

Production Manager
Michael Lowe • lowe@marinelink.com

Asst. Production Manager
Oksana Martemy • martemy@marinelink.com

CIRCULATION

Circulation Manager
Dale L. Barnett • barnett@marinelink.com

ADVERTISING SALES

Vice President of Sales
Lucia M. Annunziata • annunziata@marinelink.com

National Sales Manager
Rob Howard • howard@marinelink.com
Tel: (561) 732-4368; Fax: (561) 732-6984

North American Sales Manager
Brett W. Keil • bkeil@marinelink.com
Tel: (561) 732-1185; Fax: (561) 732-8414

Director, New Business Development
Jean Vertucci • vertucci@marinelink.com

Manager, Information Services
Tina Angelino • angelino@marinelink.com

Accounting Manager
Angelica Rivera • arivera@marinelink.com

Classified Sales
Tel: (212) 477-6700

PUBLISHERS
John E. O'Malley
John C. O'Malley • jomalley@marinelink.com

Chief Financial Officer
Al Adinolfi

International Sales Operations

Managing Director, International Sales
TONY STEIN
12, Braehead, Bo'ness, West Lothian EH51 OBZ, Scotland, U.K.
Tel: +44 (0) 1506 822240; Fax: +44 (0) 1506 828085

CHARLES E. KEIL, Vice President, International Operations
215 NW Third Street, Boynton Beach, FL 33435
Tel: +561-732-0312; Fax: +561-732-8063
24-hr Tel/Fax: +561-998-0313; Mobile Tel: +561-716-0338
e-mail: ckeil@marinelink.com

China
TED GREEN
Zhejiang International Advertising Corp.
596 Tiyuchang Road, Hangzhou, Zhejiang 31007
Tel: +86 571 5150937; Fax: +86 571 5150444

Germany/Switzerland
TONY STEIN
12, Braehead, Bo'ness, West Lothian EH51 OBZ, Scotland, U.K.
Tel: +44 (0) 1506 822240; Fax: +44 (0) 1506 828085

Japan
KATSUHIRO ISHII
Ace Media Service Inc., 12-6, 4-chome, Nishiike,
Adachi-ku, Tokyo 121, Japan
Tel. +81 3 5691 3335; Fax: + 81 3 5691 3336

Korea
JO, YOUNG SANG
Business Communications, Inc., Kwangwhamun PO. Box 1916, Seoul, Korea
Tel: +82 2 739 7840; Fax: +82 2 732 3662

Scandinavia
STEPHAN R.G. ORN/LEON SCHULZ
AB Stephan R.G. Orn, Box 184, S-271 24 Ystad, Sweden
Tel: +46 411-184 00; Fax: +46 411 105 31

Spain
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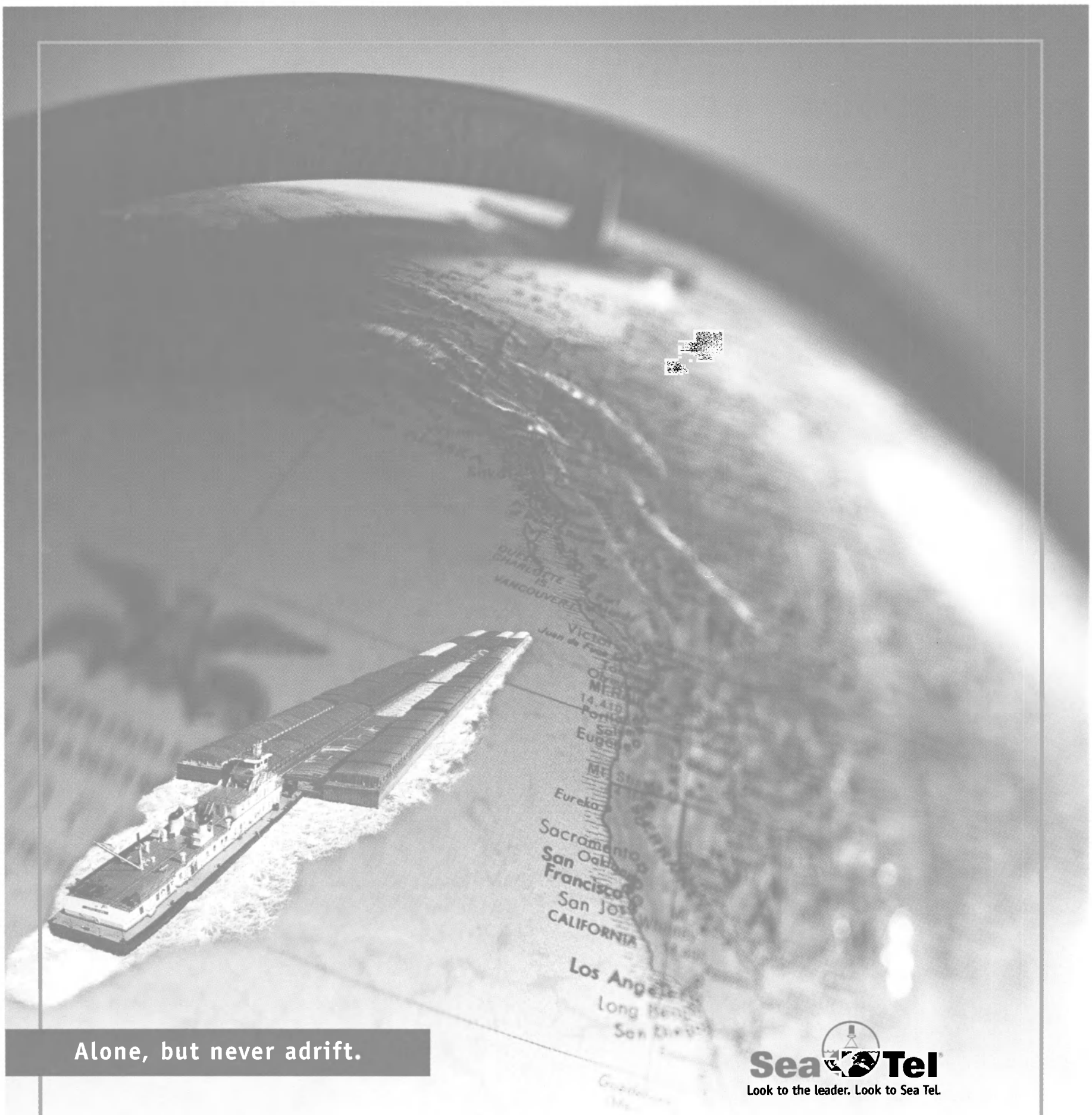
Directory of companies given editorial coverage in this edition of *Maritime Reporter & Engineering News.*



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"American Shipbuilding has, in my opinion, seen its lowest point, during the past year."

Most of you might naturally assume that this is a recent quote from a high ranking shipyard, government or other informed source regarding the current status of the U.S. marine industry.
Wrong!

This quote is attributed to the opinion of Captain **C.A. McAllister**, president of the American Bureau of Shipping, published in the January 1, 1928 edition of *Marine Age* magazine. This, and something my five-year-old son said recently, struck a chord within me regarding the challenges facing the U.S. ship and boatbuilding industry. Upon coming home from the beach one hot August day, Shane, upon inspecting his "Adidas" sandals, said, "It says that these were made in Indonesia ... I thought everything was made in China." From the mouths of babes.

This month I am pleased to present — with the dogged determination of Bastianelli, Brown & Kelly's **H. Clayton Cook Jr.**, and the much-appreciated cooperation of U.S. Maritime Administrator **William G. Schubert** — what I feel is one of the most comprehensive and thought provoking assessements of the U.S. Maritime market, current status and future prospects. Mr. Schubert — in the article starting on page 78 — addresses in a straight-forward manner the needs of the industry by vessel niche, as well as complex topics such as financing options and propects of operating ships profitably

Another traditional maritime powerhouse, Germany, hosts SMM 2002 — arguably the best marine exhibition in the world — later this month in Hamburg. In conjunction with this exhibition, **Alan Haig-Brown** has recorded in words and photographs — in *On the Road with Charles Kuralt*-esque fashion — an unparalleled insight to German Harbor Pilots operations. Those of you who enjoyed his coverage of a journey down through the Germany country side aboard the 345-ft. Johannes Von Nepomuk with Albrecht Zoller and his wife **Roswitha**, are sure to enjoy his experience in North Germany, as presented starting on page 34.

Gregory R. Trauthwein

www.marinelink.com **trauthwein@marinelink.com**

On the Cover

This month's cover is a broad rendering of the technological developments highlighted throughout the September 2002 edition, in conjunction with both the SMM Exhibition in Homburg, Germany and the SNAME Exhibition in Boston later this month.

Also in this Issue

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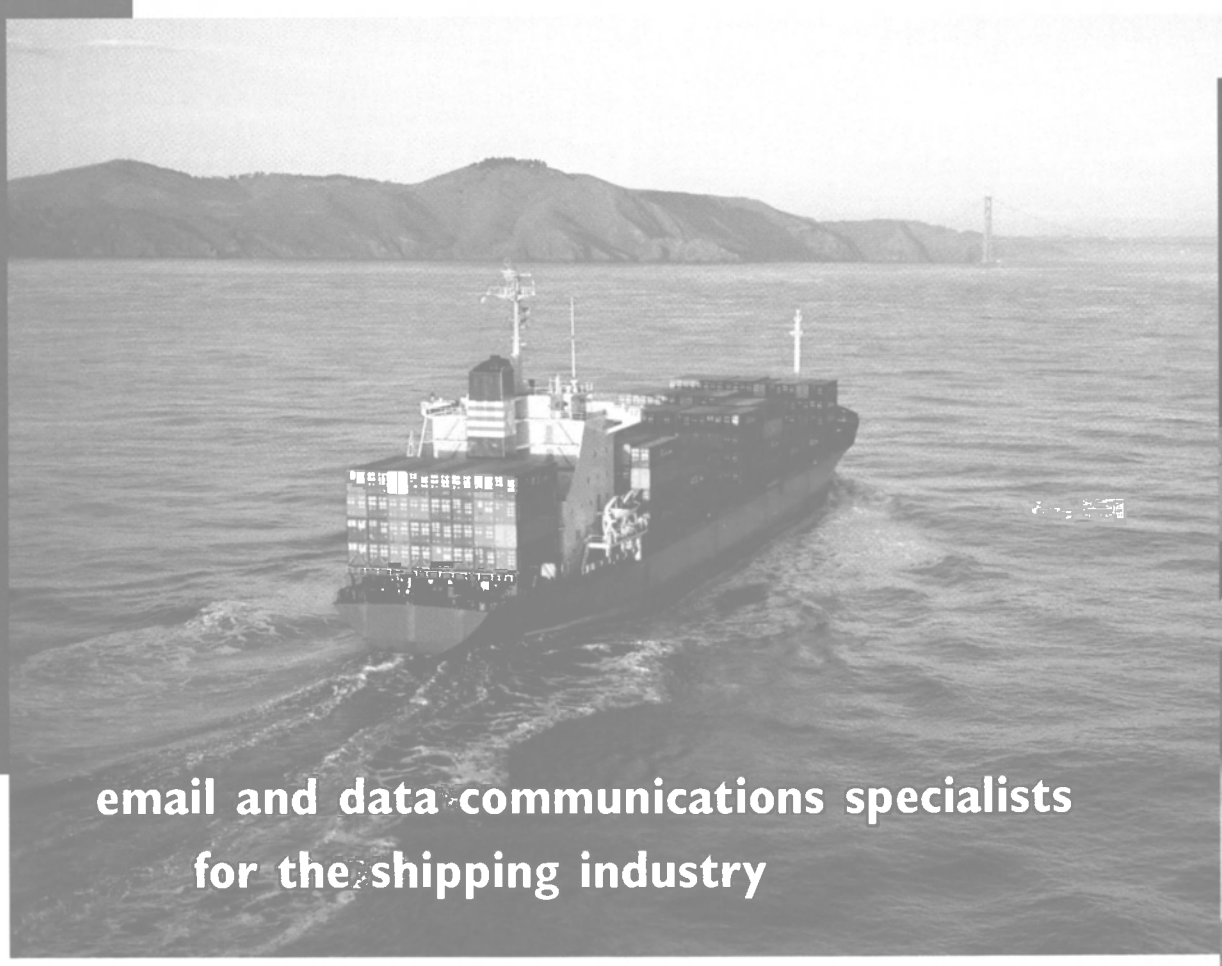

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GAO Affirms DD(X) Contract to Gold Team

Northrop Grumman Corporation, leader of the DD(X) Gold Team, and Raytheon company, received positive news last month when the General Accounting Office (GAO), decided that an appropriate evaluation process was used when the U.S. Navy selected the Gold Team to complete the system design for the Navy's 21st century surface combatant, DD(X).

Northrop Grumman's Ship Systems sector will lead the DD(X) system design, engineering prototype development and testing under a $265 million contract awarded to the Gold Team by the Navy on April 29. The Gold Team includes Raytheon and more than 30 of the nation's top engineering and maritime industrial companies. The initial design contract has a total value of approximately $2.9 billion over four years.

Design and technology verification work, which will culminate in the construction of a new family of surface

combatants, includes destroyers, cruisers and littoral combat ships. The transformational technologies developed in the DD(X) program will also be backfitted into today's existing fleet of Aegis-equipped cruisers and destroyers.

Key technologies of DD(X) include developing and testing engineering development models for advanced concepts for the gun system, radar suite, integrated power system, vertical launch system and signature management/reduction.

As electronic systems integrator, Raytheon's Naval & Maritime Integrated Systems (N&MIS) business will be responsible for DD(X) systems engineering, software development and development of combat system equipment. As part of this effort, Raytheon N&MIS will build and test a dual frequency radar suite, an integrated solid-state communication system, a new launcher, an Integrated Undersea Warfare Suite and a multimission total ship computing environment.

Coming in October MR:
A top to bottom review of the U.S. Navy's new "family" of ships.

GD Awarded $61M Drydock Contract

Electric Boat, a wholly-owned subsidiary of General Dynamics, has been awarded a U.S. Navy contract worth up to $61.1 million to maintain and operate the Shippingport drydock at the Naval Submarine Base New London.

The contract covers an initial period of one year, with options for four additional years. Management, operation and preventative maintenance of the Shippingport will be provided on a cost-plus-fixed-fee basis and is worth up to $34.6 million over the next five years, with $2.2 million of the total funded in the current fiscal year. The drydocking services associated with this contract will be paid on a firm-fixed-price basis and will be worth up to $26.4 million during the life of the contract.

The Shippingport (ARDM-4), which is used to lift submarines out of the water for repairs, had previously been operated by Navy personnel, but will now be run by a civilian crew of about 40 Electric Boat employees.

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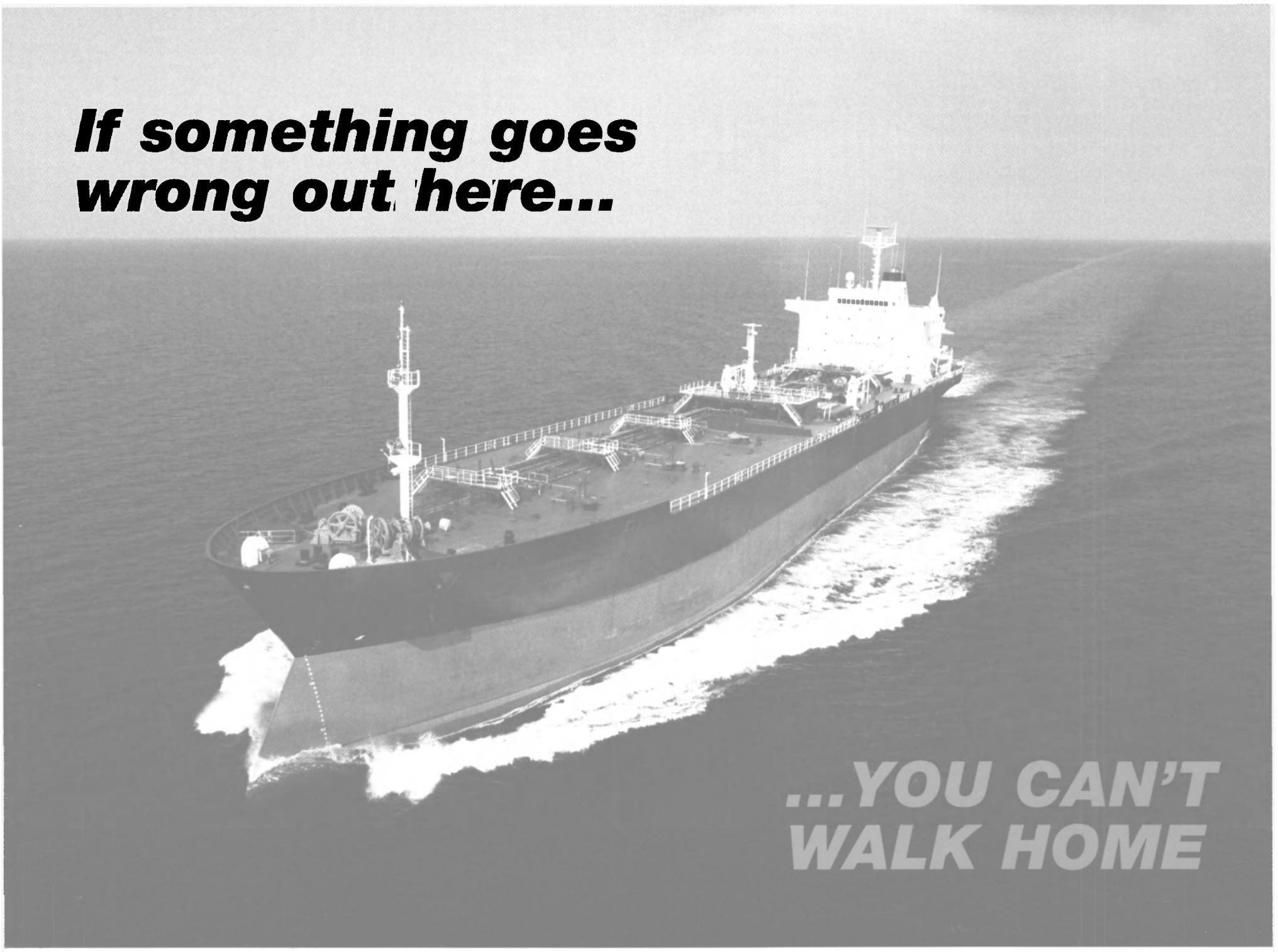

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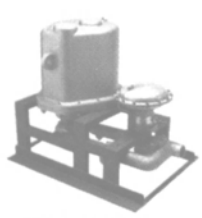

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Northrop Grumman Unloads Half-built Project America Ship to NCL

The saga of the now-defunct American Classic Voyages' U.S. Lines has seemingly come to a close with Northrop Grumman Corporation reaching an agreement on August 19 to sell all structures and material associated with the cruise vessel program at the company's Ship Systems sector to Norwegian Cruise Line.

Under the agreement, Norwegian Cruise Line will take possession by Sept. 30, 2002 of the nearly half-complete first ship and all associated equipment and materials, as well as material acquired by Northrop Grumman for a planned second ship. Approximately 350 Ship Systems employees are currently preparing the cruise ship for launching and towing. These ships were to have been known as the first cruise ships to be constructed in the U.S. in more than 30 years.

The company does not expect the sale to impact previously announced financial guidance. In May, the U.S. Maritime Administration (MarAd) conducted an auction for the cruise ship and associated materials, at which time MarAd subsequently directed Northrop Grumman Ship Systems to proceed unilaterally with the disposition of the vessel.

Malaysian-based Star Cruises Group, which is the parent company of NCL, said that that the vessel will be operated as part of the Norwegian fleet as a 2,000-guest purpose-built ship for Freestyle Cruising. The yet-to-be-named ship will be delivered in spring of 2004 in time for the summer season.

NCL has contracted with Northrop Grumman Ship Systems (NGSS) to buy all of the materials and equipment and the work performed to date on the two Project America vessels under construction at Northrop's Ingalls shipyard in Mississippi, that were to have been part of the now-defunct United States Lines fleet. The substantially completed hull of the first vessel, plus all of the associated equipment and materials, will be transported to Europe, where work will be completed ina yet to be determined shipyard.

"The acquisition of the 'Project America' assets was prompted by the success of Freestyle Cruising, the tremendous reception we have had to Norwegian Sun and Star, and the need to add ships as soon as possible after the delivery of Norwegian Dawn, our last scheduled new build, in December 2002," said **Colin Veitch**, president and CEO of NCL.

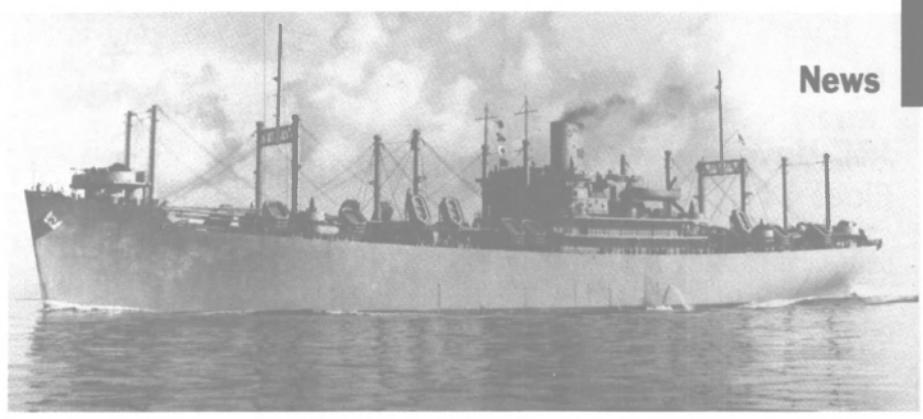
The original design of the "Project America" ship has been modified and will sail under the NCL brand as the latest addition to the company's revolutionary Freestyle Cruising fleet, which allows passengers to enjoy the benefits of no fixed meal times and no assigned seating in a relaxed atmosphere.

Eighty percent of the staterooms will have an ocean view, with 85 percent of those including private balconies — a total of five decks with private balconies.

Once the completion of the first vessel is under way, NCL will explore the feasibility of completing the second vessel based on the work in progress and materials that have been purchased as part of the deal with NGSS.

Oil Recovery Project Makes Progress

The U.S. Coast Guard's Marine Safety Office San Francisco Bay, the California Department of Fish and Game Office of Spill Prevention and Response (OSPR) and Titan Maritime, Inc. continue their steady progress on the assessment and oil removal operations from the sunken 468-ft. (142.6-m) cargo ship S.S. Jacob Luckenbach, which sank 50 years ago, 17 miles West of San Francisco.



S.S. Jacob Luckenbach, which sank 50 years ago, 17 miles West of San Francisco, has been slowly leaking oil.

Despite the challenges and risks involved with the operation, the responders have identified 26 tanks and spaces on the wreck containing about 132,000 gallons of heavy fuel oil. To date, about 12,000 gallons of oil have been recovered. During the assessment, many fuel tanks were found to have badly corroded vent pipes, which allowed oil to slowly leak into the cargo holds. These vents are the primary sources of the pollution that has contaminated shorelines and sea birds over the last few years.

Most of the leaking fuel vents have been sealed, but the process in ongoing. Operations in the forward cargo holds have been especially challenging. Inaccurate ship drawings and piles of cargo have complicated the search for vents in the holds. The 50-year-old cargo has corroded and fused together, forcing divers to chisel through solid walls of material to tunnel access ways to the vents.

The piles of cargo create safety concerns for the divers due to its instability. The recovery team has also had to overcome many challenges, including; diving in 175 ft. of water, 45 degree sea temperatures, poor underwater visibility, and strong bottom currents.

With the assessment and vent sealing phase nearly completed, the responders are using various techniques to remove the oil from the tanks. The oil at 50 degrees resembles that of peanut butter in thickness and is very difficult to pump to the surface. Divers are inserting heat exchangers and injecting steam into the oil to raise the oil's temperature enough to pump. The responders are making good progress refining these techniques or developing new, innovative ways to remove as much oil as possible.

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New & Notable

Crowley Christens Tug Response

Crowley's latest ship assist and escort tug renamed Response was christened August 2 in Elliott Bay.

Deicy Mathur, wife of **Anil Mathur**, President of the Alaska Tanker Company, LLC, performed the christening ceremony aboard Response. A team of Crowley engineers and architects designed the Response, with input from Crowley's ship assist and escort customer, Alaska Tanker Company; the vessel was constructed by Marco Shipyard in Seattle.

Response is a 130 ft. (39.6 m) and 7,200-hp tug able to provide enough indirect force to get most any job done quickly and safely.

Response features twin Voith Schneider 32G II/250 cycloidal propellers, powered by two Caterpillar 3608 DITA engines, and a unique high lift and streamlined hull designed to meet the indirect forces and speed requirements of the tankers operating in Puget Sound. The hull is derived from a design for the tug Boxer and was developed by Bukser og Berging, Norway. It is also equipped with full fire fighting capabilities and can carry 2,800 of foam concentrate.

Measuring 130 x 46 x 25 ft. (39.3 x 14 x 7.6 m), Response is designed to generate direct bollard pull of 150,000 lbs. and indirect forces in excess of 340,000 lbs. at 12 knots, with an anticipated free running speed of 15 knots.

Fitted with a Markey Model DESS-52 High Performance single-drum electric Hawser winch designed

specifically for this vessel, Response's winch will hold 1,000 ft. of 10-in. circumference AmSteel Blue high molecular weight polyethylene line with an average strength of more than one million lbs. This main line will be able to be hauled in at pressures of over twice the bollard pull of the boat's engines, a condition that can occur when escorting tankers at high speed.

For more information on the following companies, circle the corresponding Reader Service Card number:

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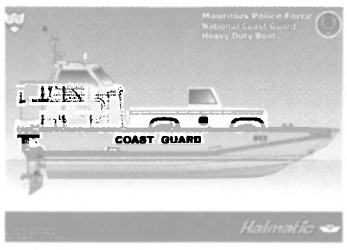

To satisfy their requirement for four heavy-duty multi-purpose workboats the Mauritius Police have opted for the RTK Marine 29-ft. (9-m) Ramped Logistic Support Boat.

The workboats are a new commercial derivative of the 29-ft. (9-m) Combat Support Boat proven in service with the U.K. Ministry of Defense and feature a raised aft-wheelhouse with a ramped well deck.

Main Particulars

Length, (o.a.)	29 ft. (8.7m)
Beam	10 ft. (3.2m)
Draft	3.2 ft. (1 m)
Weight	3,450 kg (lightship)
Payload	1,800 kg max

The planing, asymmetrical catamaran hull form is manufactured from GRP and features a high degree of reserve buoyancy to enable the craft to remain afloat when fully swamped. The self-draining well deck features a manually operated bow ramp and is capable of carrying a short wheelbase Land Rover, general cargo or personnel with the modular straddle seating in place.

Power is provided by twin 200-hp outboard motors to give a service speed in excess of 30 knots, the outboards are protected and can be quickly raised to facilitate beach landings.

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NASSCO and TOTE Christen Midnight Sun

National Steel and Shipbuilding Company (NASSCO) has joined with Totem Ocean Trailer Express, Inc. (TOTE) to christen M.V. Midnight Sun, the first commercial dry cargo vessel to be built in the U.S. in 10 years. Midnight Sun is the first of two new Orca-class trailerships being built by NASSCO for TOTE's service from Tacoma, Wash., to Anchorage, Alaska.

Lynn Garvey, wife of **Mike Garvey,** Chairman of the Board of TOTE's parent company, Saltchuk Resources, Inc., and **Lily Stevens**, the daughter of Senator **Ted Stevens** (R- Alaska), were the ship's sponsors, christening M.V. Midnight Sun with ceremonial bottles of champagne. Senator Stevens, who is serving in his seventh term in the U.S. Senate, was the keynote speaker at the event. M.V. Midnight Sun, and its sister ship, M.V. North Star, are 840 x 118-ft. (256 x 35.9-m) RoRo cargo ships offering the option to carry trailers as large as 53 ft. The ships' cargo can be loaded and discharged in nine hours, with the speed and efficiency of this process being an important competitive advantage for TOTE.

TOTE's 840-ft. (256-m) M.V. Midnight Sun was floated out at NASSCO in August.

M. V. Midnight Sun and M. V. North Star have already received several prestigious awards for their environmentally sensitive design. These include the States/British Columbia Oil Spill Task Force Legacy Award for 2000, the Alaska Department of Environmental Conservation Commissioner's 2000 Pollution Prevention Award, and the Biennial William M. Benkert Foundation 2002 Environmental Excellence Bronze Award. With Midnight Sun scheduled for delivery in early 2003, North Star will be christened on March 15, 2003, for a summer 2003 delivery.

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Halter Launches First J&L Barge

Halter Marine has launched Capella (meaning the brightest star in the constellation Auriga) an 80,000-barrel tank barge for J&L, Inc. The barge, the first project Halter has undertaken for J&L, was built at Halter's Gulfport, Miss. Yard for an August 30 delivery.

Measuring 332 ft. (101.1 m), with a beam of 74 ft. (22.5 m) and a depth of 25 ft. (7.6 m), the barge is built to U.S. Coast Guard standards under Sub-chapter D, as a tank barge certified to carry Grade A or lower bulk petroleum products. The barge also qualifies to be certified by ABS under the +A1 Oil Tank Barge designation.

The facility, technical, managerial and manpower assets of the Halter business unit are in the process of being transferred to VT Kinetics. After the closing, which is expected to take place no later than the end of August 2002, the new name of this company will be VT Halter Marine, Inc.

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"Taxi!?"

New York Water Taxi (NYWT) has accepted the delivery of Mickey Murphy — the first in a series of 53-ft. (16.1-m) passenger ferries constructed by Derecktor Shipyards. The bright yellow boats, which sport a black and white checkered trim, they will enhance waterborne transportation for New York City residents, as well as the millions of tourists that visit the major attractions on the West Side, Lower Manhattan and Downtown Brooklyn Waterfront each year.

Designed by Nigel Gee & Associates, the new Water Taxi is powered by two Detroit Diesel Series 60 engines, providing 600 hp at 2,100 rpm via Twin Disc gears. It is an all-aluminum catamaran with a low-wake hull and a top speed of 25 knots carrying 54 seated passengers. A bow-loader type, the vessel allows the passengers to disembark directly from the bow into the cabin located on the main deck. Able to hold 75 passengers, the vessel boasts 54 seats designed by Beurteaux, situated back-to-back so that passengers can enjoy panoramic views of the city during their ride.

Main Particulars

Length, (o.a.)	53 ft. (16.1 m)
Beam, (o.a.)	19 ft. (5.7 m)
Draft	4 ft. (1.2 m)
Engines	2x Detroit Diesel Series 60, 600 bhp
Passenger capacity	75 (max.)

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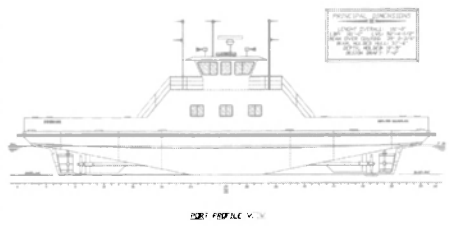
Blount Barker Delivers South Ferry Vessel

Last month the 101-ft. (30.7-m) double-ended ferryboat, Sunrise, was delivered to South Ferry, Shelter Island, N.Y., for service along the half-mile crossing of partially protected inland waters between Shelter Island and the South Fork of Long Island.

The 101 x 39 x 11-ft. (30.7 x 11.8 x 33-m) ferryboat designed by Dejong & Lebet, Inc. was built to USCG Sub Chapter "T" Rules and Regulations for 150 passengers. The vessel is a traditional car ferry with one open auto deck and enclosed aluminum side cabin with pilothouse.



The Sunrise can carry a maximum of 50 cars or 4 semi-tractor trailers with a maximum load of 240,000 lbs. Sunrise is powered by two Detroit Diesel Series 60 engines producing 400 hp at 1,800 rpm with stand-alone Twin Disc MG-516 gears (4.5:1) for easy access to change Vulcan couplings and Detroit Diesel DDEC controls. The vessel is equipped with two Rolls Royce, ice class, right hand, 54 x 40-in. pitch, four-blade propellers.

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Kvaerner Masa-Yards Delivers Carnival Legend

MS Carnival Legend was delivered on August 14 to Carnival Corp. at Kvaerner Masa-Yards' Helsinki shipyard. Legend, which is the fourth cruise ship in a series of new Panamax-Max size cruise ships under construction for Carnival Corporation, is operated by Carnival Cruise Lines and Costa Crociere. The first ship in the series, Costa Atlantica, was delivered in June 2000 - with sisterships Carnival Spirit and Carnival Pride in 2001.

The vessel carries a total of 2,680 passengers (lower beds: 2,124 passengers) in a total of 1,062 staterooms, and a maximum crew capacity is 961. Measuring 961 ft. (293 m), with a maximum breadth of 127 ft. (38.8 m) (over bridge wings), and a draft at dwl of 25 ft. (7.8 m), the vessel's relative number of outside passenger staterooms and staterooms with balcony is very high; 80 percent of all the staterooms are outside staterooms, and 70 percent of all the staterooms have a balcony. All prefabricated staterooms have been manufactured by Piikkio Works Oy.

Carnival Legend has been built by the yard together with a large number of turn-key and other suppliers. Production began in October 2000, and the assembly of the hull begun in the covered newbuilding dock in April 2001. The vessel was launched in December 2001, after which the cruise ship was transferred to the outfitting quay in front of the yard's outfitting terminal.

Legend has a diesel-electric machinery, consisting of six Wartsila 9L46D diesel engines, with a total power of 62,370 kW, each connected to an alternator producing electricity to the ship's main electric network. The propulsion consists of two azimuthing electric Azipod propulsion units, with a power of 17.6 MW each, as well as three 1.91 MW tunnel thrusters in the bow. The service speed is 22 knots.

Sailing under the Panamanian flag, the vessel is built according to RINA classification standards, fulfilling RINA's new Green Star environmental standard, consisting of two voluntary RINA class notations, CLEAN SEA and CLEAN AIR, setting strict requirements on the ship's design and operation, in order to protect the environment and keep the sea and air clean.

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Main Particulars - Carnival Legend

Class	RINA
Flag	Panama
Length, (o.a.)	960 ft. (292.5 m)
Length, (cwl)	865 ft. (263.6 m)
Length, (pp)	855 ft. (260.6 m)
Breadth, (max.)	127 ft. (38.8 m)
Breadth, (dwl) 106 ft. (32.2 m)	
Draft, (dwl)	25 ft. (7.8 m)
Draft, (scantling)	26 ft. (8 m)
GT	85,900, (including balconies, approx. 88,500)
Passenger capacity, lower bed	2,124
Passenger capacity, max.	2,680
Passenger staterooms, total	1,062
Crew capacity	961
Speed, service	22 knots
Speed, maximum	24 knots
Main engines	6 x Wartsila 9L46D
Power	6 x 10,395 kW/514 rpm
Main generators	6 x 14,405 kVA ABB
Propulsion	2 x 17.6 MW Azipod

Government Update

Crewing and Maritime Security

By Dennis L. Bryant, Senior Maritime Counsel, Haight Gardner Holland & Knight, Washington, D.C.

In the process of enhancing homeland and maritime security in the United States, the federal government is substantially increasing the burden on the owners, operators, managers, and agents of foreign ships. The heaviest burden, though, is being felt by the individual crewmember.

INS Policy

For a short time after the horrific terrorist attacks of September 11, 2002, Immigration and Naturalization Service (INS) officials in some ports (particularly the Port of New York and New Jersey) would not allow non-U.S. crewmembers to land (come ashore) in the United States. This knee-jerk reaction gradually faded and INS processing of foreign crewmembers slowly returned to nearly the pre-9/11 situation.

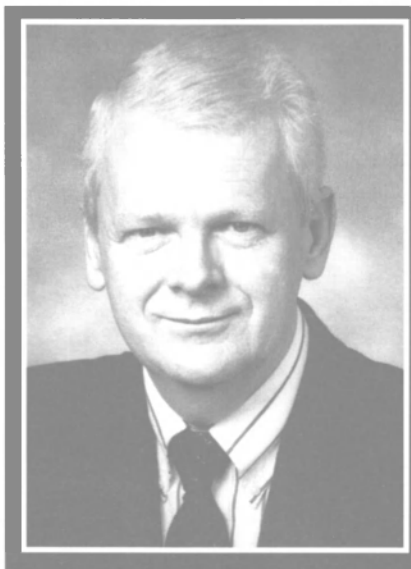
In March 2002, an incident in Chesapeake, Va. changed the unofficial INS policy. Four Pakistani crewmembers from the Maltese-flag freighter PROGRESSO sought shore leave. They did not have individual passports and the ship had not obtained a crew list visa. Despite that, the INS officer attending the ship exercised his discretion and, in accordance with the regulations, granted the shore leave request. The crewmembers promptly deserted, hoping for a better life in the United States. The INS Commissioner reacted by immediately recalling the District Director. This action had the intended effect of prompting all other INS District Directors to tighten the procedures for handling foreign ships and their crews.

The unofficial policy that rapidly but unevenly developed within the INS following the PROGRESSO incident was that no work was to begin on any vessel carrying non-U.S. crewmembers unless prior clearance had been received from the INS boarding inspector. On vessels that the Customs Service was not boarding, the gangway was not to be put down unless the INS inspector was present, unless prior approval has been received from the INS inspector. Finally, no visa waivers would be approved. Medical emergencies or other paroles will be considered only on a case-by-case basis, and then only with the specific approval of an INS supervisor.

Recently, though, even this policy has been tightened. At an increasing number of U.S. ports, the INS is issuing "detain on board" orders, requiring masters to keep on board some or all crewmembers. Allegedly for national security reasons, the INS is refusing to tell masters, agents, and ship owners, operators, and managers the basis of the "detain on board" orders. In many cases, the U.S. Coast Guard, at the request of the local INS office, issues Captain of the Port (COTP) orders requiring masters to hire commercial guard services to man the gangway 24-hours a day while the ship is in port to prevent crewmembers from going ashore. Disputes are now arising between ship owners and ship operators over responsibility for this added cost, which can run as high as $3,000 per day of the port call.

Crew List Visas

The U.S. Department of State, in a separate initiative, has drafted a proposal to eliminate crew list visas entirely. This measure, which was submitted on August 6, 2002 for review by the Office of Management and Budget (OMB) and could be placed into effect as early as January 2003, would eliminate U.S. shore leave for all foreign crewmembers except those fortunate enough to have both a valid passport from their country and a current U.S. visa. Many



Dennis L. Bryant is Senior Maritime Counsel at the law firm of Haight Gardner Holland & Knight, Washington, D.C.

crewmembers from third world countries lack passports, which traditionally were not required. In addition, it is often difficult for a mariner, who may be sailing for months at a time and who doesn't know future ports of call far in advance, to obtain a U.S. visa. The elimination of the crew list visa will provide a further obstacle to both shore leave and the ability of ship owners, operators, and managers to undertake crew changes while the ship is in a U.S. port.

Maritime Identification Credentials

The U.S. Coast Guard has announced that, starting September 6, 2002, it will only accept certain credentials for the purpose of identifying maritime personnel needing to board or disembark from ships and enter or leave waterfront facilities. Acceptable credentials include a military identification card, a federal employee badge, a driver's license or official identification card issued by a Department of Motor Vehicles or a Motor-Vehicle Administration within the U.S., a merchant mariner's document issued by the U.S. Coast Guard, a valid passport, a local law enforcement credential, an identification credential issued by a state or local port authority, and an identification credential issued by a company, union, or trade association. The credential must contain the full name of the individual, include a current photograph of the individual, bear the name of the issuing authority, and be laminated or otherwise secured against tampering.

Unofficially, the individual Captains of the Port (COTPs) are given broad discretion to accept additional credentials that they have determined to be trustworthy, but this will naturally vary from port to port.

Immediately after the terrorist attacks in September 2002, the Secretary of Transportation convened various Direct Action Groups to examine various aspects of transportation security. The Credentialing Direct Action Group (CDAG) has been studying the issue of a National Transportation Workers' Identification Card (TWIC) for all transportation workers and other persons who require access to secure areas at transportation facilities. The Coast Guard policy regarding maritime identification credentials will remain in effect at least until the TWIC process has been finalized and implemented.

National Security Entry-Exit Registration System (NSEERS)

On August 12, 2002, Attorney General **John Ashcroft** announced that on September 11, 2002, the Immigration and Naturalization Service (INS) will commence a pilot program at selected ports of entry called the National Security Entry-Exit Registration System (NSEERS). The NSEERS Program will be adopted at all U.S. ports of entry (including seaports, airports, and land border crossings) on October 1, 2002. This program, which is intended to "provide greater protection for the United States and help aliens fulfill their responsibilities under the laws of the United States," will require the fingerprinting of some entering foreign visitors and completion of registration forms. Initially, the requirements will be imposed on all nationals of Iran, Iraq, Libya, Sudan, and Syria and on all other nonimmigrants whom the State Department or the INS determines to present an elevated national security risk.

The NSEERS Program relies on regulations that have been on the books for many years, but these regulations have been suspended for decades, as conceded by the Department of Justice.

Analysis

The new emphasis on ships' crews raises a host of issues.

The INS is now strictly enforcing reg-

ulations that have not been adhered to in years. The U.S. Coast Guard is preparing to do likewise. Particularly with regard to the newly-reinvigorated INS policy, the question of due process is germane.

The federal government is preparing to implement a transportation worker's identification card system at the same time that it is negotiating at the International Maritime Organization (IMO) in London and the International Labor Organization (ILO) in Geneva for adoption of a universal mariner's identification card.

Crewmembers are being branded as threats to U.S. national security, but the individuals affected, the masters, owners, operators, managers, and agents are not being advised of the basis of the allegations. Further, masters are not even being allowed to remove the "suspect" crewmember from the vessel. Such removal would both reduce the alleged risk to national security and eliminate the requirement for hiring commercial guard service. In many instances, the masters are not even being advised of the reason for the requirement for guard service.

It is questionable whether INS has the authority to require a master to hire a commercial guard service merely because INS has issued a "detain on board" order with regard to a particular crewmember. The pertinent statute merely requires the master to receive and detain the crewmember. The regulations largely repeat the statutory provision. The words 'guard' or 'guard service' appear in neither the statute nor the regulations.

This would not be the first time that INS has overstepped its authority. In the mid-1990s, INS was demanding that sea and air carriers pay detention costs (including the cost of guard services) in cases where a stowaway alleged political asylum. Processing of asylum cases can be lengthy and the detention costs can be high. Various sea and air carriers brought separate actions against INS for recovery of monies expended in accordance with the INS orders. The appellate courts held that INS lacked authority to require the carriers to bear the expense of detention.

On the diplomatic level, the question arises with regard to how the United States Government can engage in meaningful negotiations in an international forum to develop a universal standard for mariners' identification cards when it is actively working on the domestic level to implement a unilateral scheme. Only time will whether the two processes will be compatible.

It is presently unclear how many mariners will be caught up in the NSEERS Program and required to be fingerprinted and complete new documentation. If the incidence of "detain on board" orders is any indication, though, the number could be quite high.

Conclusion

Foreign mariners on foreign ships carry 95 percent of U.S. imports and exports. The U.S. economy would grind to a halt without them and their ships. They have carried U.S. military personnel and U.S. military equipment on a regular basis since at least World War I. While the United States certainly needs to exercise heightened vigilance subsequent to September 11, 2001, the need to "detain on board" large numbers of foreign mariners is less than clear, and certainly has not been explained to those involved or to the public at large. Until and unless a public explanation of the new processes is forthcoming, the U.S. Government will lack moral authority in this regard.

President Cuts USCG Funding

On August 13, President Bush hosted the President's Economic Forum at Baylor University in Waco, Texas, bringing together a variety of individuals to discuss the fundamentals of the economy and the President's agenda to increase economic growth for the future.

From the President's Statement at the Economic forum Plenary Session, President Bush indicated that he will refuse to spend a $5 billion package included in the 2002 Supplemental Appropriations Act for Further Recovery from and Response to Terrorist Attacks on the United States stating, "Congress, for the long-term economic security of America, needs to restrain spending.... And if the Congress won't show spending restraint, I intend to enforce spending restraint."

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SENESCO To Construct 171-Ft. Hopper Barge

The Southeastern New England Shipbuilding Corporation (SENESCO) has signed a major barge contract for construction of a 171-ft. (52.1-m) hopper barge that will have a holding capacity of 2,750 cu. yds. Construction has already begun and is expected to be completed this fall. The barge is being built for Disch Construction of Summit, N.J. who will use the barge to transport dredge spoils.

In addition to an increase in its executive ranks and the announcement of the Disch contract, SENESCO also recently completed a multi-vessel repair contract for Modern Continental, a Boston-based construction company.

SENESCO's repair business is expected to grow even further when the company launches a new dry dock it is building at its Quonset Point, R.I. facility. The new dry dock will allow the company to repair larger vessels and also enable Senesco to launch larger barges, including the 320-ft. (97.5-m), 80,000 barrel double hulled liquid fuel barge being built for **Don Church** of Sea Boats, Inc.

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Bollinger Builds Next Generation Liftboat

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What sets L/B Myrtle apart from other liftboats is that it is equipped with a bow thruster and controllable pitch (CP) propellers for greater maneuverability and pinpoint positioning of the huge legs with oversized pads on the ocean bottom.

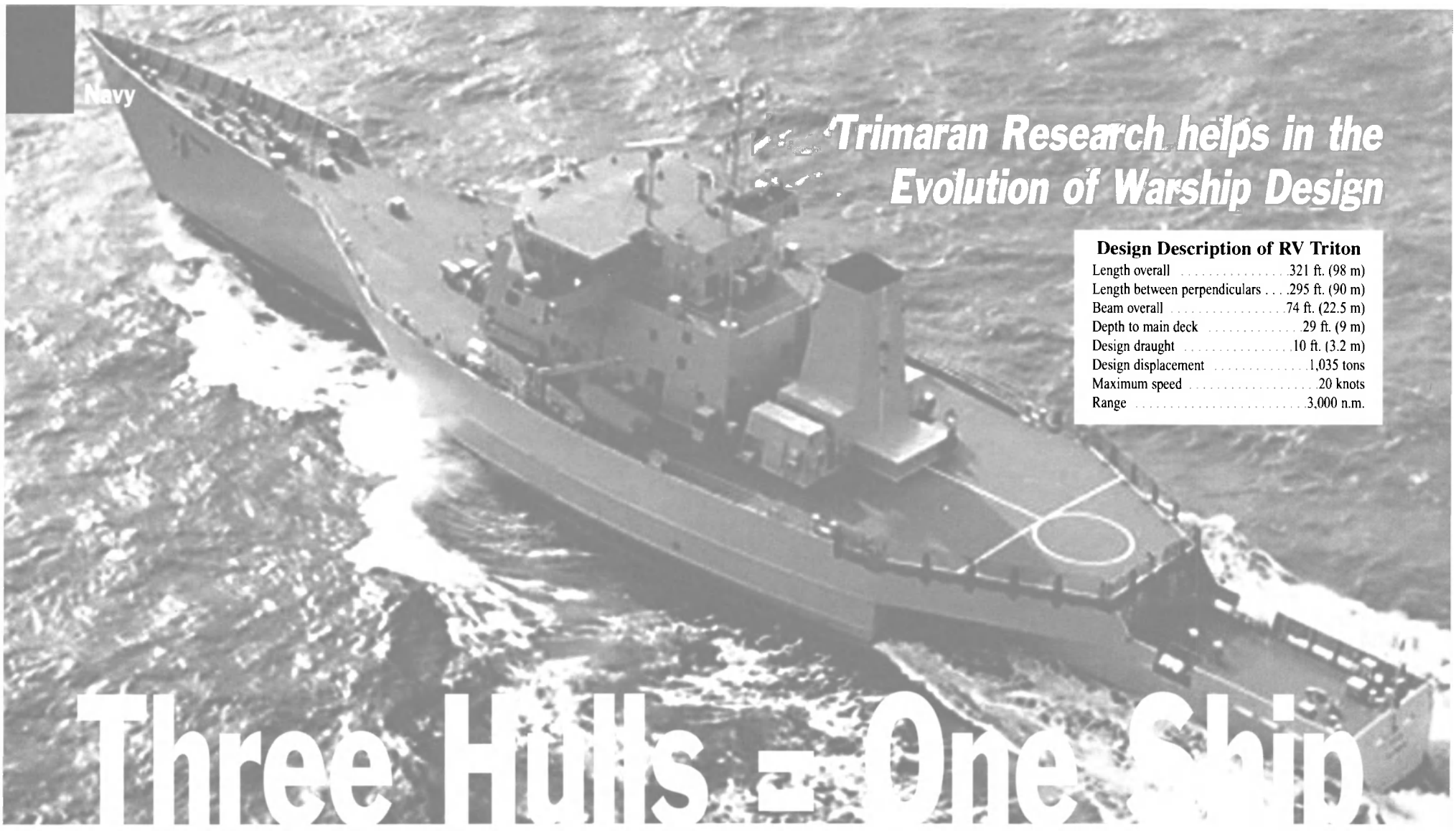
The vessel's namesake is in honor of **Myrtle Orgeron**, mother of **Lee Orgeron**, and is equipped with 40 x 16-ft. pads (12.1 x 4.8-m), much larger than those on other liftboats, to provide for greater bottom stability and greater deck loads. The L/B Myrtle can also jack with a full pre-load and its pre-load system has quick acting stainless steel dump valves.

It is equipped with three Nautilus cranes with 150, 50 and 25-ton capacities in an innovative configuration. The smaller crane is positioned on the starboard stern so that support vessels can tie-up to the liftboat and offload personnel, cargo, and/or fluids without hindering other work being done by the liftboat. The 150-ton crane has a 110-ft. boom and is equipped with VHF radio, loudhailer, load indicator and boom-mounted video camera with monitor to assist when load hook-ups are out of the normal view of the operator.

With regulatory classifications consisting of ABS loadline, SOLAS/MARPOL, USCG Subchapter L, L/B Myrtle measures 137.5 ft. (41.9-m) with a 92-ft. (28-m) beam and hull depth of 13-ft. (3.9-m). Open deck area is 6,000 sq. ft., and its three legs are 72 in., in diameter and constructed of 1.5-in., wall thickness high strength steel. Power is supplied by two Caterpillar 3512 diesels developing a total of 3,000 bhp, driving Berg controllable pitch propellers through Reintjes reduction gears. Electrical power is produced by two 190 KW generators driven by Caterpillar 3306 diesels. A 350-bhp hydraulic motor drives the bow thruster.

The Hydraquip jacking system is designed using the latest hydraulic and computer technology to accurately control the leg position. The programmable logic controller provides all jacking system logic, safety interlocks, leg position and alarm monitoring. The hydraulic system incorporates a three speed jacking system that allows leg tagging at 10 ft./min, normal jacking at 4 ft./min and preload jacking at 2 ft./min. The jacking system has counterbalance (holding) valves at each motor for pinion isolation. All jacking system pressures, system status, temperatures, alarms, and operation manual are displayed on a liquid crystal plasma touch screen.

that a sensible extra olation to design s r t e s r resen a ive of a warship CRANKSHAFT



Trimaran Research helps in the Evolution of Warship Design

Design Description of RV Triton

Length overall	321 ft. (98 m)
Length between perpendiculars	295 ft. (90 m)
Beam overall	74 ft. (22.5 m)
Depth to main deck	29 ft. (9 m)
Design draught	10 ft. (3.2 m)
Design displacement	1,035 tons
Maximum speed	20 knots
Range	3,000 n.m.

Three Hulls - One Ship

The U.K. Ministry of Defense (MOD) has been studying the use of the trimaran hullform for its Future Surface Combatant. As part of its research and risk reduction process an ocean going demonstrator Research Vessel (RV) Triton was procured by QinetiQ, the former U.K. Defence Evaluation and Research Agency. From October 2000 to March 2002 it was used in these risk reduction trials and is now available for hire as a general trials ship. Over the past seven years the U.K. Ministry of Defence (MOD) has explored in some detail the potential benefits of a trimaran. Hydrodynamic and structures studies by QinetiQ together with design investigations by the U.K. MOD Director of Naval Architecture and the Surface Ship Concepts Group at QinetiQ have suggested that, for a given requirement, the trimaran could offer:

- Improved powering characteristics at high speed leading to a reduction in installed power;
- Alternative ship layout options helping to optimise operational effectiveness and the potential to improve survivability;
- The ability to adjust the hull configuration to cater for through life changes, which would significantly effect stability;
- An upper deck layout and superstructure design that can be more aviation friendly;
- The ability to fit larger weapons and sensors higher up with less penalties than for a monohull; and
- Greater scope to accommodate alternative propulsion arrangements including independent propulsion in side hulls improving damage tolerance.

Many of these potential benefits will be explored by the design and build of RV Triton, the Trimaran Demonstrator and an extensive series of sea trials.

Trimaran Research

The first work was carried out at the University College in London where the U.K. MOD sponsors a department, studying warship design. In the late 1980's task of designing various trimaran warships. The results of this work were so encouraging that the Director of Operational Requirements within the U.K. MOD decided to fund research work at QinetiQ to confirm the advantages promised by the hullform and also to understand the design constraints imposed on the use of the hullform in warship design.

This work started in 1994 and initially concentrated on the hydrodynamic aspects of the hull design, which was carried out by running small-scale models of typically 26 ft. (8 m) in the tanks at the QinetiQ site at Haslar. The research was successful and the key parameters of main hull length to beam ratios and side hull length and position were identified. While this was progressing computer design tools were developed which predicted the resistance, propulsion, seakeeping and maneuvering characteristics of the trimaran warship. Once the hydrodynamic design was set, our structural experts at Rosyth started to investigate the structural design requirements. This has been largely based on the development of computer codes in a series of numerical models. These have been used to predict loadings and stresses in different sea states, which have allowed the structural rules for the design of trimaran warships to be established. The final area of research covers survivability where any peculiarities of using a long slender hullform are being investigated through the use of scale model experiments and the development of computer based numerical models.

The results of this research have been most encouraging and to date nothing has been identified which negates any of our perceived advantages. However it is a very brave group that would commit to building a fleet of trimaran warships based on the results of small scale model testing. An interim step was needed and this is the Trimaran Demonstrator — RV Triton.

The Need for a Demonstrator

It is unusual to build a prototype warship on this ensuring structural safety. These role is not compromised the contractor ed commercial crew. This approach of trimaran warships would represent a significant change from the more conventional monohull, both in terms of the design challenges and the operation of such ships.Perhaps the greatest concern is that of structural design. The critical issue is; exactly what design loads and associated safety factors should be applied? While most other aspects of design and performance can be predicted adequately by mathematical or small scale physical modeling, structural synthesis relies on knowledge of the loads the ship is likely to encounter.

Warships are inherently lightweight structures to maximize payload in a small platform and to ensure high speed at minimum cost. A conservative approach to the structural design of a trimaran could severely penalize the form when compared to a mono-hull designed to the same requirement. To enable appropriate design criteria to be established an accurate knowledge of the loads which an ocean-going trimaran will experience is required.

Developing the Requirement

During the early stages of the project it became clear that it would take about two years of sea trials to gather the structural load data required by the MOD. However, a financial commitment to purchase a vessel of this size with use for just two years was not viable. To justify the procurement of RV Triton, a business case was prepared showing that an acceptable return on investment could be provided by a program of various trials over a 15-year period. RV Triton therefore has two roles. First, as a research tool and subsequently as a trials vessel with flexibility to fit and trial many disparate weapons and commercial systems.

Given the need to produce "frigate like" structural data, the first question to be answered was "how big should the demonstrator be?" This question was put to DNV the classification society that was selected, and the U.K. MOD's structural experts at Rosyth. They were both asked to consider the time required to gath- can be measured and recorded. RV Tri-

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It is equipped with three Nautilus cranes with 150, 50 and 25-ton capacities in an innovative configuration. The smaller crane is positioned on the starboard stern so that support vessels can tie-up to the liftboat and offload personnel, cargo, and/or fluids without hindering other work being done by the liftboat. The 150-ton crane has a 110-ft. boom and is equipped with VHF radio, loudhailer, load indicator and boom-mounted video camera with monitor to assist when load hook-ups are out of the normal view of the operator.

With regulatory classifications consisting of ABS loadline, SOLAS/MARPOL, USCG Subchapter L, L/B Myrtle measures 137.5 ft. (41.9-m) with a 92-ft. (28-m) beam and hull depth of 13-ft. (3.9-m). Open deck area is 6,000 sq. ft., and its three legs are 72 in., in diameter and constructed of 1.5-in., wall thickness high strength steel. Power is supplied by two Caterpillar 3512 diesels developing a total of 3,000 bhp, driving Berg controllable pitch propellers through Reintjes reduction gears. Electrical power is produced by two 190 KW generators driven by Caterpillar 3306 diesels. A 350-bhp hydraulic motor drives the bow thruster.

The Hydraquip jacking system is designed using the latest hydraulic and computer technology to accurately control the leg position. The programmable logic controller provides all jacking system logic, safety interlocks, leg position and alarm monitoring. The hydraulic system incorporates a three speed jacking system that allows leg tagging at 10 ft./min, normal jacking at 4 ft./min and preload jacking at 2 ft./min. The jacking system has counterbalance (holding) valves at each motor for pinion isolation. All jacking system pressures, system status, temperatures, alarms, and operation manual are displayed on a liquid crystal plasma touch screen.

Trimaran Research helps in the Evolution of Warship Design

Design Description of RV Triton

Length overall	321 ft. (98 m)
Length between perpendiculars	295 ft. (90 m)
Beam overall	74 ft. (22.5 m)
Depth to main deck	29 ft. (9 m)
Design draught	10 ft. (3.2 m)
Design displacement	1,035 tons
Maximum speed	20 knots
Range	3,000 n.m.

Three Hulls — One Ship

The U.K. Ministry of Defense (MOD) has been studying the use of the trimaran hullform for its Future Surface Combatant. As part of its research and risk reduction process an ocean going demonstrator Research Vessel (RV) Triton was procured by QinetiQ, the former U.K. Defence Evaluation and Research Agency. From October 2000 to March 2002 it was used in these risk reduction trials and is now available for hire as a general trials ship. Over the past seven years the U.K. Ministry of Defence (MOD) has explored in some detail the potential benefits of a trimaran. Hydrodynamic and structures studies by QinetiQ together with design investigations by the U.K. MOD Director of Naval Architecture and the Surface Ship Concepts Group at QinetiQ have suggested that, for a given requirement, the trimaran could offer:

- Improved powering characteristics at high speed leading to a reduction in installed power;
- Alternative ship layout options helping to optimise operational effectiveness and the potential to improve survivability;
- The ability to adjust the hull configuration to cater for through life changes, which would significantly effect stability;
- An upper deck layout and superstructure design that can be more aviation friendly;
- The ability to fit larger weapons and sensors higher up with less penalties than for a monohull; and
- Greater scope to accommodate alternative propulsion arrangements including independent propulsion in side hulls improving damage tolerance.

Many of these potential benefits will be explored by the design and build of RV Triton, the Trimaran Demonstrator and an extensive series of sea trials.

Trimaran Research

The first work was carried out at the University College in London where the U.K. MOD sponsors a department, studying warship design. In the late 1980's as part of their MSc course, students were given the task of designing various trimaran warships. The results of this work were so encouraging that the Director of Operational Requirements within the U.K. MOD decided to fund research work at QinetiQ to confirm the advantages promised by the hullform and also to understand the design constraints imposed on the use of the hullform in warship design.

This work started in 1994 and initially concentrated on the hydrodynamic aspects of the hull design, which was carried out by running small-scale models of typically 26 ft. (8 m) in the tanks at the QinetiQ site at Haslar. The research was successful and the key parameters of main hull length to beam ratios and side hull length and position were identified. While this was progressing computer design tools were developed which predicted the resistance, propulsion, seakeeping and maneuvering characteristics of the trimaran warship. Once the hydrodynamic design was set, our structural experts at Rosyth started to investigate the structural design requirements. This has been largely based on the development of computer codes in a series of numerical models. These have been used to predict loadings and stresses in different sea states, which have allowed the structural rules for the design of trimaran warships to be established. The final area of research covers survivability where any peculiarities of using a long slender hullform are being investigated through the use of scale model experiments and the development of computer based numerical models.

The results of this research have been most encouraging and to date nothing has been identified which negates any of our perceived advantages. However it is a very brave group that would commit to building a fleet of trimaran warships based on the results of small scale model testing. An interim step was needed and this is the Trimaran Demonstrator — RV Triton.

The Need for a Demonstrator

It is unusual to build a prototype warship on this scale, but there is a great deal at stake. Running a fleet of trimaran warships would represent a significant change from the more conventional monohull, both in terms of the design challenges and the operation of such ships.Perhaps the greatest concern is that of structural design. The critical issue is; exactly what design loads and associated safety factors should be applied? While most other aspects of design and performance can be predicted adequately by mathematical or small scale physical modeling, structural synthesis relies on knowledge of the loads the ship is likely to encounter.

Warships are inherently lightweight structures to maximize payload in a small platform and to ensure high speed at minimum cost. A conservative approach to the structural design of a trimaran could severely penalize the form when compared to a mono-hull designed to the same requirement. To enable appropriate design criteria to be established an accurate knowledge of the loads which an ocean-going trimaran will experience is required.

Developing the Requirement

During the early stages of the project it became clear that it would take about two years of sea trials to gather the structural load data required by the MOD. However, a financial commitment to purchase a vessel of this size with use for just two years was not viable. To justify the procurement of RV Triton, a business case was prepared showing that an acceptable return on investment could be provided by a program of various trials over a 15-year period. RV Triton therefore has two roles. First, as a research tool and subsequently as a trials vessel with flexibility to fit and trial many disparate weapons and commercial systems.

Given the need to produce "frigate like" structural data, the first question to be answered was "how big should the demonstrator be?" This question was put to DNV the classification society that was selected, and the U.K. MOD's structural experts at Rosyth. They were both asked to consider the time required to gather the data, the areas the ship would be tested in and the

loads that had to be generated in order that a sensible extrapolation to design and extreme conditions could be achieved reliably. Both studies concluded, independently, that a vessel of between 295 and 361 ft. (90 and 110 m) should provide the data necessary to validate numerical and small-scale physical models. Since the main function of the ship is to be a "structural transducer" it is imperative that the structure is representative of a warship and as light as possible so that induced strains can be measured by the onboard instrumentation with the minimum of error. Obviously the need for the lightest structure could compromise the structural safety of this ocean-going ship. Studies were carried out to investigate the best way of

ensuring structural safety. These showed that adopting a structural design code such as the DNV High Speed Light Craft rules, should result in a structure similar in style to a typical Royal Navy frigate. Safety of the vessel will, therefore, be demonstrated by adherence to appropriate Classification Society rules. To ensure the "structural transducer" role is not compromised the contractor was required to obtain confirmation from DNV that the structural weight of RV Triton was minimized.

As well as providing a mechanism for a safe structural design the adoption of classification society standards was also consistent with the need for the vessel to be operated by QinetiQ using a contracted commercial crew. This approach meant that RV Tritonwould also need to meet the requirements of the Maritime and Coastguard Agency and be registered as a U.K. merchant vessel.

Trials Instrumentation System

Clearly, a structural demonstrator is of little use unless the structural responses can be measured and recorded. RV Triton has been fitted with a significant instrumentation package feeding data into a central recording facility. The system records more than 300 channels covering a wide range of data from structural instruments and other sources such as machinery control, ship motion, steering gear, navigation and the environment. The Trials Instrumentation System (TIS), as it is known, has been developed by the US Navy from the system installed in the SWATH T- AGOS 19 and will be fitted to RV Triton under an inter-governmental agreement.

Hydrodynamic Parameters

A number of hydrodynamic studies were carried out at Haslar as part of the trimaran research program. These were used to generate a reference hull form and to define the required hydrodynamic parameters. During the early stages of the program it emerged that under certain stern quartering sea conditions and with the ship having a metacentric height of that expected of a trimaran

Primary Design Drivers

The requirement for Triton to be a "structural transducer," combined with the novelty of the hull form, led to the design being driven predominantly by three issues :

1. Structural Design

The initial structural design was carried out in accordance with the High Speed and Light Craft Rules of DNV. However, with no historical data on which to base predictions it was imperative to estimate, without undue conservatism, the structural loads resulting from motions in a seaway at various speeds and at various headings. To achieve this, DNV used their SWAN package which simulates the passage of the vessel through a given seastate to generate estimates of the in service and extreme loads. The results of the simulations were time dependent predictions of structural loading which were then, together with a number of quasi-static load cases from the DNV rules, used as the basis for global finite element and fatigue analysis of the structure. This work revealed a number of potential problem areas with the initial structural design. For example, high stresses from transverse wave loading were induced in 2 deck around the transverse bulkheads which could have led to buckling. Panel stiffeners and some increases in plate thickness were necessary.

2. Hydrodynamics

One of the central justifications for the adoption of the trimaran configuration has been the benefit of lower resistance leading to higher speeds or lower installed power. For this reason, the minimization of resistance, in particular at top speed, has been a high priority during the design.

The extensive experience gained by QinetiQ during its model testing enabled a highly efficient configuration to be developed within the constraints laid down by the specification.

The main hydrodynamic parameters of the hull form are as follows:

Length waterline	298 ft. (91 m)
Side hull % of total displacement	37 percent
Main hull CB	0.49
Main hull B/T	2.14
Side hull LWL	112 ft. (34.2 m)
Side hull BWL	4 ft. (1.4 m)
Side hull draught	7 ft. (2.3 m)
Side hull separation	30 ft. (9.3 m)
Side hull longitudinal position	2.25m aft amidships

3. Stability

The specification required that both Naval Standards, supplemented by a specific trimaran GZ shape criterion, and MCA requirements were met. The only standard used by MCA that is appropriate to multihull craft is the SOLAS high-speed craft code.

warship, models exhibited unacceptable dynamic roll characteristics. With a shorter roll period, equivalent to that of a scaled mono-hull, this characteristic improved. Exploration of this phenomena during the trials of RV TRITON is a vital part of trimaran development. Tight control of the predicted roll period of the vessel was included in the specification.

The contract for the design and build of RV Triton was placed with Vosper Thornycroft in July 1998 as the result of a competitive tender process. The ship was launched in May 2000 and delivered to QinetiQ (then DERA) in August of the same year.

Hull Form

The main hull is of round bilge form with underwater sections approaching semi-circularity amidships. A gentle rise of buttock lines aft leads to a counter-stern transom with minimal immersion. The sidehulls are of multi-chine design on the outboard face with a plane inboard face for ease of manufacture. A parallel section is included extending above and below the waterline to avoid large changes in waterplane as displacement varies. Above this there is a flared section outboard and a haunch inboard to provide additional buoyancy as the opposite side hull emerges when heeling. Both hull and decks are longitudinally stiffened and supported by transverse frames at 1,500 mm spacing. Frames are fabricated up to two-deck level while above this both frames and deck beams are flanged. The steel grade used has a yield stress of 265 Mpa that is similar to the main structural steel used on frigates.

Propulsion

RV Triton is a diesel electric ship with both propulsive and ship service power provided by a pair of diesel generators. Drive is provided by a single conventional shaftline in the main hull, plus a right angle drive thruster in each side hull. The main shaft is driven by a single 3.5MW AC electric motor through a reduction gearbox. Side hull thrusters are driven by 350 kW electric motors. The prime movers are two Paxman 12VP185 powered 2MW diesel generators backed up by a 400 kW harbour set and an 80 kW emergency set.

A single fixed pitch propeller and rudder are conventionally arranged under the aft end of the main hull. The capability to fit a larger permanent magnet motor of up to 5 MW power has also been provided so that any related trials could contribute to the business case.

Sea Trials Summary Report

Since delivery to QinetiQ in August 2000, RV Triton has been conducting sea trials for the UK Ministry of Defence and the US Department of Defense to evaluate the performance of the trimaran hullform in various operational scenarios and environmental conditions.

All the trials were carried out under a Memorandum of Understanding between the two governments. These trials completed in March 2002.

These trials were conducted in various sea states and at different speeds to ensure the ship encountered a diverse set of sea conditions. One of the perceived advantages of the trimaran hullform is the decrease in resistance and the lower power required to drive the ship when compared against the equivalent displacement monohull. In trials this has been proved as a reduction at high speed.

RV Triton has good directional stability due to its long centre hull and the sea trials have proved that she is far more comfortable in higher sea states than a monohull. Towing operations were conducted in one sea state higher than had previously been conducted for ships of RV Triton's size.

Structural Loading

Although considerable research had been successfully carried out, the risk

with trimarans was considered to be in determining the structural design of the ship particularly at the junction of the mainhull and sidehulls together with slamming loads on the underside of the cross-deck. This could only be determined by gathering structural strain and load data at ocean going scale. RV Triton conducted a number of specific structures trials where she encountered a wide variety of sea states from sea state 2 through to sea state 8.

The data gathered correlated well with the predicted computer model results with the anticipated results. The ship behaved extremely well in all trials the hull suffered no damage.

Northrop Grumman Preble (DDG 88)

Northrop Grumman Corporation delivered to the U.S. Navy its newest warship — Preble (DDG 88) — an Aegis guided missile destroyer built by the shipyard's facility in Pascagoula, Miss. Preble is the 38th ship in the DDG 51 Arleigh Burke-class of Aegis guided

missile destroyers. In naming DDG 88 Preble, the Navy, for the sixth time, honors Cmdr. **Edward Preble,** (1761-1807), a pioneer in U.S. naval and merchant marine service. With Cmdr. **Timothy Batzler**, USN, a native of Baltimore, Md., and a 1983 graduate of the U.S. Naval Academy, as the new ship's commissioning commanding officer, Preble will depart from Pascagoula in October where it will join the U.S. Pacific Fleet during commissioning ceremonies Nov. 9, 2002, in Boston, Mass. — moving on to its homeport in San Diego, Calif.

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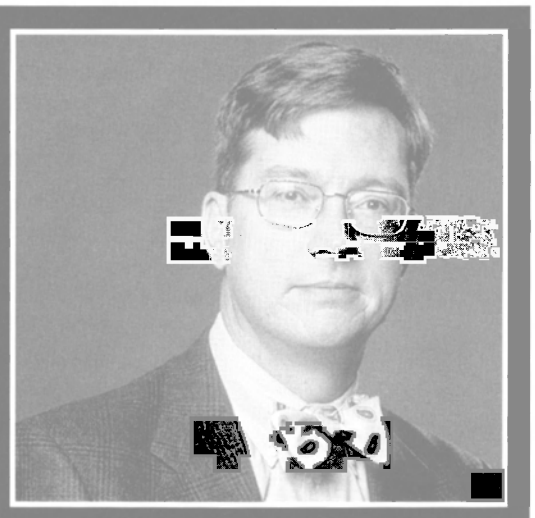
McCampbell Commissioned

The U.S. Navy commissioned Arleigh Burke class guided missile destroyer, McCampbell on Aug. 17, 2002. Measuring 510 ft. (155 m), with a 59-ft. (17.9-m) waterline beam, the ship, which honors the late Navy Capt. **David McCampbell** (1910-1996), who is the Navy's top ace with 34 confirmed aerial victories and recipient of the Medal of Honor while serving as commander, Air Group 15, the USS Essex, during the Battle of the Philippine Sea (June 19, 1944) and the Battle of Leyte Gulf (October 24, 1944). During the first encounter, McCampbell's force virtually annihilated an attacking force of 80 Japanese carrier-based aircraft, of which he personally shot down seven. In the Battle of Leyte Gulf, he daringly attacked a formation of at least 60 Japanese land-based aircraft. McCampbell shot down at least nine of these aircraft, forcing the remainder to abandon the attack. In addition to the Medal of Honor, McCampbell received the Navy Cross, Silver Star and Distinguished Flying Cross. No previous ship has been named McCampbell.

Construction of DDG 85 took place at Bath Iron Works in Bath, Maine.

What Hull Shape Is Best?

Back at the dawn of maritime history, a coastal dweller first took a log and ventured out on the water. Over time his craft evolved from a rough log to one that had shape at the ends and was hollowed out. These changes to the basic log shape were the first example of modifying a hull form to increase carrying capacity, improve ride comfort, and to reduce resistance. Since then, shipbuilders, naval architects, and ship owners have experimented with hull shapes and the number of hulls to find the "best" design. Let's look at some of those variations to understand the challenges of choosing a hull shape. **— by John Waterhouse**



By John Waterhouse, P.E., president, Elliott Bay Design Group, Seattle, Wash.

Monohull Design

The basic monohull can be defined by six key numbers: length, beam, depth of hull at midships, design draft, prismatic coefficient, and displacement. Length, beam, and draft are familiar to everyone. Depth of hull at midships gives an idea of the freeboard as well as an indication of the hull strength in bending. The prismatic coefficient is a measure of how much shape there is in the ends of a hull. A high prismatic coefficient means that the ends are full such as a tanker bow. A low prismatic means that the ends are fine, with little volume, such as a tugboat stern.

The choice of what dimensions to use depends on the intended use of the vessel. For a passenger vessel, there are considerations of carrying capacity, operating environment, and type of operation. Clearly, a 400-passenger dinner boat operating on a river will have different characteristics than a 400-passenger overnight car ferry operating in Alaska. Characteristics the riverboat hull will likely have include:

- **Shallow Draft** — allowing the vessel to operate near river banks at various river levels
- **Relatively low freeboard** — vessel is not subject to the bending forces from ocean waves
- **Relatively high beam** — provides stability since there is little of the vessel down in the water
- **Moderate displacement** — the variable load (people, fuel, provisions) is relatively small
- **Low prismatic** — the hull operates at modest speeds and low horsepower

Further refinements of the hull shape have to do with factors such as: type of propulsion, sea conditions the vessel will experience, method of construction, and handling characteristics. Using our example of a riverboat, the after portion of the hull will be shaped differently if the vessel is propelled by a paddlewheel versus propellers in tunnels. Similarly, for steel construction, the designer must decide whether to choose a molded hull or a hard-chine hull. The latter construction method is less expensive, but may require more power to drive at the same speed.

Key Factors in Hull Shape Selection

Speed and displacement are key factors in choosing a hull shape. To a waterfront observer, a 600-ft. (182.8-m) tanker moving at eight knots leaves little or no apparent wake behind it while an 80-ft. (24.3-m) tug operating at the same speed leaves a very noticeable wake. The great naval architect William Froude showed us that the wave-making resistance of a vessel is proportional to the square root of the vessel's waterline length, or:

$$Rw = \frac{\text{Speed}}{(\text{waterline length})1/2}$$

The tanker is operating at eight knots divided by the square root of 600 ft., or a so-called speed-length ratio of 0.33, while the tug is operating at a speed-length ratio of 0.89. Relative to its size, the tug is putting more effort into moving through the water.

Another factor in hull design is the displacement. Our tanker has a displacement of some 46,700 long tons versus some 301 long tons for the tug. However, if they both had the same hull shape, say the tug was shaped like the tanker, the tug's displacement would only be 110 tons, its beam would be

Figure 1: Hull Shape Comparison Chart

Vessel Type	Length oa (ft)	Length wl (ft)	Beam (ft)	Depth hull midship (ft)	Design draft (ft)	Displ. (long tons)	Primatic Coeffic.	Design speed (knots)	Speed/ Length Ratio	Displ/ Length Ratio
Fast Ferry (Catamaran)	134.5	115.5	9.8	13.9	6.5	84	0.60	36.0	3.35	54
Trans-Atlantic Liner	1029.3	962.0	117.8	91.8	36.6	68350	0.58	29.5	0.95	77
Riverboat	274.0	241.0	62.0	8.5	6.0	1497	0.70	8.7	0.56	107
Fast Ferry (Monohull)	98.0	88.0	22.0	9.5	5.6	83	0.70	26.0	2.77	122
Tanker	620.0	600.0	100.0	46.0	34.0	46700	0.76	14.5	0.59	216
Tug	80.0	80.0	29.0	13.1	10.0	301	0.58	12.0	1.34	588

Note: Beam, Displacement, and all ratios are given for the demi-hull of the catamaran

only 13.3 ft. (4.4 m) versus 29 ft. (8.8 m) and the depth of hull would be only 6.1 ft. (1.8 m) versus 13.1 ft. (3.9 m). Clearly one shape does not fit all vessels. Since vessel displacement is roughly proportional to the length cubed, we can group vessels by a so-called displacement-length ratio (DLR), which is defined as:

DLR = Displacement (long tons)
(waterline length (ft)/100)3

By this measure, the tug has a displacement-length ratio of 588 vs. 216 for the tanker. In other words, the tug is quite heavy for its length. Typical of vessels with high displacement-length ratios (over a value of 400) are tugs, fishing vessels, and some yachts. Most slow passenger vessels have moderate displacement-length ratios (values between 200 and 300) while fast vessels generally have low displacement-length ratios (values of less than 100).

For speed-length ratios from zero to approximately 1.3, the weight of a vessel, at speed, is supported by buoyancy forces. Operating at a speed above 1.0 times the square root of the waterline length, greater speed typically means a long, slender hull. This is shown in the transatlantic liners of the 1930's such as Normandie, which has an operating speed of 29.5 knots - provided by a hull that was approximately 962 ft. (293.2 m) on the waterline; giving her a speed-length ratio of 0.95. Its ratio of length to beam was 8.7:1 and its displacement-length ratio was 76.7.

Where the weight of the hull is supported by both buoyancy and hydrodynamic forces, as in a planing hull, the hull shape is markedly different. The width of the hull relative to the length increases in order to provide more lifting area to get the hull out of the water. Typical of monohull planing boats are length to beam ratios of between 5:1 and 4:1. The hulls have significant deadrise in the bow to prevent pounding in waves. The bottom lines aft of amidships tend to be of a relatively constant shape, providing good water flow. The stern is a transom shape to provide a clean separation of the water flow. Again, the hull shape changes as the operation changes.

Figure 1 on page 27 provides some comparison between various hull shapes, sorted by displacement-length ratio.

What About Multi-Hulls?

Shortly after our coastal dweller modified his basic log shape, his neighbor probably lashed other timbers onto a log and pronounced his invention of a newer, better hull shape: the outrigger canoe. Since that time there have been a large number of vessels built with two or more hulls. Are two hulls better than one? Let's see what our key numbers tell us.

For low speeds, the resistance of a hull

is primarily due to the frictional resistance of the water flowing past the hull. This frictional resistance is proportional to the surface area of the hull. With two hulls, a catamaran has more surface area than a monohull of the same displacement. Therefore, at low speeds, a catamaran is less efficient than a monohull. It does have greater stability however due to the spacing of the hulls. A designer may use a catamaran hull for a slow speed vessel where there is a need for greater stability or where there is a need for a large deck area.

At high speeds the catamaran design divides the weight of the vessel and wave making resistance between two demi-hulls, both of which are relatively narrow for their length. Let's take the example of a 135-ft. (41-m) catamaran with a waterline length of 115 ft. (35.2-m), a speed of 36 knots, and a full load displacement of 170 metric tons (167.3 long tons). Each demi-hull has a speed-length ratio of 3.35 and a displacement-length ratio of 54.4. The beam of the demi-hull is 9 ft. (3 m) giving a length to beam ratio of 11.7:1. Note that the hulls are long and narrow and that the weight is relatively low compared to the size of the vessel. They are also spaced far enough apart that the wave train from one demi-hull does not affect the other demi-hull. The shape of the main deck with a beam of 34 ft. (10.5-m) also gives a good layout for passenger spaces.

Like any other hull type, there are disadvantages to the catamaran configuration. The narrow shape of the demi-hulls makes for restricted access to the propulsion machinery.

The hull will be subject to slamming when the height of the seas exceeds the air gap clearance between the cross structure and the design waterline. The fine shape of the bows can cause the bow to plunge into waves rather than rise over them and the stresses induced by two demi-hulls working in a seaway can lead to structural cracking.

Lastly, the performance of the vessel is very sensitive to weight so careful monitoring of weight growth is essential.

So, What's the Perfect Hull Shape?

The answer will be different for different operations. If you are thinking of a new vessel design or about modifying an existing one, I suggest talking to a variety of designers. Each one has their preferences and their areas of expertise. If someone is trying to convince you that there is a break-through design that is better than anything out there, be cautious. As we have tried to show above, there is no one hull shape or type that will meet all needs.

Designers have lots of good tools to analyze vessel performance in order to optimize hull shape for seakeeping and resistance. Talk to them and get educated about the options for hull shape and their costs. Size up those logs and pick the one that's best for you.

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Advances in CAD and CAM System Integration

Over the past 25 years CAD and CAM have become a vital part of shipbuilding. The individual tools have evolved into highly capable products of today. This has included the change from 2-D to 3-D CAD, a dramatic increase in the level of usability (example: from batch mode to fancy 3-D GUI's) and increased functionality within the tools themselves.

With the development of these tools has also come improved integration of the CAD and CAM data. While 2-D CAD drawings were originally entered into the CAM system manually, it has now become commonplace to utilize a fully integrated product model environment from vendors such as Dassault Systems (Catia), Intergraph (ISDP), Nupas-Cadmatic, Sener (Foran) and Tribon Solutions (Tribon M1).

Even today, some current installations utilize a complete 3-D product model for the design of a system such as piping or HVAC, but then create a paper drawing to transfer data to the production (CAM) system.

CAD and CAM integration has always been a primary problem for U.S. shipbuilders. U.S. naval shipbuilders have tended to use general-purpose mechanical CAD systems such as CADDS or CATIA because of their exceptional 3-D model viewing capabilities.

An Integrated Solution

Because these systems lacked shipbuilding CAM capabilities, they had to be combined with separate shipbuilding CAM systems such as AUTOKON or SPADES. Few options were open as to how to integrate these CAD and CAM systems, and yards have normally created the connections themselves by writing dedicated custom interfaces. These interfaces must then be maintained by the shipyard (or sub-contractor) and be modified to accommodate software upgrades or new tools.

In general European shipyards have tended to utilize shipbuilding specific CAD/CAM systems such as Tribon, Foran and Nupas. These systems provide an integrated CAD/CAM solution as part of a single system. Such monolithic systems utilize proprietary data architecture, to provide seamless links between the two systems. In this case the shipyard is tied to a single vendor and may have to compromise on the available features in one part of the system in order to have the desired features of the other part. Additionally, many shipyards implemented the sole source vendor's products while they were in the early stages of product development and were left to create many custom interfaces to other shipyard systems themselves.

Up until now, major Japanese shipbuilders have employed either their own homegrown systems such as Mitsubishi Heavy Industry's MATES or specialized shipbuilding CAD/CAM systems such as Tribon. Like their European counterparts, the Japanese put more emphasis on CAM and production than the U.S. yards, which, as mentioned, tend to emphasize model viewing.

Regardless of the type of configuration, once the shipyard finally gets all of its connections in place, little flexibility remains to adopt new, improved products or practices. In order to make

changes to a single system, a major revision to the connection architecture is normally required.

Additionally, several manual steps might be necessary to perform the actual data transfer. These environments typically don't have support for data management, putting a heavy burden on the systems user. This is especially true in the "one of a kind" production in shipbuilding, where the CAD to CAM data transfer happens often.

Research, Development, Sharing = Better CAD Systems

As the implementation of 3-D product modeling becomes the norm in more shipyards, the need for a flexible CAD and CAM integration solution will increase. The need for flexibility is compounded by the worldwide consolidations taking place in the industry. Acquisitions and mergers have created families of companies working together in ways that would have seemed impossible just five years ago.

The current direction from the large product model vendors is to allow an open standard format as an optional output from their product model. This is demonstrated by vendor involvement in projects such as NSRP, ISE / ESTEP. Use of open standards would support a local integrated architecture and provide data access between systems used by sister shipyards or subcontractors.

Two open-standard formats; STEP and STEP-NC are destined to compete with proprietary solid-model formats. These important standards allow the sharing of model data between different systems and will provide a better integration of CAD and CAM.

STEP or ISO 10303 (http://www.diffuse.org/products.html#STEP) is a vendor neutral standard that describes how to represent (and therefore exchange) digital product information. STEP-NC or ISO 14649 (www.step-nc.org) provides a neutral NC-programming interface to support information transfer between CAD and CAM and NC systems. Recent emphasis has been on milling operations; however further exploitation of this standard for other applications such as shipbuilding is currently underway.

There are several U.S.-based R & D projects currently underway that are intended to better integrate CAD, with the current and planned CAM systems.

The Integrated Steel Processing Environment (ISPE) is an NSRP-ASE funded research project. Headed by Northrop Grumman Ship Systems, the project goal is to create an interoperable solution that removes the dedicated link from one CAD system to one CAM system for the design and production of steel plate.

STEP Tools (Troy, NY) currently is working on an U.S. Navy, ONR funded research project to examine the technical merits of utilizing STEP-NC for manufacturing operations in the shipbuilding industry. STEP Tools will study applying STEP-NC technology to control pipe bending and cutting at Electric Boat, Quonset Point, RI.

Atlantec Enterprise Solutions (Annapolis, MD)

PRELIMINARY NOTICE - UNRESERVED PUBLIC AUCTION

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A partial list to date includes:

CABLE LAYING EQUIPMENT: Moran Sled.

15- BARGES: Marcus 100 x 30 x 6 Ft Steel Spud, Mobro 2001 180 x 52 x 11 Ft 923 Ton Steel Spud, Mobro 2000 180 x 52 x 11 Ft 933 Ton Steel Deck, Sam 2 90 x 50 x 7 Ft 297 Ton Steel Spud, 2- 2000 195 x 40 x 12 Ft 820 Ton Steel Material, 2- 2001 195 x 40 x 12 Ft 786 Ton Steel Material, 120 x 33 x 6 Ft Spud, 100 x 24 x 4 Ft Deck, 2- 96 x 28 x 9 Ft 193 Ton Steel Dump, 38 x 14 x 75 Ft 10 1/2 Ton Steel, 38 x 14 x 3 Ft, M2 47 x 16 x 3 Ft 24 Ton Steel.

14- MARINE - COMMERCIAL VESSELS: ***Tug Boats;*** Champion 63 x 23 x 9 Ft 125 Ton, Joe Van 49 x 15 x 7 Ft 32 Ton, Nancy Anne 54 x 20 x 8 Ft 73 Ton, Ray Durocher 42 x 12 x 5 Ft 20 Ton. ***Push Boats;*** 1993 Michael V 20 x 8 x 2 Ft 4.45 Ton, Monark 26 x 9 x 2 Ft Alum Tri-Hull Crew. ***Skiff/Work Boats;*** Lowe 10 x 2 Ft, Monark 21 x 7 x 1 Ft Alum Tri-Hull, Sea Ark 21 Ft Alum, Sea Ark 18 x 5 Ft Alum Tri-Hull, Sea Nymph 16 x 4 Ft Alum Tri-Hull, Sea Nymph 16 Ft Alum Skiff. ***Crew Boats;*** Monark 21 x 7 x 1 Ft Alum, Timmy V 12 Passenger.

MARINE EQUIPMENT: Quantity Of Anchor Buoys, 2- Mesotech 971- Type Sonar Heads, Garmin GPSMAP180 GPS/Chart Plotter, Hydrotrac HT97001 Precision Survey Echo Sounder, Lucker CPM100 Cable Puller, Mesotech MS940 Sonar Power Supply, Mesotech MS900 Sonar Receiver, Raytheon DE-719C Faithometer, Swoffer Instruments 2100-LX Current Velocity Transducer, 5- Trimble DSM212L GPS Units.

BARGE EQUIPMENT: American 2 Drum Winch, Clyde 2 Drum Winch, Domestic 2 Drum Winch, 4- Ingersoll-Rand HU Single Drum Air Operated Winch, Sasgen SD40 Single Drum Winch, 2- Single Drum 11,000 Lb Winch, 2 Drum Winch.

Other equipment in this sale includes: Rough Terrain Cranes, Conventional Cranes, Crane Attachments, Wheel Loaders, Skid Steer Loaders, Hydraulic Excavators, Cable Laying Equipment, Compaction Equipment, Truck Tractors, Flatbed Trucks, Step Deck Trailers, Van Trailers, Office Trailers, Telescopic Forklifts, Forklifts, Snow Equipment And Much More.

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BARGES: Mobro 130 7 x 45 x 120 Ft Spud, 1202ABS 150 x 45 Ft Spud, 2000 50 x 180 Ft Work, 30 x 120 Ft Deck, 2- 8 x 32 Ft Portable Work, 8 x 20 Ft Work, 2000 GBS 50 x 185 x 12 Ft Deck.

MARINE - COMMERCIAL VESSELS: Betty D Crew Boat, Gladys P 8 x 26 Ft Crew Boat, Jeff Boat 1613 10 x 35 x 195 Ft Material Deck Barge, Meaghan Beth 9 x 22 x 52 Ft Tug Boat, Michael Van 24 Ft 6 In. x 65 Ft Tug Boat, Mobro 35 x 195 Ft Work Barge, Red Poll 18 x 48 Ft Push Boat, Sea Ark MV2472 7 x 20 Ft Work Boat, Troy 5 x 13 x 29 Ft Push Boat.

BARGE EQUIPMENT: 2- Smatco Clyde Frame 7 3 Drum Deck Winch.

MARINE EQUIPMENT: 2- 4 Ft Round Mooring Buoys, Dawforth 10,000 Lb Boat Anchors, 10,000 Lb Boat Anchors.

CONVENTIONAL CRAWLER CRANES: American 9270 165 Ton, American 7260 100 Ton, 2- American 5299 50 Ton.

CONVENTIONAL TRUCK CRANE: American 4450 40 Ton, American 395BT 30 Ton.

ROUGH TERRAIN CRANES: 1993 P & H Century 150, P & H Omega 40 Ton, P & H Omega 20 Ton.

HYDRAULIC TRUCK CRANE: P & H T300 30 Ton, Grove TMS300 30 Ton, Lorrain MC320.

CRANE ATTACHMENTS: 1996 Anvil 19,000 Lb 4.5 Cy Clamshell Bucket, Hawco R300 3 Cy Orange Peel Bucket, Hawco 36 In. Rock Tong, Hawco 3 Cy Orange Peel Bucket, 8 Cy Clamshell Bucket, 2- 4 Ft Orange Peel Bucket, 3- 4 Cy Clamshell Bucket, 2- 3 Cy Clamshell Bucket.

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currently has an ONR funded research project to determine the feasibility of an open connector architecture that decouples CAD and CAM software applications. The goal of this is to provide greater flexibility in selecting best of breed CAD and CAM system and simplify the information infrastructure typically required to support CAD and CAM connections. Atlantec-es is working with Electric Boat, Quonset Point, RI in the HVAC fabrication area and Howaldtswerke-Deutsche Werft, Kiel Germany in the plate production and pipe bending areas.

While there have been major improvements in the tools available on the market today, these projects all offer a glimpse of the future for the shipbuilding industry. Computer aided design and production tools are headed towards a higher level of interoperability, which will lead to greater flexibility in upgrading and working with other shipyards, subcontractor, and suppliers.

*The preceding article was written by **Bryan Miller** and **Paul Rakow**. Atlantec would like to thank all of the shipyard personnel that contributed to this article.*

Atlantec Enterprise Solutions is a software and consulting company based in Annapolis, Md. and Hamburg Germany. Founded in 1999, Atlantec-es develops and markets its Topgallant shipbuilding software system to the marine industry.

*The core competencies of Atlantec-es are data management, production engineering and shipbuilding. Customers include Electric Boat, NASSCO, ONR, NSWC, ABS, and Howaldtswerke-Deutsche Werft. Atlantec-es is owned by management. The company's two senior managers are **Bryan J. Miller**, President and Dr. **Thomas Koch**, Managing Director.*

Precision Ship-Handling Writ Large

Story and Photos by Alan Haig-Brown

On the Elbe River, the famous port of Hamburg's Nautical Institute had its final intake this year due to a shortage of prospective students. From now on it will be known as the Hamburg Institute for Ship Handling and Simulation, but for many years it sent highly trained young people to sea. Some of those, after gaining years of deep sea experience, returned to Hamburg to become river and docking pilots. The Port has two pilot stations and two pilotage authorities. The Harbor Pilots (Hafenlotsenbrüüderschaft), of which there are about 45, work from a beautiful brick building complete with clock tower on a point at the entrance to the port on the south side of the river where most of the docks are located. The river pilots' association (Lotsenbrüderschaft Elbe), which includes the sea pilots and has about 240 members, are located just down and across the river in a large house barely distinguishable from its luxurious neighbors in the tonier part of this very beautiful city.

Entering the Hanseatic port of Hamburg from the sea is a three-stage proposition. As the ships come into the German Bight from the North Sea, they contact a pilot from the sea station, which is the recently launched 164 x 74-ft. (49.9 x 22.5-m) SWATH station ship Elbe. The pilots are boarded from a (7.5-m) pilot boat or a (25-m) version of the SWATH that has effectively done away with the need for and use of helicopters for boarding unless specifically requested by the ship. Forty n.m. from the pilot ship and just inside the estuary, on the north shore where the Kiel Canal connects from the Baltic Sea, a pilot boat brings a river pilot out to exchange places with the sea pilot. This pilot then takes the ship the remaining 36 miles on up the river to the port entrance where one or more docking pilots take over.

Out bound the reverse order is followed. Just ahead of the Easter weekend last March 27, one of the harbor pilots handed the 3,764 teu containership Teng He over to river pilot Capt. **Jens Heesch**, who had boarded from a launch in front of the River Pilot station. Although the port is 60 miles from the North Sea some parts of it are below sea level. With 15-ft. tides common, the river typically reverses its flow to over three knots on a flood tide. A strong westerly blowing in from the North Sea can add another six feet to these tides and frequently threatens flooding in the lower port areas. On this March afternoon with the full moon just one day away, the tide is flooding just under two knots and the ship is making 12.2 knots over the bottom as it heads down river. The north shore, with its sumptuous homes, many of which were built over the centuries by Hamburg shipping magnates, is lined with swimming beaches and marinas, both of which require the pilots' care. Especially the swimming beaches in summer, says Heesch, as the ship's effect in surging and sucking water off the beach can cause a dangerous situation. It requires precision to move a large ship through water while allowing for the presence of a fragile human body in the same system. Opposite the huge Airbus fabrication facility on the south shore, Capt. Heesch calls the Port of Hamburg vessel traffic manager center located in the Harbor Pilot's building, to report that he is leaving the port's jurisdictional area. Then he checks in with the Brunsbüttel Vessel Traffic System which is operated from a state-of-the-art facility at the mouth of the Kiel Canal Brunsbüttel reports on the river traffic as Heesch brings the Teng He on course with the aide of the first of a series of leading or range lights that aide ships in maintaining mid channel for the whole length of the lower river.

Hanjin Praha's Captain **Jens Urohn** stands between hamburg docking pilots **Jan Venghaus** and **Kai Supper**. *photo credit: **Alan Haig-Brown***

Docking pilots station in the Port of Hamburg. *photo credit: Alan Haig-Brown*

Also on this stretch of the river at the lower end of Hamburg's residential suburbs, is the restaurant Schulauer Fahrhaus where a maritime flag pole displays a Chinese flag and huge loud speakers play the Chinese national anthem to honor the registry of the Teng He. The COSCO Container Line vessel's Captain **Yang Renzhong** walks out on the starboard bridge wing to wave his appreciation of the gesture. "Sometimes the captains show a little tear," says Heesch of the tradition marking a ship's entrance and exit from Hamburg.

With a number of years in deep sea service himself, Heesch is sympathetic to the emotions of the visiting captains. Following his sea duty, he has been 18 years in the Elbe pilotage, with all but the last of those spent as a sea pilot. Most of the pilots working in the river between Hamburg and Brunsbüttel have spent time in the physically more demanding leg in from the German Bight. Typically new pilots train for both the sea leg and the estuary but then start at sea. When they make the move inside, the pilots take an update to the training for the transition to the river.

An hour after leaving the Port of Hamburg controlled area, the Teng He passes a Dow Chemical plant that takes advantage of huge reserves of underground salt in the area. This is one of the few shipping docks on the lower river. Once clear of the plant, Heesch asks for another 10 revolutions on the main engine to bring the ship up to its 16-knot maneuver speed. The river is widening now but the navigation channel is maintained at a 820 x 989-ft. (250 to 300-m) width from Hamburg to Brunsbüttel with the depth dredged in a few spots as required to maintain a 114-ft. (14.4-m) low water depth allowing a 42-ft. (12.8-m) maximum ship draft on low water and 49-ft. (15.1-m) draft on high water. With the tide still flooding and the Teng He drawing 37 ft. (11.3 m), Heesch keeps the speed in check to avoid any possibility of "squat" as the ship passes over some

of the shallower areas. As the tide reaches high water slack and the ship reaches slightly deeper water 20 minutes later, he increases the vessel's speed to 17.5 knots just under its full sea speed. The pilot's years of deep sea experience are revealed as he tells not only of ocean crossings, but of watching other pilots work in the tides and currents on the Congo River and grounding a ship just inside Vancouver's Lions Gate Bridge.

The land along the lower river is uniformly flat with few villages on its flood prone expanse, but a few miles above Brunsbüttel, the mouth of the smaller Stor River is protected by a flood gate. Over the grasslands the superstructure of a small coaster containership rises from the dry-dock at the Peterswerft Wewelsfleth GmbH. shipyard that represents the long tradition of German shipbuilding. While suffering from lower cost Asian competition, the yards are active in specialized ships. But few large containerships like the Teng He are built here now. The 905 x 106-ft. (276 x 32.3-m) Teng He was built in Germany by Bremer Vulkan Ag in 1994. It was a time of busy yards when owners, anxious for new tonnage, were not so conservative on price.

At 3:30 p.m., merely three hours after leaving the dock at Hamburg, the ship is slowed for the approaching pilot boat that is coming out from the Brunsbüttel station. The widening expanse of the estuary is covered with a low mist over both the land and the water, "It can be very rough here and we usually have to make a lee for the pilot boat," explains Heesch, "But today a high pressure has brought this mist and calm seas."

The station at Brunsbüttel is the hub of the Elbe pilot area. With approximately 100 sea pilots stationed here, a similar number of river pilots come down river and then await a ship back up river while another 50 pilots are charged with bringing ships into the small port of Cuxhaven to the west on the south shore just inside entrance to the estuary. They also move ships from there to Brunsbuttel and the entrance to the Kiel Canal.

After handing off the ship to the pilot that will take it to sea, Heesch makes his way to the pilot boat. Like many foreign ships sailing the area, the Teng He also had a North Sea pilot on board. These private pilots hire out to move the ships between port pilot authorities such as those at Felixstowe in the U.K., Amsterdam in the Netherlands and Antwerp, where the Teng He was bound, in Belgium.

At the Brunsbuttel pilot station, Capt. Heesch would await his turn in rotation to take a ship back up river. The old station building is a sentimental favorite with the pilots in spite of having lost its popular cafe, which helped pass time between ships. It is scheduled to be replaced with a modern building that will reflect the contemporary design of the Vessel Traffic Center (VTC) located just across the smaller of two entrances to the Kiel Canal on a piece of land between the two locks. Built in 1895, the Kiel Canal connecting the North and the Baltic Seas, is more properly named the Nord-Ostsee Kanal. As there is virtually no tide in the Baltic and large tides on the North Sea, the canal gates are designed to protect the land around the canal from flooding, manage the drainage of water pumped from the land and lift or lower ships as is required. Before the opening of land routes to Eastern Europe from the west, the canal carried many ships to those countries. Now it is kept busy with a growing local trade of coasters taking containers and general cargo to and from the large central ports of Western Europe. It is also not uncommon to see a partially finished fishing vessel or tug being towed from an eastern shipyard to a western yard for fitting out.

The federally managed Brunsbuttel VTC on the point of land between the canal's two locks, has as its responsibility an area that extends up to the locks

NautiCast Offers AIS Solution

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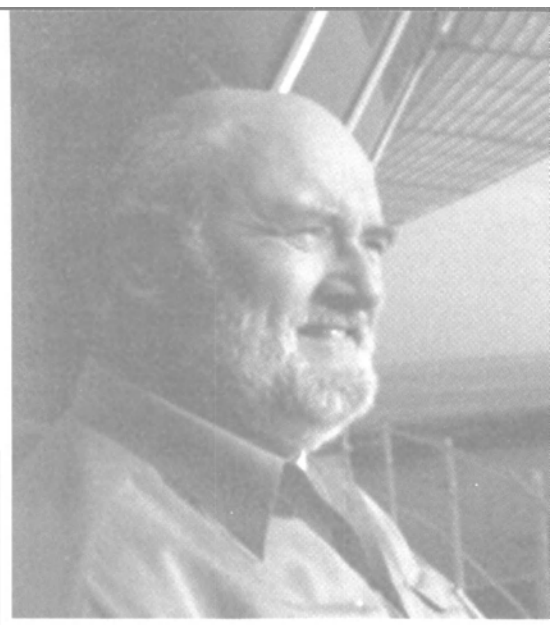
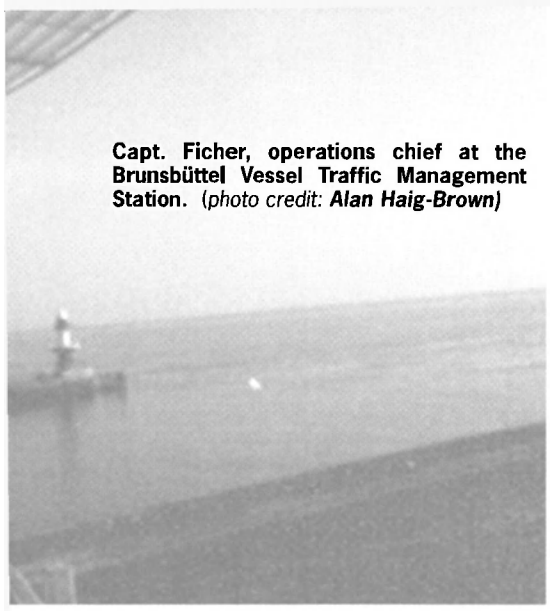
from a point just to the sea side of the station and then up river to the western boundary of the Port of Hamburg. Another station at Cuxhaven, manages the outer reaches of the estuary. The first radar system was installed on the river in the early 1960s. This new and more comprehensive facility was opened in 1994.

On the Elbe River between Brunsbüttel and Hamburg, six radar masts monitor the whole 30 n.m. of river. These masts feed data by wire and microwave to the center where they show on screens with chart representations. On screen, vectors show the direction and speed of each ship. The river channel is marked as is its center line and buoys. On a clear day the station is staffed by two operators and a chief. Ten video monitors over the chief's desk display the whole river area. Each of these representations can be brought down and displayed on a desk console. VHF contact is maintained with all ships in the system and an hourly general broadcast gives an updated notices for mariners on obstructions, visibility, tides, anchored ships, dredging and other such changeable data. In an interesting cooperation with the pilots, foggy weather with visibility less than 2,000 m will bring from two to eight pilots on duty at another bank of consoles. Their job is to work with their colleagues on board the ships to let them know their ship's precise location in relation to the channel center line. If the ship is wandering in the channel the shore pilot can inform the ship pilot who retains responsibility for final decision making. The system has the strong support of the pilots and shipping community as it means that the river can stay open to traffic in virtually all weather conditions. While it is making the pilot's life easier, it has huge economic benefit in keeping a river port competitive for time sensitive modern cargo ships.



As the sun set over the wide estuary at Brunsbuttel, the launch took three pilots out to meet three ships coming in line from sea. When the Elbe River pilot, **Christian Thiele,** boarded the second ship, the Hanjin Praha he met a German Captain **Jens Urohn** on the bridge. Urohn was returning home to Germany in command of the ship that he had taken out of the Hanjin Heavy Industries shipyard in Pusan, Korea in November 2001. The first of a series of five built for German investors and chartered back to Hanjin, the new ship is managed by Reederei F. Laeisz G.M.B.H. of Rostock, Germany. The 925-ft. (282.1 m) ship carries a 105-ft. (32.2-m) beam and

Tug Bugsier 17 puts a line up to the stern of containership LT Unica in the Port of Hamburg.
photo credit: ***Alan Haig-Brown***



Capt. Ficher, operations chief at the Brunsbüttel Vessel Traffic Management Station. (*photo credit:* ***Alan Haig-Brown)***

has a capacity for 4,389-teu with 400-teu reefer capacity. The main engine is a Hyundai MAN B&W 9K90MC-C turning 96-rpm at sea and having an output power of 41,040 kW (55,890 bhp). Its five-blade propeller has a diameter of 8,200 x 7,979 mm mean pitch and can drive it through the ocean at a 24.3-knot service speed.

But its speed was restrained as it moved smoothly up the golden moon path toward Hamburg with quiet exchanges between the pilot, captain and helmsman in the soft glow of the radars. Fifty-four year old Urohn spoke of keeping pirate watch in the Straits of Mallaca even though the fast, high sided container ship is less vulnerable than laden bulkers. And he spoke of being at sea since he was an 18-year-old. With two daughters and grandchildren he has successfully balanced the mariner's life with a 30-year marriage and now, with the children grown, he often has his wife onboard. At Hamburg the ship would take on a new chief engineer and captain who would get a familiarity cruise with Urohn and the present chief staying aboard until the next port.

Just below Hamburg, the river pilot was joined on the bridge by two docking pilots. After handing over the ship he went down to the waiting launch. When docking ships of a certain size and especially when it will be required to turn them 180 degrees in a turning basin, regulations call for two pilots to be on board. This ensures full visibility with one on each bridge wing. The Hyundai Praha would be going into a basin then fitting into a spot between two moored container ships. A tight maneuver in dead water, but with as much as two knots of current, it would require concentration and coordination between the bridge crew and the two docking tugs.

As do most European ports, Hamburg has a large contingent of Z-drive and cycloidal drive tractor tugs and the pilots know how to use them to best effect. With one tug made up mid-ship on the transom and the other working the starboard bow, the ship moved into the basin. To one side a Hapag-Lloyd ship was moored with bunkers barges alongside. On the other side an APL ship was taking on containers. Just astern of the Hanjin Praha a second container ship waited to enter the basin, while further up in the finger still another ship waited to exit the port. For this tricky but routine maneuver, Capt. **Jan Venghaus** would serve as second pilot with Capt **Kai Supper** taking the lead role. Working with calm assurance they turned the ship and gently guided it to kiss the pier where lines were made fast. The men's calm manner is marked by the precision of the vessel's placement. After a quick farewell to Capt. **Jens Urohn,** the two men left the ship by companion way and taxi. The port of Hamburg has good growth potential from the opening of Eastern Europe and many well established business like the Blohm-Voss shipyards. The port's pilot services continue to have a ready supply of seasoned mariners to draw upon, but the German role in world shipping is destined to continue shifting and evolving along the lines suggested by the Hamburg Nautical Institute's conversion to the Hamburg Institute for Ship Handling

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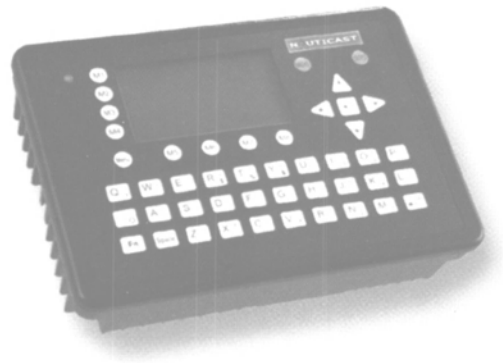

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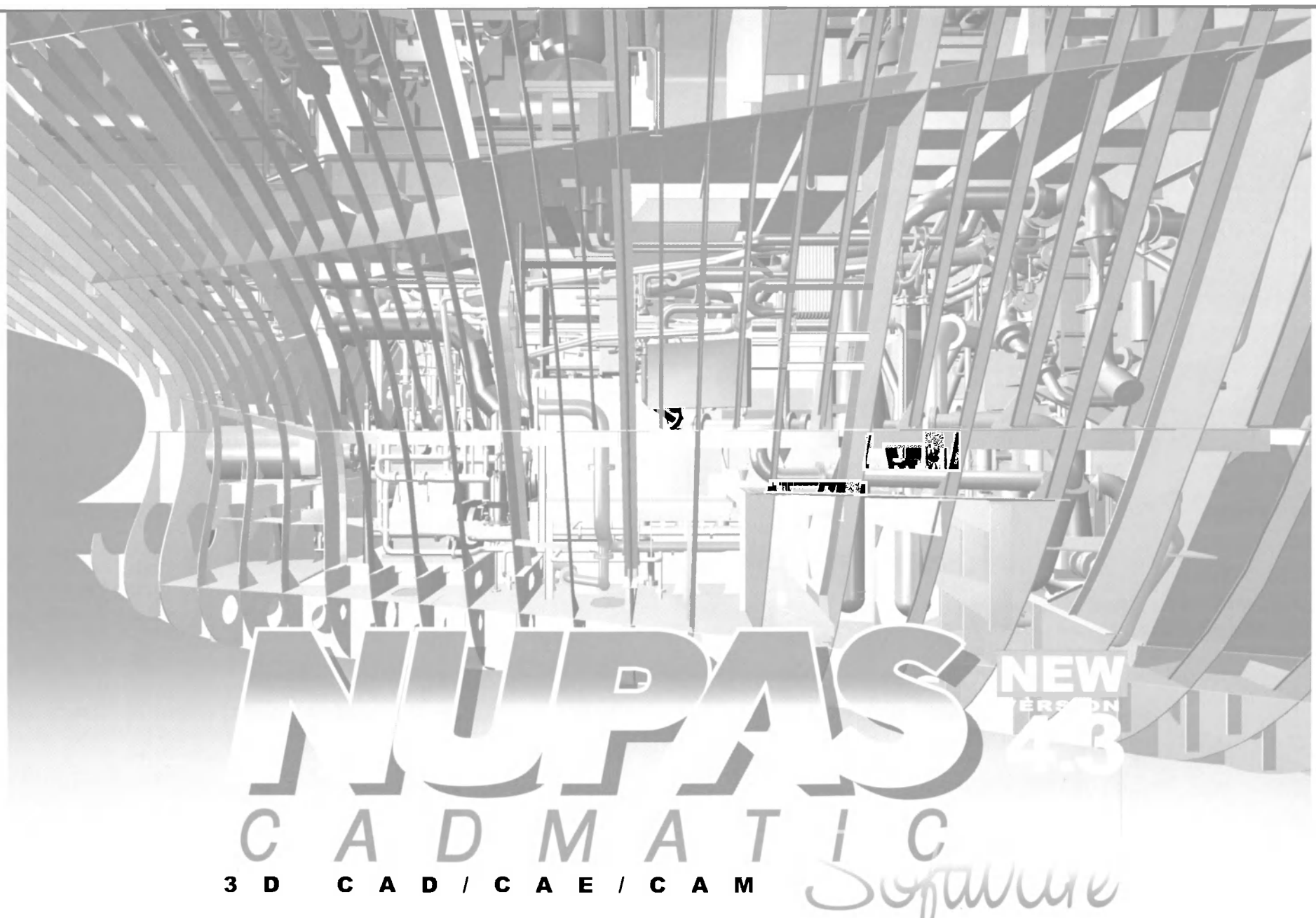

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- Weights
- Logistic data
- Data for production robots

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Internet www.cadmatic.com, e-mail sales@cadmatic.com

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Numeriek Centrum Groningen B.V
Osloweg. 110, 9723 BX Groningen, The Netherlands.
Tel +31-50-5412 632, fax +31-50-5423 717.
Internet www.ncg.nl, e-mail sales@ncg.nl

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Modern Maid-of-All Work

by David Tinsley, technical editor

Recent years have witnessed a number of programs involving new series of versatile, omni-purpose ships targeted at the market for project cargoes and otherwise heavy or outsized items of freight. The multiple-vessel nature of the various fleet investment initiatives has meant that a capability for handling more difficult consignments is increasingly allied with a regular, scheduled service pattern or transportation system, rather than with a purely tramping function. To a degree, this is evocative of the situation years ago when certain cargo liners were equipped with special heavy-lift derricks.

Combining a specialization in project and heavy-lift freight with long experience in liner-type service, Hamburg-based Rickmers-Linie has opened a major new stage of fleet development entailing nine ships of the Superflex Heavy MPC (multipurpose container carrier) designation.

First-of-class Rickmers Hamburg is every inch the modern maid-of-all-work, offering a 640-ton unit lift capacity along with a variable hold space configuration suited to the widest range of breakbulk and conventional cargoes as well as large, indivisible items of freight. The 30,000-dwt Superflex series is due to extend to nine ships before the end of next year, with construction having been distributed among three yards in China.

Testament to the Chinese shipbuilding industry's global competitiveness in an ever-widening range of tonnage, and to its strong links with the German shipowning community, the Rickmers-Linie program entails five vessels from Xiamen Shipyard and two from Jinling Shipyard, plus the Rickmers Hamburg and a sistership from Shanghai Shipyard.

The five-hold design is fitted with four, high-stooled deck cranes, two of which have a 320-ton maximum lift capacity, while one is rated at 100-tons and other at 45-tons. By using the two largest units in tandem, piece weights up to 640-tons can be handled.

The hatchway layout provides openings up to 105 ft. (32 m) in length and 34 ft. (10.3 m), accessing holds fitted with adjustable tweendecks. The below-deck arrangements mean that the hold spaces can be highly compartmentalized using three flexible tweendecks, or can be configured to give various hold heights up to 15.7-m in accordance with cargo needs, making for optimum space utilization.

Integral dehumidifiers are intended to better ensure the delivered condition of handling-sensitive cargoes such as steel and paper, while the box-like nature of the holds contributes to efficient stow intake and outturn and to a full-load capability for 1,888-teu containers. The service speed of 19.5-knots is indicative of the liner role foreseen for the versatile new breed of general-purpose trader.

"In 2003, when more of the new ships are available to Rickmers, the Round-the-World service will be upgraded for faster transit times and greater regularity," commented the line's marketing manager **Andreas Elger.**

"This transformation — which will see the re-launch of the Round-the-World service as the Pearl String service - will offer shippers unparalleled possibilities for moving project cargo," he added.

Previously untapped market sectors, such as the paper industry, will also be targeted with the employment of the MPC fleet.

The Pearl String service will also include Rickmers' own supporting feeder services, including Asian routings via Shanghai as the hub port.

Green GL Passports For Boxship Trio

Marking a departure from the company's highly effective chartering strategy of the past 30 years, three self-owned newbuilds are being phased into Contship Containerlines' core Australasian trades during the 2002 second-half.

The 4,115-teu Contship Aurora class is technically distinguished by its considerable scope for perishable cargo, in that 1,300 plugs have been incorporated for integral type refrigerated containers. The trio ordered from Daewoo Shipbuilding & Marine Engineering is replacing tonnage deployed on Contship's Eagle service between Europe, Australia and New Zealand, operated in partnership with P&O Nedlloyd's eastabout and Mediterranean strings, and will ultimately contribute to a new, weekly eastabout, round-the-world schedule.

The dimensioning and engineering of the design for up to 1,300 reefer units equates to a potential, temperature-controlled cargo volume of around 2-million cu. ft., one of the biggest concentrations of reefer transport capacity at sea today. Underscoring Contship's long-term commitment to the business, the investment in the Contship Aurora, Contship Australis and Contship Borealis has been shaped not only by considerations of through-life economic performance and asset value, but also with due regard to rising expectations as to environmental protection. A circumspect approach to the ecological properties of the design is reflected in each ship's construction to the parameters set by Germanischer Lloyd for its new Environmental Passport classification category.

The 'Green Passport' documents the environmental credentials of the ship through a certified compilation of all characteristics relevant to various national and international standards along with the basic requirements laid out in the society's Environmental Service System(GL-ESS) guidelines. The information is put together in such a way as to facilitate use by authorities and agencies for specific purposes such as processing applications for environmentally-governed fee reductions, or running checks on a vessel's environmental status.

There are compelling economic and competitive reasons for shipowners to meet or anticipate the most demanding environmental criteria through voluntary measures, such as the adoption of innovative ecological technologies on board. In addition, more and more shippers and industrial producers have an environmental agenda, which filters down to heightened expectations of environmental performance on the part of the transport service providers.

Against this backcloth, GL has developed its Environmental Service System. While this presently consists of the Environmental Passport, the intention is to extend the concept by introducing an Environmental Passport Information System(GL-EPIS).

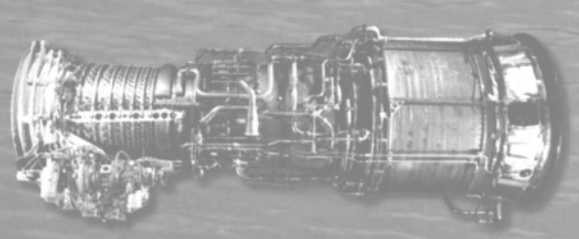
GE Gas Turbines

Success at Sea...

Proven Power for Your LNG Carriers

Worldwide GE Gas Turbines are replacing steam turbines and diesel power on military vessels, cruise ships and high-speed ferries. Over 400 such ships now enjoy the efficient, reliable, clean power that GE Gas Turbines deliver.

GE Gas Turbines are ideal in a variety of marine applications including electric prime power, combined cycle boost power, and combined gas turbine diesel electric...making them the perfect solution for the LNG carrier market.



World-proven GE Gas Turbines have dual-fuel capability and can operate on boil-off gas with supplemental liquid fuel as needed. With low SOx, NOx and particulate emissions, GE Gas Turbines allow LNG carriers access to environmentally sensitive ports.

GE Gas Turbines are the most experienced gas turbines in the world. Gas turbine compressor drive and generator sets operate on offshore platforms and gas piplelines where maintenance free/high reliability are crucial; just like on an LNG carrier.

To put GE Gas Turbines to work for you, contact GE Aero Energy Products at 713-803-0900 or visit www.gepower.com

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A German Ferry for All Harbors

The Hanseatic Port of Hamburg on Germany's Elbe River has never shied from innovative means of moving citizens and visiting ship's crew from the south shore harbor area to the beautiful city spread along the river's north shore. In 1911 they built, and continue to use, a tunnel that requires that cars be lowered one at a time in elevators to the sub river level, then drive through the tunnel to be elevated to road level on the other side. The elevator buildings reflect the design sensibilities of the picturesque Northern European port at the same time as displaying the ports continuing trade driven affluence.

Two of the twin Z-drive HADAG ferries pass on the busy Hamburg watefront.

On the water, sightseeing tourists and commuting workers are moved by a flotilla of ferries representing everything from fine lined vessels with passenger seating in the hulls and a pleasing low profile flowing down a gentle sheer line to a fine fantail stern. These old favorites could never be adapted to today's fast paced bustle and the modern need for serious people movers. That is left to an innovative new series of boats operated by HADAG Seetouristik und Fahrdienst AG.

These 98 x 26-ft. (30 x 8-m) boats have capacity for 250 passengers with stowage space for up to 50 bicycles, handicapped accessible hydraulically operated loading ramps as well as enclosed and open seating. What makes all of this so remarkable is that the vessels are operated safely by only one person.

The success of the vessels cannot be credited to any one feature. It is in the total vessel, starting with the identified needs and concept from the experienced people at HADAG and the resulting design from Netherlands naval architect **Fred Van DenBerg.** The operator works from a large enclosed bridge mounted on an arch right aft on the vessel and well above the open second deck. Passengers board aft on the ramps that are controlled from and can be seen through windows in the floor of the wheelhouse.

The wheelhouse also has 100 percent visibility of the open upper deck and closed circuit television observation of the enclosed main deck.

The engine room can also be monitored by closed circuit TV. The superstructure is all aluminum to reduce weight, displacement and wake. Sound has been kept to 65 decibels or less in passenger areas.

The beamy steel hull has a shallow 5-

ft. (1.5 m) draft and it is here that the most essential component of the ferry's success is found. A pair of open wheeled Rolls Royce/Aquamaster US381 CRP azimuthing drives are mounted in a finely faired hull. The hulls rounded chine and enhanced design reduces wake while assuring powerful water flows throughout the Z-drives' 360-degree rotation. Power to the drives comes from a pair of six-cylinder, 14-liter Cummins N14 engines. These electronically controlled engines give the fast response and power required by the operator in maneuvering around the busy harbor traffic. An 75 kW Aquamaster bow thruster further enhances dockside maneuverability while negating the need for mooring lines and line handlers.

The Cummins, like all other components on the boat, were chosen only after careful comparison and negotiation. They won the prestigious place due to their ability to cope with the heavy load conditions and strong service support from the local Cummins dealer Otto Blank in Hamburg. The first of the 98-ft. (30-m) boats was delivered in 1997 and now has 17,000 trouble free hours on the Cummins engines. The last of this class boat was delivered in January 2002 and, as of late March, had 2000 hours on the mains.

Cummins engine representative, **Lutz Paulerburg**, with one of the Cummins N14 engines that power the HADAG ferries.

Electrical needs are met by a pair of Cummins 6BT-powered 75 kW generators.

The ferry system in Hamburg handled only two million people in 1996. This has now increased to four million in 2001 with 2.5 million of those carried on a single route that has four boats leaving at 15 minute intervals on its one-hour round trips — that operate from 5:15 a.m. to 11:45 p.m.

The success of the 98-ft. (30-m) boats led to plans for a 82 x 20-ft. (25 x 6-m) vessel with 114-passenger capacity to serve some of the smaller canals in and around the city. These boats will have a 9-ft. (3-m) air draft, compared to the larger boats' 28 ft. (8.5 m), in order of pass under more of the bridges of a city that claims more of them than Venice. Each of the new boats, designed by German naval architect Dr. **Christian Masilge** of Berlin, will have only one of the Cummins N14 main engines and RR/Aquamaster drives with a 35 kW bow thruster. Like the last of the 30-metre boats, the drives on the smaller boat have a pair of five and four-bladed contra-rotating open NiAlBr 950 m/m diameter propellers. Two of these vessels will be delivered in May of this year.

Captain **Karl-Heinz Fritsch** at the controls of one of the single-crewed HADAG ferries.

Antillia Graving Dock

Dimensions:

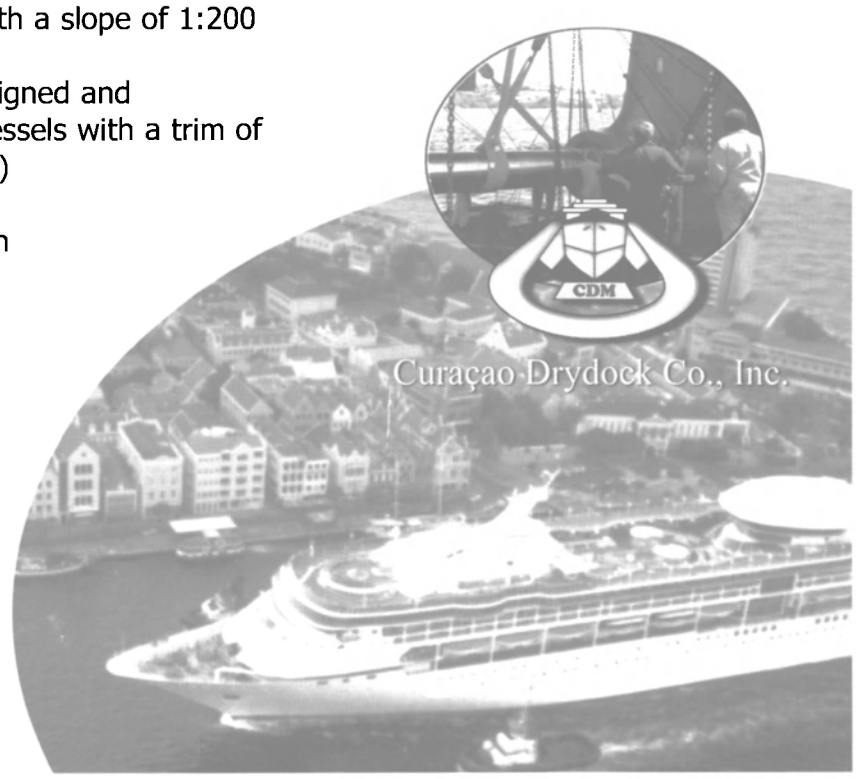
Between dockwalls: 280 x 48.00 meters
Between fenders: 280 x 47.35 meters

Depth of water over the keelblocks:

At the entrance: 8.00 meters with a slope of 1:200

Keelblock arrangement specially designed and adapted to dry-dock Large Cruise Vessels with a trim of 1:200 (angle of heel tg.alfa = 0.005)

Efficient modern hauling system with semi-automatic winches and trolleys moving along rails at both sides of the dry-dock, allowing complete control during the repairs.



Curacao Drydock Company, Inc.
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Curacao, Netherlands Antilles
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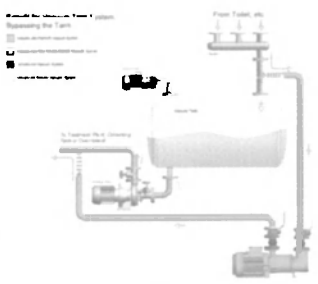
Jets Vacuum To Introduce New Retrofit Solution For Vacuum Toilet Sytems



New retrofit solution for Vacuum toilet systems Jets Vacuum AS has introduced an efficient and easy-to-install solution for the upgrading of old Vacuum generating units on passenger ships. This allows for a boost in Vacuum generating capacity as well as eliminating the use of anti-foaming agents normally needed with second generation Vacuum units. In addition to the capacity increase, the Jets solution will also improve the biological treatment process. The equipment is very compact and the in-line installation allows for an extremely easy connection to existing pipework.

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Jotron to Launch New Products at SMM 2002

At SMM 2002 in Hamburg, the Norwegian-based Jotron Group will intrduce a number of new products, including a new UHF Radio and AIS system. Tron UHF, portable maritime UHF transceiver, is based on the same design as the highly successful Tron TR20 VHF personal portable radio for marine emergency and onboard communication. Tron UHF is fully waterproof with an illuminated keyboard and backlit graphical display to facilitate ease of use. Awaiting the final international approval, Tron UHF complies to international standards ETS 300086 and ETS 300720. The Tron UHF features CTCSS and CCIR five-tone sideband signalling, Dual/Triple watch function, Channel scanning and is fitted with an accessory socket for external headset/microphone. Powered by re-chargeable NiMh batteries, the radio comes with a bulkhead or a table mountable dual slot rapid charger, also able to operate on trickle mode.

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Oilmate

Are you looking to improve your profitability? Oil Mate can help by eliminating the downtime and money spent on diesel engine maintenance. Engineered Machined Products, Inc. is proud to introduce its newest aftermarket product, Oil Mate, previously sold exclusively to diesel engine manufacturers. The Oil Mate significantly extends oil change intervals (2,000 hours) and filter life in order to decrease downtime and lengthen your engine's life span. This oil management system removes a small amount of used engine oil and blends it with diesel fuel to be burned during combustion. The used oil is then replaced with an equal amount of fresh oil from a make-up tank, extending oil and filter use. This system outperforms every competitor on the market. It is currently used and certified by a major diesel engine manufacturer, operates within emissions guidelines, and is guaranteed for one full year.

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Schottel to Exhibit New SEP at SMM 2002

Schottel's new product, an Electric Propulsor (SEP), will be the focus at the company's stand at the SMM 2002 exhibition in Hamburg (Stand no. 12021). The development of the SEP is the result of investigations into the market demand for pods in the smaller power range. This innovative pod drive system covers the power range of one to five MW. Schottel offers podded drives with different kinds of electric motors: asynchronous, synchronous and permanent-magnet motors depending on the owner/shipyard request and application of the vessel. Pod drives in twin propeller version are particularly suitable for the market sectors RoPax, double-ended ferries, supply vessels, tankers, container ships and yachts. For the offshore industry, pods with single propellers in nozzles are part of the new development. The Schottel Electric Propulsor provides a supplement to the company's existing product range of both azimuthing and conventional propulsion and maneuvering systems.

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STN to Showcase Atlas Marine Electronics at SMM

STN ATLAS Marine Electronics will exhibit a comprehensive range of advanced ship automation, communication, navigation, propulsion and power management systems under the theme, Always a Step Ahead. Key exhibits include a proprietary Ship Control Centre (SCC) integrating and automating all main bridge equipment operating functions for navigation, communications and general ship management. It incorporates a latest NACOS Series 4 navigation command system inclusive of Chartradar Atlas 1000, a new type-approved unit combining radar, electronic charting and conning functions. Chartradar Atlas 1000's innovative functions will also be featured separately together with other navaids including the Debeg 3400 UAIS transponder with interfaces to Radarpilot 1000, Chartpilot and a new 3401 DCU minimum keyboard display for retrofitting with the UAIS. **Hall 12, Stand No. 12024**

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SMIT and Frank Mohn Complete Operations

In cooperation with its Norwegian partner, the pump specialist Frank Mohn, SMIT has completed a number of highly successful operations involving the recovery of oil and chemicals from vessels located on the seabed at greater depths.' In the salvage industry, 'greater depths' refers to operations in water deeper than 164 ft. In the past, work at this depth required a technique called saturation diving and the utilization of expensive diving support vessels. In searching for a more economical solution to the recovery or oil and chemicals from greater depths,' SMIT and Frank Mohn developed the PolRec (Pollution Recovery) System. Since its development, this system has proven itself with the successful recovery of oil from two tankers, Yu-II 1 and O-Sung 3, both of which had sunk to a depth of 262 ft. off the Korean coast. The completion of this operation earned SMIT and Frank Mohn the internationally acclaimed Seatrade Award in the Countering Marine Pollution category.

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Caterpillar Motoren Presents V-type M43 at SMM Hall 6, Stand 6011

Caterpillar Motoren GmbH & Co. KG, of Kiel, Germany, introduced four new heavy-fuel engine series to the marine market between 1992 and 2000 and presented them at the respective SMMs. At this year's SMM the company is presenting yet another new engine — the V-type M 43. The VM 43 will be available in 12, 16 and 18 cylinder versions. It doubles the maximum available output of the existing Caterpillar Motoren Engine Program, so that it now covers a range from 1,020 kW/1,380 HP to 16,200 kW/22,030 HP. This latest product is opening up important new market segments.

As with all MaK engines of the new long-stroke generation, the design of the VM 43 was kept as simple as possible, which is an advantage to yards and operators in terms of ease of installation and low operating costs, due to minimum down times for service and to very easy maintenance. Its design is based on the successful in-line version, the M 43. Because the engine has the same speed, stroke and bore, it has been possible to make use of a large number of components of the M 43, e.g. cylinder head, connecting rod, piston, cylinder liner with calibration ring, valve drive, cooling water ring and the turbocharger. All these are identical in the in-line and V-versions. Caterpillar Motoren has built on extensive operational experience with these M 43 components and their impressive proof of reliability and economy, as well as their user-friendliness in operation and maintenance. An important new design characteristic is the "Flexible Camshaft Technology", the result of a development step taken to reduce NOx emissions and soot emissions to below the IMO limit over the entire operating range. The VM 43 is the first Caterpillar Motoren product to feature this technology which is internal to the engine. The M 43 in-line engine was introduced to the market in 1998 very successfully. Up to now, more than 180 engines with a total output of about 1,300 MW have been sold. It is the market leader in its output class. The VM 43 has also made a good start — the first six engines of this type have been sold already.

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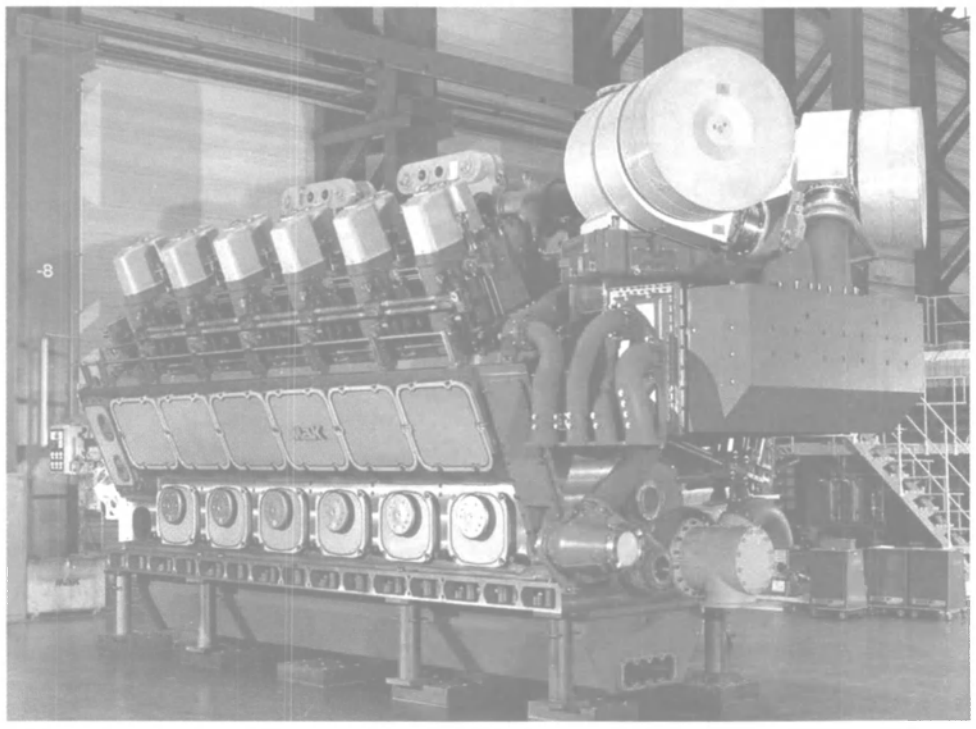

Oilsafe

Prevent equipment-damaging lube contamination and costly oil spills with Oil Safe Lubrication Tools. Whether you need to transport your oil 20 ft. or 20 miles, the unique Oil Safe sealing system will keep your lubricants safe from contamination and spills.

Oil Safe Lids are available in eight colors, allowing you to color code lubricants, thus minimizing the risk of topping off your machinery with the wrong oil. The surest way to keep your equipment up and running is through proper lubrication using clean lubricants.

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Mi-Jack Products

The Mantsinen 60 makes material handling more efficient than ever. Its width and stability makes it possible to handle pulp, scrap, paper, timber and lumber- almost efficiently

and safely.
The Mantsinen 60 offers an extensive range of lifting accessories making it possible to lift almost any type of material. Grabs, roller pincers, forks, lifting hooks, clamshells and different spreaders for any application.

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L-3 Communications

L-3 Communications is a merchant supplier of defense electronics and a growing provider of commercial communications and transportation products. The company supplies high technology, proprietary products to the Department of Defense, prime contractors, international customers, OEMs and to the space and telecommunications markets.

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Rutter Technologies: VDR Manufacturer Exhibits Again at SMM 2002

Once again, Rutter Technologies will be exhibiting at this year's SMM show in Germany. In addition to showing the Rutter VDR-100 with its multiple options and advanced features, Rutter Technologies will also be introducing a new line of interface modules. The interface modules demonstrate the company's in-depth understanding of the real issues accompanying VDR installations and confirm their status as a market leader and innovator. Rutter Technologies... leading the marine industry in VDR technology.

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Resurgence Software

Resurgence Software Inc. produces the Wave Software System, an equipment reliability analysis software system that enables ship owners and operators to achieve the best operating and financial performance of their fleet possible by maximizing vessel uptime and minimizing maintenance costs and the risks of failure. Instead of relying on inadequate information and ad hoc decision-making, the Wave Software System provides owners and operators with the critical reliability information needed to make better maintenance, repair, replacement and capital expenditure procurement decisions.

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Willi Becker Ingenieurburo Becomes Becker Marine

The German limited company Willi Becker Ingenieurburo changed its name to Becker Marine Systems to reflect its shift towards an increasingly global position as a system provider for rudders and steering gear, which development had been going for some years. While the name of the company has been changed, the substance of the company will remain the same. The new name will involve the addition of new operating areas to those already in existence. The new managing director Dirk Lehmann will concentrate the company's efforts in particular on the expansion of the new areas of operation. The new advances are expected to become most noticeable through a wider range of products, comprehensive technical support and even higher product quality. Already this year the product portfolio, traditionally consisting of rudders, Kort nozzles and steering gears has been amplified and now also includes complete rudders systems.

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Beele Engineering Adds Light Switch Highlighter to Range of Yfestos Products

Beele Engineering (Aalten, the Netherlands) has added a luminescent light switch highlighter to its range of Yfestos products. In an emergency, the highlighter prevents time being lost in unnecessary searching for light switches. The highlighter is available in various sizes and operates independently of the power supply. In darkness it emits a clear blue-green light for over 12 hours. The material retains its light absorption and emission properties for over 20 years. The Yfestos evacuation route signposting system includes luminescent footprints, polycarbonate plating for light fittings, shapes, sheeting and strip, tape, paint, discs, fluorescent lamps and compound, as well as alphanumeric symbols and pictograms.

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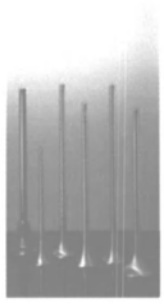
MWH Presents Entire Range of Products and Services

At this year's SMM 2000 Markisches Werk Halver (MWH) presents its entire range of products and services. Components and services for Medium-Speed 4-Stroke Diesel Engines: Valve Spindles, Valve Seats and Valve Guides, Decades of field experience and the passage of various product lifecycles has resulted in a continuous optimization of components (PRISE — Product Improvement Services). The product range comprises a multitude of valve spindles in various designs, various valve seats with individual cooling methods and optimized valve guides. Valve Rotators, The Turnomat rotation device provides for much longer lifecycles for valve spindles and valve seats. A polishing effect, which is forced by the rotation of the valve spindle, removes combustion deposits between the valve and the valve seat. This effect also improves the temperature distribution around the valve seat in order to minimize so called "blow-byes". Valve Cage/Cylinder Head Units and Reconditioning, MWH reconditions entire valve cage and cylinder head units. Incoming components are submitted to a rule-based inspection (RUBI). Based on the result of this inspection, a detailed reconditioning work package is drawn up.



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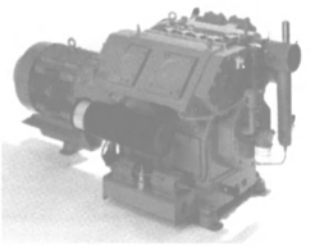
CompAir to Provide Navy with Compressed Air Technology

CompAir Drucklufttechnik will be represented by a wider range of products than ever before at this year's SMM in Hamburg. A real highlight of the exhibits on show will be the water-cooled compare H5437 high pressure piston compressor. This production series builds on the well-established Reavell concept. The compressor is designed for a pressure range from 140 to 414 bar, with a delivery capacity of between 60 and 170 m3/h. The membrane dryer located between the third and fourth stage is absolutely unique. The component is energy-neutral, fully wear-resistant and maintenance-free. The Simmern-based company is using a cutaway version of the H5417 model from its H5000 series to demonstrate the sophisticated action of its compressors. Depending on the model, units from CompAir's H5000 series offer a delivery capacity ranging from 24.8 to 291.5 m3/h at an operating overpressure of between 20 and 414 bar.



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Alfa Laval Establishes Help Desk

By calling 1-866 ALFA LAVAL (1 866 253-2528), Alfa Laval customers can now receive help with heat exchanger, separator and decanter questions from Alfa Laval's newly established Help Desk. Callers speak directly to a member of the technical support staff who is knowledgeable on all products and relevant applications. The technical support staff is qualified to answer questions regarding troubleshooting, maintenance, operation, performance and process information. Should the staff member be unable to answer the question directly, the customer is guaranteed an answer within 48 hours. The Helpdesk is manned standard business hours (8:00 a.m. to 5:30 p.m. EST) five days a week and backed by an emergency service during our non-business hours. If the issue cannot be resolved on the telephone, the caller is referred to a field service scheduler who will dispatch a service representative. Service is also available from one of Alfa Laval's six service centers, four of which specialize in heat exchangers and three of which service separation equipment.

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Transas to Launch New Nav Products in Germany

Transas will exhibit under the motto "Safety. Quality. IT." at the SMM 2002 show. The Transas stand will present a concentration of the latest IT developments in marine navigation and simulation embodied in high-quality equipment aimed at providing safety at sea and ashore. The highlight of the Transas exposition will be the launch of the new-generation 3000 line of navigational products. The range was started in June 2001, by the Navi-Sailor 3000 navigational system that incorporated all the functionality of the previously type-approved ECDIS with some additional innovative features. Since then, the range of new-generation onboard systems has expanded with the Navi-Radar, PC-based radar display system; the Navi-Bridge; the Navi-Fisher, electronic chart system specifically adapted for fishery vessels. These latest solutions will be introduced at the exhibition, including the recent enhanced version of Navi-Sailor 3000 ver.2 with UAIS transponder interface. To illustrate the advanced capabilities of the UAIS manufactured by Transas - McMurdo, a live demonstration of the equipment will be performed on the stand.

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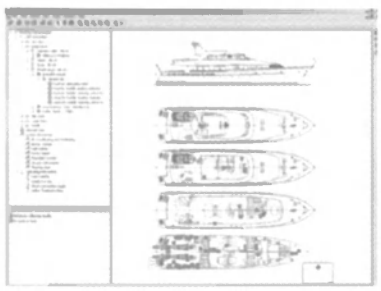
ILS-Software Package for German Coast Guard

Just two weeks after christening the first of three 216-ft. (66-m) Offshore Patrol Vessels, the German Coast Guard (Bundesgrenzschutz) ordered an extensive software and data package for Integrated Logistic Support (ILS) of the new " Bad Bramstedt"-class from Abeking & Rasmussen, designers and builders of the new vessels. The order consists of three on-board versions and one shore version of the new developed Virtual Ship Explorer (VSE). The logistic company Ocean Logistics GmbH, a subsidiary of Abeking & Rasmussen is responsible for the total system. With the on-board version the crew will be able to manage all documentation for on-board systems, including full spare parts logistic, i.e. from choosing relevant parts from the respective spare parts lists, to storage up to ordering parts needed. The system includes compilation of all relevant technical logs as required by law and assists all requirements of the ISM Code.



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Germanischer Lloyd Classifies New Tankers

Classed by Germanischer Lloyd, the 31,600 dwt Seychelles Pride is a new addition to GL's stable of technologically sophisticated double-hull product tankers. Designed for the transport of chemicals (IMO Type 3), oil, and oil products, it represents a further development of the "Lindenau Safety Tanker Class 2004," which has received a number of international awards for innovative design and safety.

Delivered in June 2002, it is the fifth vessel in this successful series to be classed by GL. Built for Seychelles Shipping Lines Ltd. by the Lindenau shipyard at Kiel; the new tanker will be operated by Columbia Shipmanagement Ltd. of Limassol.

Seychelles Pride was joined by a sixth tanker in the series — the 34,200 dwt "Eberhardt Arctic," which was launched on July 20, 2002 for the Carl F. Peters shipping company of Bargteheide, Germany. The vessel was also built by the Lindenau yard at Kiel.

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JWP-26-C Generator Offers Low Scaling

The JWP-26-C Plate Type Freshwater Generator with titanium plates offers low scaling rates with high levels of performance and reliability. With its compact, lightweight design, the JWP-26-C is ideal for newbuildings or as a replacement unit on an existing vessel.

Supplying high quality fresh water for all domestic and process needs onboard ships, the JWP-26-C Plate Type Freshwater Generator converts seawater into fresh water by vacuum distillation, utilizing waste heat from engine cooling water systems or other sources.

Maintenance requirements are low. Titanium plates in the heat exchangers and extensive use of non-ferrous materials prevent corrosion of vital parts.

The low scaling rate also reduces maintenance requirements. If cleaning becomes necessary, the front cover accessibility of the JWP-26-C makes the task simple.

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Optimal Electric Ship Propulsion Solution

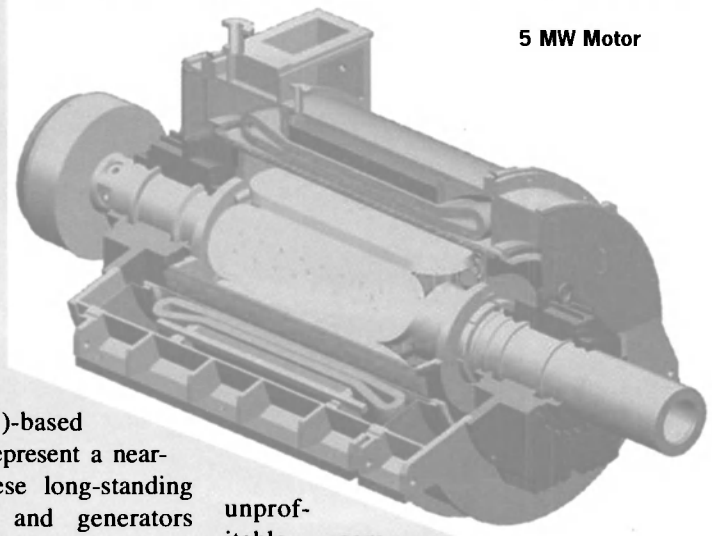
By Stuart C. Karon,
American Superconductor

Throughout the history of shipbuilding, the key challenge too often has been how to build the right ship around a given propulsion system, rather than creating tailored propulsion system for the ship. That was true when the best propulsion "engines" available were sails, and it is also true for today's diesel, gas turbine and electric hybrid systems as well.

The ideal, of course, is to allocate cargo space, cabin space, the shape of propulsion units, and even the shape of the ship's itineraries around the needs of the marketplace rather than around the limitations imposed by the ship's propulsion system. Factors that remain in the path of that ideal include the underlying efficiency across a broad operational range with which chemical energy is turned into mechanical energy, and the ability to allocate space in the most profitable manner. In other words, if you can dramatically improve the power densities of marine propulsion motors and generators as well as their efficiencies; i.e. make these efficiencies much higher and more uniform at varying loads, many of the other issues would be resolved too — and ship design need not be compromised.

In fact, with continuing improvements in power density and efficiency, electric drive propulsion systems are projected to displace mechanical drive systems across a broader spectrum of applications.

The maturation of HTS rotating machine design coupled with the upcoming U.S. Navy-sponsored 5 MW prototype motor development and testing indicate that high temperature superconducting (HTS)-based propulsion systems represent a near-term solution to these long-standing challenges. Motors and generators employing HTS wire are very compact in size and low in weight. These qualities make them easier to site in the ship, allows more modular ship construction, and reduces undesirable tradeoffs that face many ship designers. Naval architects can now begin to translate these propulsion system improvements into increased profitability for ship owners and operators.



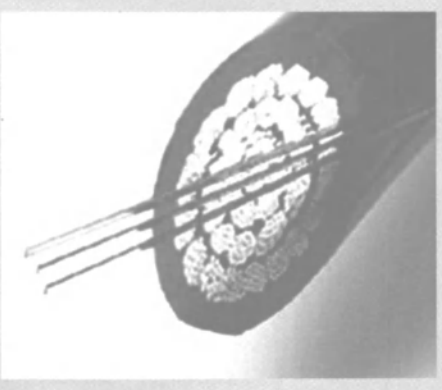
5 MW Motor

The Challenge

Even in modern ships, propulsion systems are so large and heavy that in many applications they force the rest of the ship to be constructed around them. Machine sizes and their locations also reduce the space available for cargo and passengers and interfere with efficient loading and unloading. Shafts can extend considerable lengths, further compromising efficient space utilization. Additionally, the propulsion systems, both mechanical and electrical, used in virtually all ships today operate less efficiency at lower speeds — creating excess costs on shorter routes and eliminating the use of some otherwise desirable ports.

All these issues carry associated costs. Installing propulsion systems so early in the ship's construction increases the cost of capital and reduces the builder's ability to use the most efficient shipbuilding practices. Less usable internal volume decreases the revenue generation potential for commercial vessels as well as the war-fighting capability for military ships. Inefficient loading and unloading create longer cycle times, increase port costs, and jeopardize schedules. Prolonged and low speed operation of diesel direct-drive and geared propulsion systems increases maintenance costs. Reduced efficiency at low ship speeds may make certain shipping routes unprofitable compared with other transportation alternatives. The shift to diesel electric propulsion systems addressed some of these issues. Electric motors can be located further aft in a ship, freeing naval architects from the "tyranny of the shaft-line," giving ship designers almost unlimited flexibility in the ship arrangements. The length of the drive train is reduced, as is the requirement to maintain strict alignment requirements over long lengths from the prime mover to the propeller. For ships that incorporate podded propulsors, this length is reduced to zero. These externally mounted motors maximize a ship's hydrodynamic efficiency and its usable internal volume for revenue generation. Podded propulsors also reduce shipbuilding costs through increased modularity during construction. Ships today tend to consume more electricity than did their predecessors. Integrated electric propulsion systems optimize ship operators' flexibility through the ability to only use the minimum amount of electricity generation equipment for a given operational scenario. The generators may therefore be operated closer to their full outputs and unneeded machines shut down, which increases the overall system efficiency and minimizes maintenance requirements.

It is because of advantages like these that nearly all cruise ships and many other ship types including shuttle



The small strips of HTS wire carry the same current as the much larger and heavier copper cable.

tankers, product carriers, ferries, icebreakers, and offshore oil exploration platforms have made the transition to integrated electric propulsion systems, in both in-hull and podded propulsion variants. In addition, 13 navies of the world have either modern electrically propelled ships, are already designing/constructing electrically propelled ships, or have announced plans to initiate such programs. Prominent among these is the U.S. Navy, which in 2000, announced that its next generation of surface combatant ships will have electric propulsion systems. Although they are an improvement over their predecessors, modern electric drives still have not presented an ideal propulsion solution for shipbuilders across a wide range of applications. Electric propulsion motors at higher power levels can be large and heavy, which limits their flexibility in placement within the ship. In propulsion pod applications, this large size and weight provide an upper bound to the pod's applicability, apparently around 20 MW. In addition, today's electric propulsion motors have significantly reduced efficiencies at lower ship speeds, thereby failing to take best advantage of one of their primary attributes — reduced fuel consumption when compared to low speed diesel engines operated at low power levels.

Improving Energy Transformation Efficiency and Power Densities

Unlike the force of gravity or the speed of light, the efficiency of mechanical/electrical energy transformation is not a universal constant. Efficiency is a function of variables that have been well known for decades, including the geometry of the motor or generator, the presence or absence of an iron core in its rotor, the material from which the wire in the rotor coils is composed and so forth. In fact, the variable found to have the biggest impact on efficiency is the rotor coil winding material. The maturation of electrically loss-less ceramic materials, known as high temperature superconducting (HTS) wires, has dramatically improved rotating machine efficiencies, and allowed their designs to be modified so that they can now be built at a fraction of previous sizes and weights.

Just as optical fiber transmits data much better than copper does, so too can ceramic filaments transmit electricity much better than copper. The difference is that optical systems must plug into special adaptive electronics, while motors and generators using HTS wire plug into the same grid and operate in exactly the same way as their copper-based counterparts.

Electric propulsion motors using coils made with HTS wires are just a lot lighter and smaller for a specified power output, and more efficient at all loads. This makes them easier to site in the ship, allows more modular ship construction, and reduces undesirable tradeoffs that face many ship designers. HTS motors in larger power ratings will fit easily into external pods, for example, and therefore simplify the shipbuilding process. The only consideration for these HTS motors and generators is that they require a small, commercially available refrigeration system to cool the HTS wires. These refrigerators are similar but less complex than those used satisfactorily in thousands of medical

(Continued on page 54)

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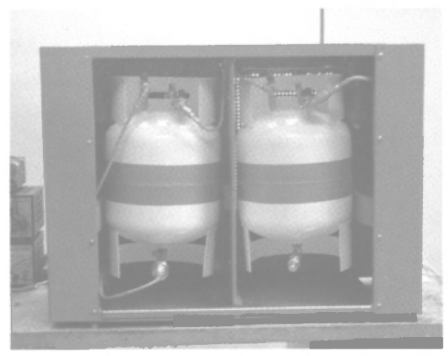
New Technology Has Promising Maritime Applications

Millennium Cell Inc., which designs and develops systems for the safe use of hydrogen fuel in energy applications, has teamed with Seaworthy Systems in a CCDOTT (Center for Commercial Development of Transportation Technologies) and California State University, Long Beach Foundation program. This program will demonstrate the benefits of using its fuel to power ships and facilities in ports. The project is designed to meet CCDOTT goals for zero emissions from fuel cells, and the contract award comes as many operators in U.S. ports are facing potential fines for being well in excess of Environmental Protection Agency air and water quality standards.



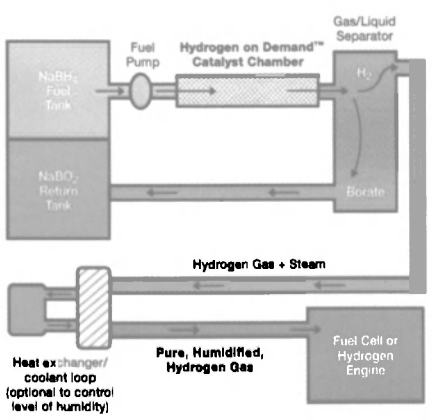
"So there's a movement afoot right now in California to add regulation to reduce emission for all of the maritime fleet," said **Rex E. Luzader**, vice president of Business Development for Transportation and Hydrogen-Fuel Infrastructure at Millennium Cell. "We're going to see more and more potential applications where hydrogen is either used in fuel cells to provide electricity with zero emissions or to burn in internal combustion engines for propulsion power with extremely low emissions."

Founded in 1998, Millennium Cell has invented and developed a proprietary process called Hydrogen on Demand that is designed to safely generate pure hydrogen or electricity from environmentally friendly raw materials. Sodium borohydride is made from borax, a material that is found in substantial natural reserves globally, with a particularly large supply in the U.S., prompting Millennium Cell to call their fuel, Freedom Fuel.

The Hydrogen on Demand system releases the hydrogen stored in the chemical bonds of sodium borohydride solutions by passing the liquid through a chamber containing a proprietary catalyst.

The reaction is totally inorganic, producing a high-quality energy without polluting emissions. Hydrogen is only produced — on demand - when the liquid fuel is in direct contact with the catalyst, thereby minimizing the amount of gaseous hydrogen present in the system at any given time. The fuel solution itself is nonflammable, non-explosive and safe to transport, minimizing many of the logistical issues associated with hydrogen.

Hydrogen on Demand™ Typical System Schematic



CHALLENGE:

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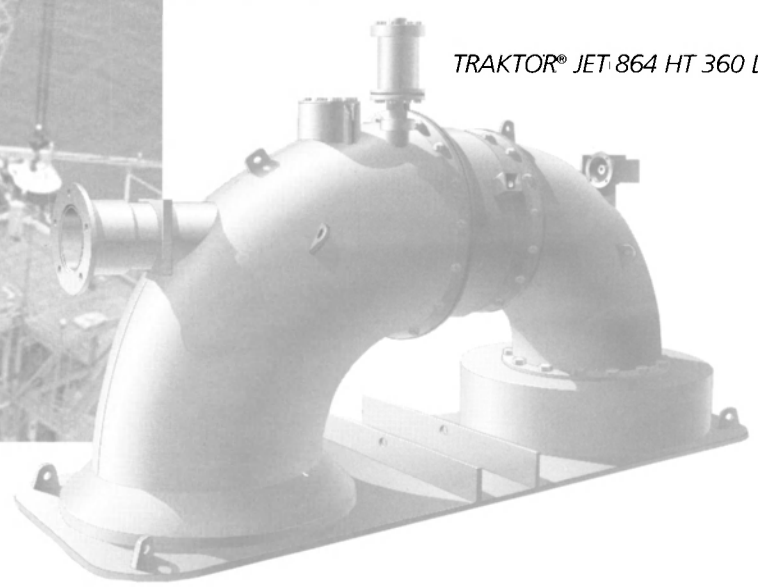

TRAKTOR® JET 864 HT 360 Degree Thruster

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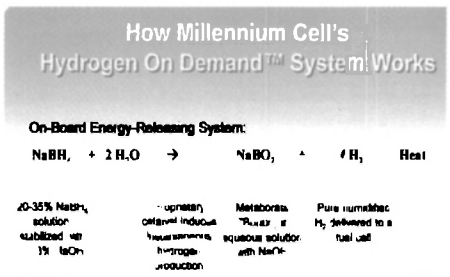

Millennium Cell technology can be applied in transportation and portable power, including micro-power and longer-life batteries. This unique fuel system gives the Natrium a range potential of 300 miles, significantly longer than any fuel cell vehicle shown to date. In addition, the vehicle has zero emissions — no greenhouse gas or smog-forming compounds. The system can be used with fuel cells and diesel or gas turbine engines.

"Millennium Cell is providing visionary leadership in developing hydrogen fuel solutions for transportation, stationary and portable power and we are excited about the opportunity to assess the merits of the Hydrogen on Demand system in maritime applications — including hydrogen-powered fuel cells and internal combustion engines," said **Matthew Winkler**, vice president of Seaworthy Systems.

Luzader said the Hydrogen on Demand system has a variety of maritime uses. "It could be any application from propulsion to onboard electrical generation or anything in between," he said. "It could be backup power or distributed generation where you have multiple units on board serving various sections of the ship. Containerships could be towed into port by a clean-fuel vessel."

Another promising use of Hydrogen on Demand is in military applications, said Luzader. The use of an energy-dense fuel source that is nonflammable and non-explosive would be a tremendous asset to military on land and at sea.

"We've had discussions with the Naval Surface Warfare Center where, if they used fuel cells as the source of energy for propulsion, one possibility is that they could use our fuel as the source of hydrogen for the fuel cell," he said. "We could actually regenerate the fuel or the borate solution at sea and eliminate the supply chain. The ability to regenerate fuel at sea with the fleet is a unique proposition for the Navy that no other technology offers.

"They're operating on one possible premise that, beyond 2050, there may not be diesel fuel available for burning on board ship to generate power for propulsion," Luzader said. "So they're looking at other alternatives to produce propulsion power, and fuel cells would be one. Our technology would be an advantageous source of hydrogen for the fleet. The concept would be one in which you would have a ship within that fleet that would actually make sodium borohydride from the borates made aboard all the ships in that fleet powered by fuel cells using Hydrogen on Demand as the source of hydrogen. That's the program we've got on the table for consideration for the Navy of tomorrow."

Dr. **Stephen S. Tang**, president and CEO of Millennium Cell, said, "We expect the demonstration of the Hydrogen on Demand system in maritime applications will show how efficiently we can reduce air and water pollution in our seaports and waterways and provide a clean energy solution to help solve complex environmental issues."

For more information on Millennium Cell
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Tel. +1/269/441 7000 • Fax +1/269/441 7001

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GEISLINGER

Recent Wärtsilä Four-Stroke Engine Developments

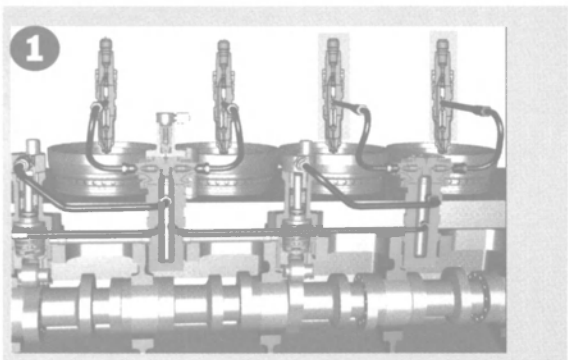
Wartsilä has focused its technological developments in this realm on three main areas: Common-rail fuel injection for heavy-fuel engines; Humidification methods for reduction of NOx; and Dual-fuel engines with micro pilot. Long-term research on the concepts hot combustion for combined cycles and steam injected diesel is also going on.

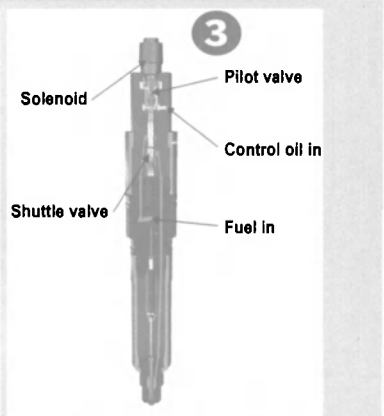
Common-Rail Fuel Injection

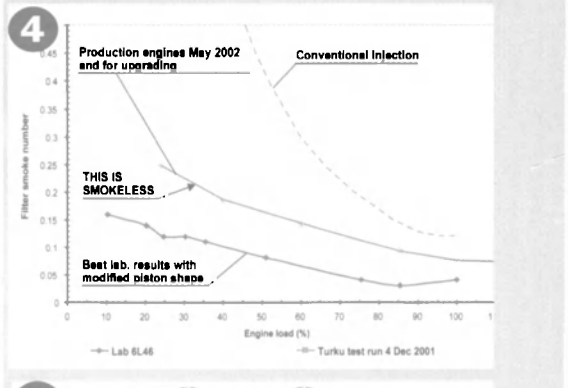
Three engine types, i.e. the Wartsila 46, Wartsila 38 and Wartsila 32 have - so far - been made available for the common-rail injection systems. The pilot engine, which sails onboard the Carnival Spirit, has to date gathered more than 3,500 hours of operational experience, and the Wartsila 46 test engine has more than 3,000 hours as well. While there has been a normal amount of teething problems, the experience so far has proven that the basic concepts of the Wartsila common-rail system are sound.

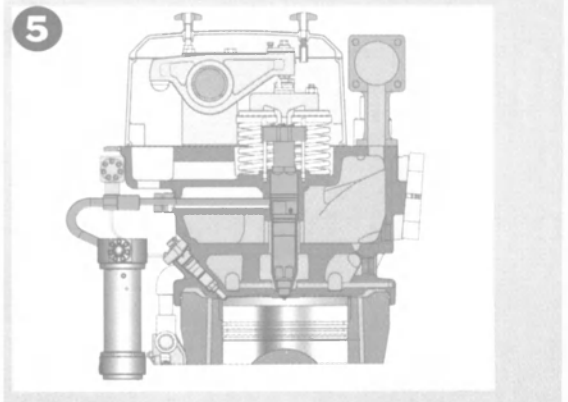
The accumulator architecture (Figure 1) has proven very successful in providing excellent pressure stability, meaning that every injection starts from the same rail pressure.

The rail pressure control by linear solenoid valves on the injection pump (Figure 2) provides even better than expected rail pressure accuracy, i.e. the rail pressure is maintained at + 35 bar, while + 100 bar would have been still









acceptable.

The injector with the shuttle valve and the press-down piston for the injector needle provides together with the flow fuse total safety against early introduction of fuel into the cylinder. The press-down piston also contributes to excellent smoke behavior. (Figure 3)

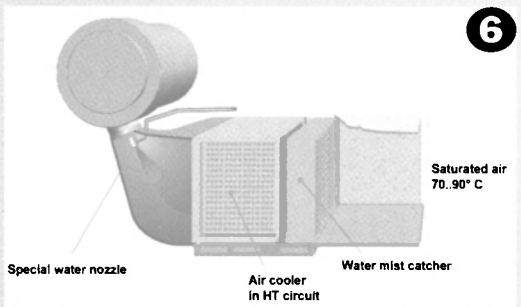
The target of smokeless operation at all loads and load pick-up has been reached (Figure 4), and laboratory tests have proven that there is further potential to do even better. Wartsila 46 engines with common-rail injection systems for five cruise vessels have been delivered so far. The first Wartsila 32 common-rail engines are due for delivery shortly, and during the autumn the first Wartsila 38 engines will be retrofitted into common rail.

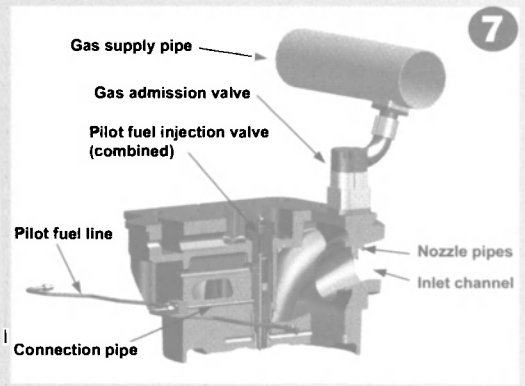
Humidification for Reduced Nox

Direct Water Injection used to be the Wartsila method for combustion air humidification. The system has been developed for common rail engines with side-mounted injector (Figure 5). This configuration is now in field test. The Combustion Air Saturation System (CASS) (Figure 6) has been further tested, and a pilot installation on a Wartsila 32 engine will go into operation this autumn. The system is also being qualified for the Wartsila 46 engine, and further engine types are likely to follow. The first systems are sold for half the NOx value compared to Marpol Annex VI curve.

Fuel-water emulsion is not promoted for engines with conventional injection systems. With common-rail fuel injection most of the disadvantages are eliminated. Compared to conventional injection systems the common rail offers the following advantages:

- Full load can be reached without increased camshaft torque. In fact the camshaft torque of a common-rail engine is always much reduced compared to conventional engines.
- There will be no risk of cavitation in





1 The accumulator architecture (Figure 1) has proven very successful in providing excellent pressure stability, meaning that every injection starts from the same rail pressure.

2 The rail pressure control by linear solenoid valves on the injection pump (Figure 2) provides even better than expected rail pressure accuracy.

3 The press-down piston also contributes to excellent smoke behavior.

4 The target of smokeless operation at all loads and load pick-up has been reached (Figure 4), and laboratory tests have proven that there is further potential to do even better

5 Direct Water Injection used to be the Wartsila method for combustion air humidification. The system has been developed for common rail engines with side-mounted injector

6 Wartsila Combustion Air Saturation System CASS.

7 Wartsila DF pilot fuel and gas system

the high-pressure pump, because the pressure relief process is not taking place in a common-rail high-pressure pump.

• It is possible to optimize the engine both for fuel-water emulsion and pure fuel as different timings and durations can easily be used in both cases.

The NOx reduction of water-fuel emulsion alone might not be very interesting in the current world, because it is limited to 20-25 percent. The reason for Wartsila's interest is mainly because of the opportunity to reach ultralow NOx emissions by a combination of Combustion Air Saturation and Fuel-Water Emulsion. A patent application for this combination has been filed.

Dual-Fuel Engine With Micro Pilot

The dual-fuel engine with micro pilot has demonstrated itself as a surprisingly successful concept. Although the micro pilot injects only one percent of the full-load fuel, the igniting capacity of the pilot spray is thousands of times better than from a spark plug. This means that good combustion stability can be reached with leaner mixes, which again allows for higher compression ratios, resulting in high efficiency and improves the possibility to run good performance in the gas mode and in the diesel mode in the same hardware.

Introductions & Updates

Wartsilä 50DF

While the Wartsila 32DF has been on the market for some time, the first installations are at about 20,000 running hours, the Wartsila 50DF is a new product introduction. This engine is based on the diesel engine Wartsila 46. It offers a cylinder output of 950 kW. The shaft efficiency in gas mode is 47 percent, which is probably a current world record for gas engines. As has been earlier reported, the 50DF has made a breakthrough into the LNG tanker market.

Wartsila 38B

With more than 60 engines sold, the Wartsila 38B is not exactly a new product introduction, but the fact that this engine is now available also with common-rail fuel injection makes it worth mentioning. The cylinder output of this engine is 725 kW. A test engine is currently being installed in the research center in Trieste. During the autumn the focus will be on endurance testing of the common-rail equipment.

Wartsila 32 with Increased Output

The Wartsila 32, which is the successor of the Vasa 32, has now been on the market for some time, and with more than 300 engines sold and the first engines passing 25,000 running hours, the engine is now ready for an output increase into 500 kW per cylinder.

Wartsila 64

An excellent piece of experience can be reported from the Wartsila 64, of which the first engines to go into operation are now approaching 20,000 hours. Thirteen engines are — at the moment — in operation, and up to now in total 12 hours of non-availability have been recorded. Most of those hours were due to a mishap with parts logistics. Mathematically this means that the availability has been more than 99.9 percent and the mean time between failures is calculated to more than 5,000 hours. The step from the Wartsila 46 with 1 MW per cylinder into the Wartsila 64 with 2 MW per cylinder was certainly a big one, and for that reason no effort was spared in terms of numerical calculations and simulations.

CMR: Monitoring is Control

CMR, which offers specialized systems for monitoring industrial and marine engine parameters, introduces the Clarine line to the marine industry, including the Clarine Marine Rack 101, which provides several advantages to shipbuilders. CMR's Clarine Marine Rack 101 is a centralized device designed to eliminate the need for separate monitoring and alarm units. Designed to mount flush in the wheelhouse console, the Rack 101 features standard display formats for a traditional "console look" on a 12-in. (305 mm) LCD screen. It also has an integrated logic functions and can replace PLCs on workboats, OSVs and crew boats and tugs. Additionally, a black box function records all monitored events for remote viewing. Clarine monitoring systems enable acquisition, processing and LCD display of parameters transmitted on a CAN-Open network. This eliminates most of the complicated wiring on the ship and reduces labor during construction and long-term maintenance. Completely self-contained, the Rack 101 system is designed for use in harsh environments and can be integrated into any CAN-Open network. Designed for local and networked monitoring of engines, gen-sets and the complete alarm list, the Clarine system processes up to 200 analog channels and generates an alarm when any of several specified thresholds is exceeded.

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GE Gas Turbines on Brilliance of the Seas

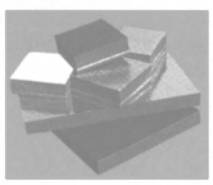
GE LM2500+ combined gas turbine and steam turbine integrated electric drive system (COGES) plant powers Royal Caribbean International's 90,900-gt, 962-ft. (293.2 m), 2,100 passenger Brilliance of the Seas cruise ship, which recently made its maiden voyage. The 25-knot ship features a COGES arrangement with two GE LM2500+ gas turbine-generators and one steam turbine-generator set for a total output of 59 MW. This electric drive configuration provides for both main ship propulsion as well as all onboard power generation.

The LM2500+ COGES ships operate on clean distillate fuel to significantly reduce emissions of most airborne pollutants and other particulates, as compared to a diesel electric power system operating on heavy fuel oil, which is customary for most cruise ships.

Including the 12 LM2500+s aboard the six Royal Caribbean/Celebrity Cruises ships, GE has delivered a total of 19 gas turbine-generator sets for 12 cruise ships. Of these, 17 are driven by GE

New Fireproof, Sound Absorbing Foam

A British company is introducing a new range of fire-resistant sound absorption foams to the U.S. market. Designed specifically for marine applications, the product is manufactured by Siderise (Special Products) Ltd. The foams weigh between 22 and 176 lbs./cu. m., and are supplied with 10 types of facing, ranging from reinforced foil through to spray-applied PVC. The product comes with a self-adhesive backing made from a pressure-sensitive high-specification acrylic tape that, once applied, will become a permanent fixture. The foams can be supplied with a built-in acoustic barrier, with either a lead or a mineral-loaded polymeric base. The acoustic barrier system, the company says, can offer up to 28 dBA of sound reduction in the engine room.



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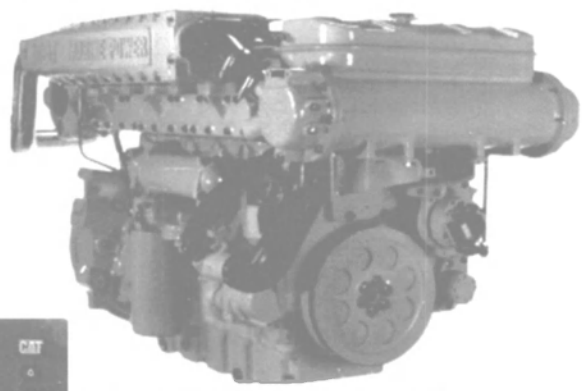
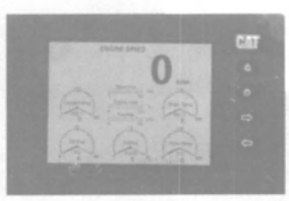
Caterpillar Offers New C12 Engine

Caterpillar recently released a full line of ratings for its new C12 marine diesel engine, the electronically controlled, compact, lightweight 12-liter diesel. With the signature Caterpillar four-stroke, in-line six-cylinder design, the engine is rated 345 mhp (340 bhp, 254 bkW) at 1,800 rpm to 710 mhp (700 bhp, 522 bkW) at 2,300 rpm. The C12 is aimed at small to mid-sized commercial vessel applications, and is available for worldwide distribution. At its 710 mhp rating, the manufacturer claims that the engine offers the best power-to-weight ratio in its class: 3.65 lb/mhp.





Something Old ... Something New

The C12 borrows heavily from other engines in the Caterpillar stable, yet features a number of innovations unique to this unit, designed to enhance both performance and durability. For example, a new exhaust manifold design with a special casting at the entrance to the turbocharger reduces backpressure and improves exhaust gas flow, resulting in increased power and lower exhaust temperatures. Piston ring position and cooling oil jet flow to the piston have been fine-tuned to reduce engine temperatures and are designed to improve power output. A new aftercooler core design is to reduce thermal and vibration stress to increase engine durability. In its three highest ratings configurations, the C12 uses the same high-efficiency turbocharger that has proven successful in a twin-turbo arrangement on the larger Cat 3412E. Electronic control for the engine is provided by Caterpillar's ADEM III electronic control module (ECM). ADEM III has nearly eight times as much memory, nearly twice the input/output capacity and significantly faster processing speed compared to previously available Cat ECMs. The C12s ECM control software is written to maximize power and performance at all commercial ratings, while reducing fuel consumption and meeting all known current and future requirements for NOx emissions. The new engine is also available in keel-cooled configurations to handle the most demanding workboat and fishing boat applications.

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LM2500+ and two by GE LM2500 gas turbines. In addition, GE has a total of eight gas turbine-generators on order for cruise ship applications.

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Integrated Propulsion Controller Launched

Regulateurs Europa now offers an Integrated Propulsion Controller. Designed for any vessel with a diesel engine and a CP propeller, the IPC is installed with the Viking 25 digital electronic governor and engine control system. It is designed to protect against ambient and engine conditions, by monitoring the air and water temperature to run the engine most effectively according to prevailing conditions.

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Siemens, Schottel Extend Pod Cooperation

Siemens Marine and Schottel extended their cooperation on the development and marketing of pod propulsion systems. With this, the product line will be expanded to include systems with outputs less than five MW, making the systems available for smaller vessels, including the offshore market.

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(Continued from page 51)

diagnostic equipment worldwide.

These cooling compressors give new meaning to the term "hot swappable" as they are easily stocked and field-replaceable — even when the generator or motor is running — and they occupy the space of a single-drawer file cabinet. HTS motors and generators are designed typically with "n + 1" refrigeration system redundancy to preclude presenting an operational limitation to the ship operator. In addition, the power consumption of these refrigerators is negligible relative to the output of the generator or motor. The reason HTS motors and generators are so efficient is that HTS wire can carry up to 140 times more current than the copper wire of the same size and weight. More current means greater flux density, more powerful magnetic fields and in the case of motors, more torque per unit mass of the machine. HTS motors and generators can therefore be much lighter and smaller, not only because the wire inside them is smaller and lighter, but also because they produce more powerful magnetic fields.

HTS motors also have another advantage: their high efficiency is a constant across virtually their entire power range. Figure 2 (below, left) compares the calculated efficiency of a typical HTS synchronous marine propulsion motor with equivalent conventional marine propulsion synchronous and induction motors. The calculations also include the losses from the motor cooling system. This means motors and generators can operate at close to maximum efficiently regardless of the ship's speed, creating savings that flow directly to the operators' bottom line. In one study, it was shown that in some scenarios HTS electric propulsion systems

Fig. 2

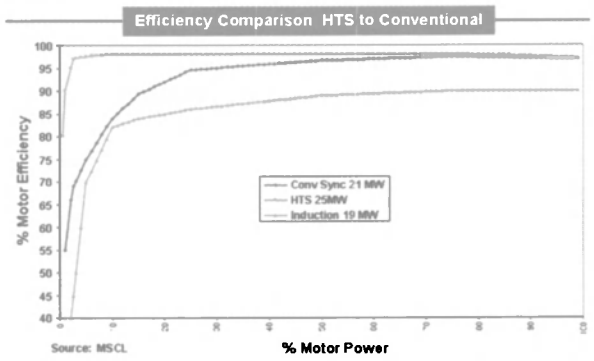


Fig. 3

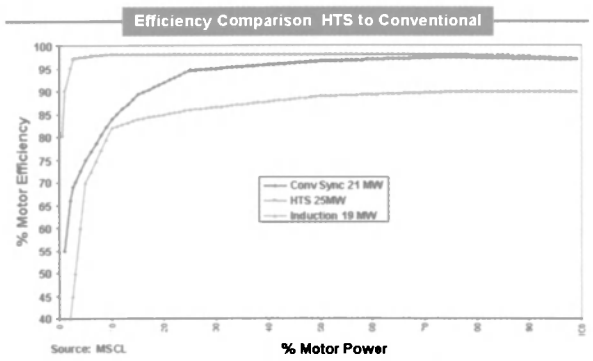
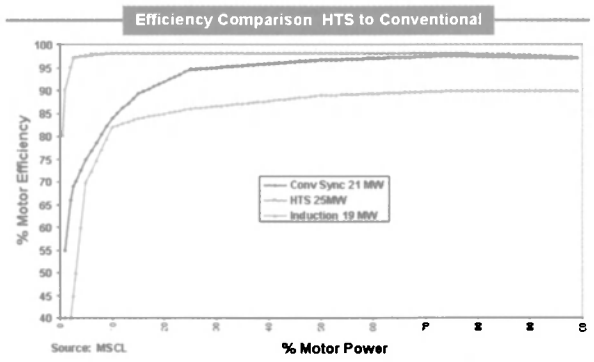


Fig. 4



can achieve fuel and lube oil cost parity with diesel direct drive ships.

Size/Weight/Power Comparisons

The implications of these advantages for shipbuilders are far-reaching — especially since they apply to both the generator and the motor. Compare, for example, the weight and size of a variety of HTS and conventional synchronous motors ranging in power ranges from 5 to 90 MW, and at slow speeds as required for marine propulsion. All are 4.2 KV machines. Figure 3 (previous page) shows a weight versus power comparison for the two technologies. Figure 4 shows a size versus power comparison. The size comparisons also include maintenance volume, allowing one meter all around the HTS motor (except the bottom) and two meters all around the much larger conventional motor (again, except the bottom).

The weight savings advantage achieved by HTS motors is particularly valuable in pod applications. It has been estimated that for every 500 tons less light ship weight, about 40 more containers can be carried. Thus, a container ship using HTS podded propulsors will be able to carry about 2.5 to 4 percent more containers.

Complementing their light-weight and compact size, HTS motors can be optimized around specific dimensional requirements. These requirements may include minimizing a propulsion motor's diameter to maximize the hydrodynamic performance of a propulsion pod or to create increased cargo capacities in ships/ lower decks, or maximizing the machine's efficiency. The machines' reduced size creates volume and deck savings that are advantageous in virtually all types of ships, both military and commercial.

Likewise, HTS generators will be much smaller and lighter than their conventional counterparts. In fact, HTS generators enjoy an additional advantage: they operate with greater efficiency than their conventional counterparts even when the refrigeration requirements are considered.

With such small motors and generators, ship machinery space allocations become much less restrictive — making room for more revenue producing volume and allowing for highly innovative designs. Consider for example a 25 MW HTS generator. Coupled with a marine gas turbine engine at about 17 tons, the overall unit could weigh less than 50 tons. This might be light enough in some ships to mount the system in the deckhouse, offering much more revenue space below, better turbine efficiency, and better maintenance access which may, in some instances, offset the drawbacks of environmentally friendly but relative inefficient gas turbines. Such small and light HTS electric motors might, for example, enable more efficient electric drive pump-jet systems and hydrodynamically optimized pod drives that offer better efficiency and higher power than is achievable with conventional motors.

As noted earlier, HTS propulsion systems have the additional advantage of being able to operate just as efficiently down to low speeds, which is especially important for cruise ships, coastal merchant ships and warships that spend much of their time operating at partial loads. Overall, the fuel savings from efficiency gains of HTS machines depend on the operating scenario but preliminary calculations suggest that fuel savings from $100,000 to $500,000 per ship per year can be expected for many ship types.

Other Advantages

There are other advantages of HTS machinery as well. Because there is little or no iron in the magnetic path of the motor or generator, there is very little distortion in the power supply and little noise feedback from the motor. This should simplify power-conditioning system requirements and make for extraor-

dinarily quiet machinery (both electrically and acoustically). The lower weight of the generator rotor also reduces noise.

In other respects, HTS machines behave like conventional electric machines. Their magnetic field can be dumped quickly in case of a system casualty, just like in a conventional synchronous motor or generator. They can be operated with existing synchroconverters, cycloconverters or PWM converters, although some simplification of these systems may be possible in order to take advantage of the lower distortion.

The machines' low weight and small size allow them to be shipped and installed intact, rather than having to be built and tested at the factory, disassembled for shipment to the shipbuilder, and then reassembled and tested at the building yard prior to installation.

Preliminary pricing evaluations indicate that HTS motors and generators should be commercially available at prices equivalent to conventional machines but be easier and less expensive to install — and could be installed later in the ship's construction.

The View Forward

So what's next for HTS and how soon will it be widely deployed? HTS wire has been extensively tested in Navy and commercial laboratories, and its durability has been proven. HTS motors rated up to 5,000 hp at 1,800 rpm have been built and tested successfully to a continuous rating of 5,900 hp.

A 230-rpm, 5 MW ship propulsion prototype motor, funded by the U.S. Navy's Office of Naval Research, is now being built at American Superconductor Corporation, and will be rigorously evaluated by the U.S. Navy in the last half of 2003. A 100 MVA HTS commercial generator, funded in part by the U.S. Department of Energy, is under development at General Electric. From this view, it appears that HTS-based propulsion systems are the next generational improvement in marine propulsion systems. Naval architects can now begin to translate these propulsion system improvements into increased profitability for ship owners and operators.

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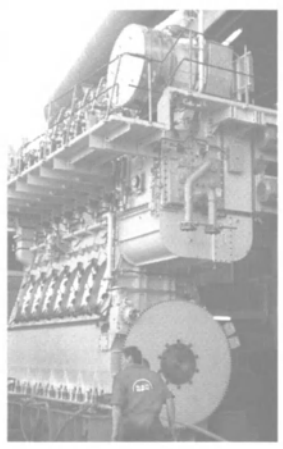
About the Author

***Stuart C. Karon** is Director, Government Programs and Director, Business Development for the Electric Motors and Generators Business Unit at American Superconductor. Formerly a U.S. Navy Officer and subsequently marketing & sales director in the commercial sector, Karon is responsible for structuring effective government-funded R&D and system design/development programs, and for bringing about the business relationships necessary for the American Superconductor Corporation Electric Motors and Generators Business Unit to achieve its objectives. He can be reached at Skaron@Amsuper.Com.*

MAN B&W Two-Stroke Engines Enter Vietnamese Market



In August 2002, two 7S35MC engines were delivered to Vietnam from MAN B&W Diesel A/S in Frederikshavn, Denmark - builders of the engines. The engines, which will be installed in two 11,500-dwt freighters ordered by Vinashin Shipping and Service Company from the Bach Dang and Ha Long Shipyards, have an output of 5,180 kW at 173 rpm. The 35MC was the first engine in the MC-engine program when it was introduced two decades ago and has proved a huge success with more than 1,000 engines ordered or delivered. In total there are 6,885 MC engines on order or delivered as per July 2002.

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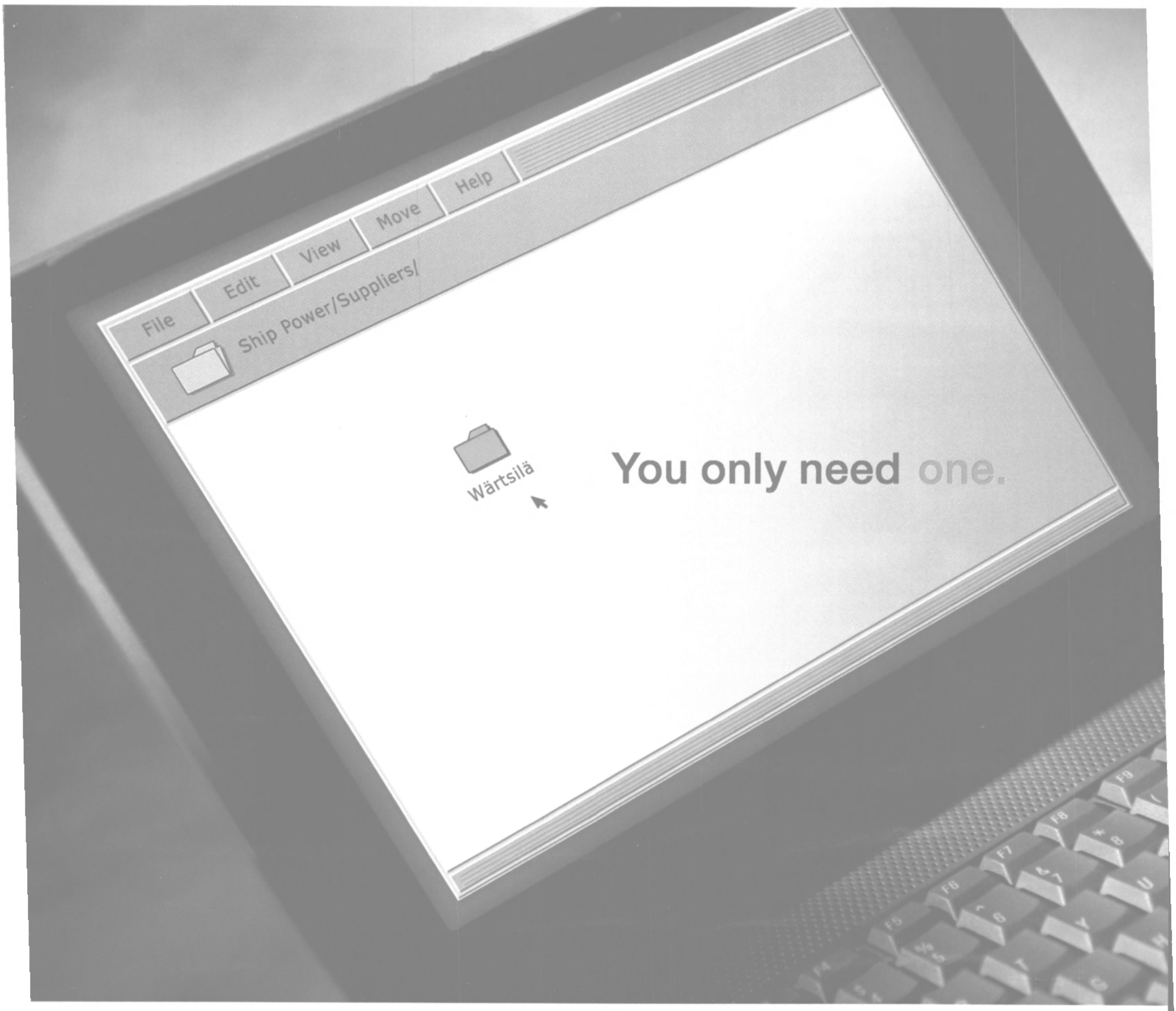

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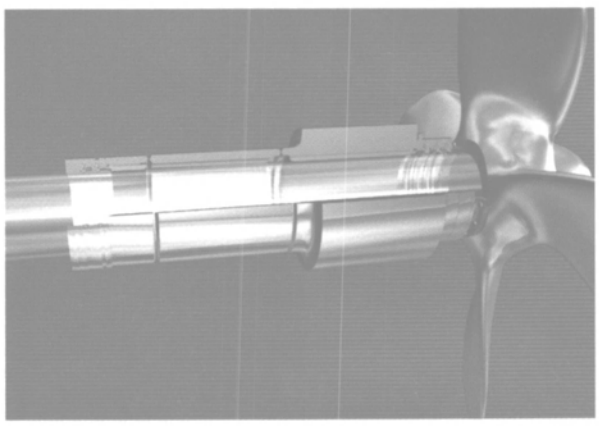
Stern Tube Lubricant Absorbs Costs

In many industries and businesses, equipment failure or unexpected maintenance does not present a major problem. Standby systems can be brought online quickly, service engineers can repair machinery within a few hours, with spare parts that are readily available, or temporary equipment can be hired at a moment's notice.

For some industries, however, failure or serious malfunction of machinery can be very damaging, whether financially or commercially. Such industries include steel making, oil and gas processing, underground mining, and shipping.

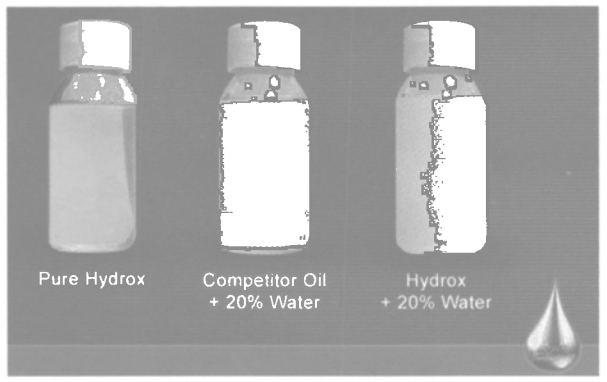
Some systems aboard ships do not have standby backups, spare parts may be difficult or impossible to replace while at sea, even if they are carried on the vessel, and delays to voyages (whether through stoppage or slowdown) are likely to be costly. One item of equipment on ships that is not possible to replace or repair while at sea is a stern-tube bearing.



Benjn. R. Vickers & Sons Ltd., based in Leeds, England, offers the Hydrox range of specialized stern-tube oils. Hydrox stern-tube oils absorb water, which may enter the stern-tube bearing, and the resulting emulsions continue to provide a high standard of lubrication and corrosion protection to the shaft and bearings. All of the oils in the Hydrox range are approved under the Lloyds Product Verification scheme. They are the first lubricants to have been approved in this way, with benefits of the Hydrox oils acknowledged by other leading Classification Societies.

Oil lubricated bearings are more than likely white metal, but can be manufactured from specialized resin material. In either case the stern-tube is filled with oil, which is retained by means of a seal system designed not only to keep the oil in, but also to prevent seawater from entering. A header tank for the oil maintains a static head of pressure, which supports the sealing system in discouraging water entry.

Stern-tube bearings can operate satisfactorily — with few or no problems. Sometimes, however, the stern



tube seals can become worn or damaged. Equally, conditions can arise whereby seawater bypasses the seal. For example, the oil/sea-water pressure relationship can be radically affected if extreme pitching is experienced, or stern tube vibration can result in seawater being drawn in and/or oil being forced out. It is not at all uncommon for oil to leak out of the stern-tube, creating a pollution problem, or more often for seawater to leak in or indeed both — water can do enormous damage to plain bearings. Where a conventional oil is being used, the presence of water can cause rusting and corrosion, and it can seriously compromise the quality of lubrication offered to the bearings. Any of these factors is likely to lead eventually to bearing damage and failure. Obviously, a stern-tube should be fitted with high performance seals, but a specialist stern-tube lubricant, which is able to lubricate bearings even in the presence of significant quantities of seawater, can provide very real cost savings. The Hydrox range of stern-tube oils manufactured by Vickers are specifical-

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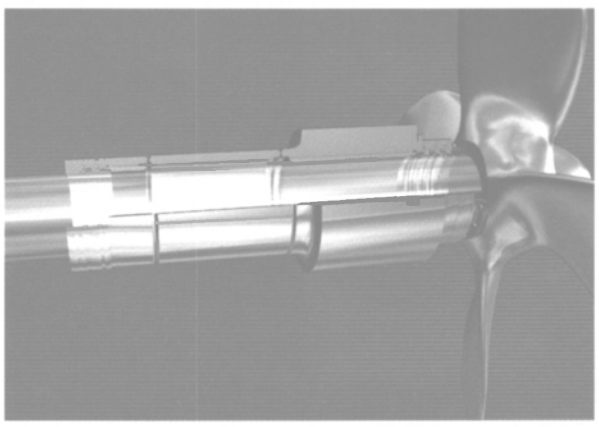

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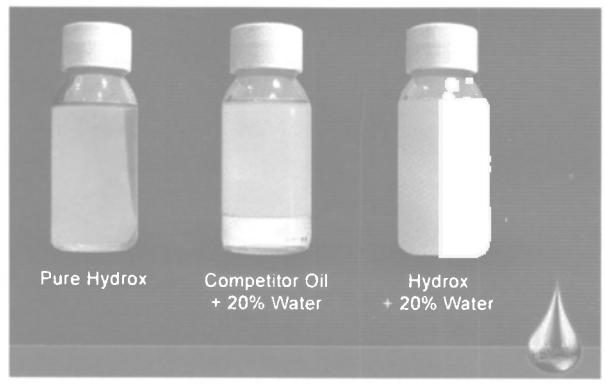

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ly formulated to do just that.

Conventional engine oils that are often used to lubricate stern-tubes do not form stable emulsions with water, particularly seawater. Some "emulsifiable oils" may form emulsions, which are unstable, thereby allowing free water, leading to a breakdown in lubrication.

Water ingress into a stern-tube lubricated with a conventional oil or unsuitable "emulsifiable oil" may therefore lead to serious bearing failure and damage to the propeller shaft should there be any significant degree of contamination with seawater. Hydrox 550 has been developed especially for use in stern-tubes. It forms stable emulsions with water and these continue to provide a high standard of lubrication and corrosion protection. Consequently, unscheduled repairs are unnecessary.

Vickers calculates, for example, that an offshore supply vessel could achieve net savings of more than $21,538 where Hydrox 550 is in use and there is significant water entry into the system. These savings arise largely from the avoidance of unscheduled docking. Similarly, a large crude oil tanker could save more than $215,385 on a similar basis. The significance of the unit price premium is further diminished when the modest volumes of oil used in the stern-tube are taken into account.

For example, Hydrox 550 is currently being used on the Queen Elizabeth 2 (QE2), the Oriana and the Ocean Princess. It is also being used on Stolt-Nielsen ships and on Andros Maritime ships. **Chris Zukowski**, Atlantic Fleet Manager at Stolt-Nielsen Transportation Group, says, "Stolt-Nielsen vessels use Hydrox 550 as a stern-tube lubricant because experience has shown that seawater entry into the stern-tube can occur on occasions. Using Hydrox 550 greatly reduces the likelihood of interrupted sailing schedules due to emergency repairs."**G. Foustanos**, superintendent engineer at Andros Maritime adds, "Andros Maritime, the tanker fleet agent, is typical of the growing number of Hydrox 550 users who value the long-term benefits provided by the product."

Hydrox 550 has been formulated so that it will form stable emulsions with up to 20 percent of seawater, which may enter the stern-tube. The oil is suitable for use in stern-tube systems fitted with circulatory oil-feed systems and is approved by leading seal manufacturers having been tested for compatibility with their seal materials. It may well be the case that a conventional oil is not compatible with the seal in which case excessive swelling or embrittlement of the seal can occur with consequent seal failure. Hydrox 550 is also used in cruise liner stabilisers, again to combat water ingress into the lubrication system. The oil is approved by a number of stabiliser manufacturers, including Sperry Marine and Brown Brothers.

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Wärtsilä, Haldor Topsøe To Cooperate on Fuel Cell Development

Wartsila entered into an agreement with Haldor Topsøe A/S to start a joint development program within the area of fuel cell technology, aiming to bring to the market highly efficient, clean and cost competitive fuel cell products with power outputs above 200 kW for distributed power generation and marine applications. Wartsila will apply its know-how in decentralized power plant applications and marine propulsion systems. Haldor Topsøe has long experience in catalyst development for oil industry and in development of planar solid oxide fuel cell (SOFC) technology.

The program is part of Wartsila's strategy to provide environmentally friendly solutions for customers with various power generation needs. SOFC technology will provide products for cogeneration applications with ultra-low emission levels, high efficiency and outstanding reliability.

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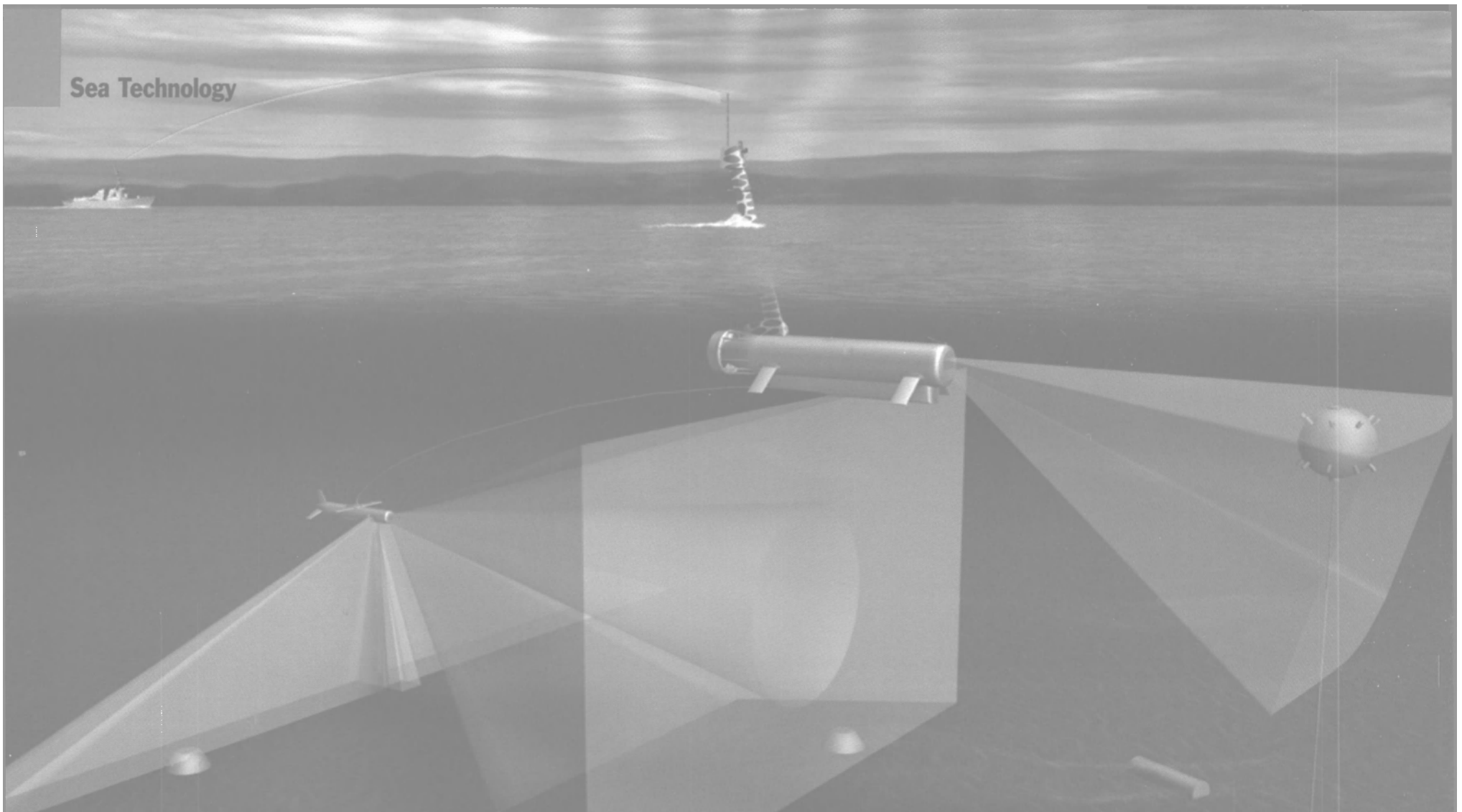

The New Hunter/Gatherers

In its search for sea mines, the Remote Minehunting Vehicle tows a variable depth sensor containing four sonars. The combined sonar coverage enables the VDS to detect bottom, close-tethered and moored mines along its search track. The RMV also features a forward-looking sonar by which to detect and avoid moored mines. The RMV sends back contact data to the host ship via radio link from atop its mast.

(All photos are permission of Lockheed Martin Naval Electronics & Surveillance Systems)

U.S. Navy's Unmanned Mine Reconnaissance System Will Provide Organic Mine Countermeasures Capability

By Frans Jurgens, freelance defense writer

The concept that a naval task force operating in littoral waters can detect underwater mines using remotely controlled unmanned vehicles is on the verge of being realized.

In Syracuse, N.Y., where Lockheed Martin Naval Electronics & Surveillance Systems (NE&SS) division has been developing just such a mine reconnaissance system for the USN, confidence is high that requirements have been met or exceeded.

In Pascagoula, Miss., Ingalls Shipbuilding is constructing USS Pinckney, the first of 11 Arleigh-Burke class guided missile destroyers (DDGs) whose mission will include this mine countermeasures (MCM) capability. By late 2003, the new ship will take delivery of a mine reconnaissance system that will change the way the USN thinks about and conducts what it calls "organic" or "assigned" (i.e. on-board) mine warfare.

The system to be carried by each Flight IIA DDG is designated AN/WLD-1(V)1. Its principal component is a 23-ft. (7m) semi-submersible, semi-autonomous Remote Minehunting Vehicle (RMV) that tows an advanced variable depth sensor (VDS) whose purpose is to detect, classify, localize and identify moored and bottom mines. The RMV can operate over the horizon from its host ship, sending back mine contact data and obstacle avoidance video imagery via radio link.

But WLD-1 is not an isolated phenomenon. It is one of seven organic MCM (OMCM) programs currently under development for the USN. By 2005, these permanently assigned OMCM capabilities will begin extending the combat systems reach of carrier battle groups — and later, potentially, amphibious ready groups. These systems will integrate with the sensors and weapons of ships, helicopters and submarines to enable minefield reconnaissance, minehunting, minesweeping and, if necessary, clearance of the mine threat to enable a limited breakthrough ability.

The effect of the organic MCM approach is to mainstream mine warfare in the U.S. Navy from a domain for specialists to a basic skill for all naval warfighters.

The Case for Organic

On the morning of February 18, 1991, in the northern Persian Gulf, the amphibious assault ship USS Tripoli struck a Pattern 1908 contact mine. The explosion ripped a 20 x 30-ft. hole in the ship's hull on her starboard bow and injured four sailors.

Hours later, the USS Princeton, a guide missile cruiser, detonated an Italian-made MRP acoustic mine lying on the seabed. The gas bubble from the explosion spread underneath the ship's keel transferring large volumes of energy into the structure. While not holed, 80 percent of the structural strength of the ship was compromised.

Since the beginning of the Cold War, at least 12 other Navy ships also have been casualties of mines, most during the Korean conflict. The worst mine incident occurred in 1988 during the Gulf Tanker War when the frigate Samuel B. Roberts nearly sank after striking an Iranian SADAF-02 contact mine. Although the mine cost just $1,500, the explosion caused nearly $96 million in damages.

Since 1950, the Navy has spent hundreds of millions of dollars to repair ship damage caused by mines each costing only a few thousand dollars. Furthermore, most of the affected ships were out of action for months. Countering asymmetric warfare of this kind would require transformational thinking, strategies and assets.

Already by 1991, changes in world geopolitics were shifting the focus of operations of the Navy forward-deployed forces from the open ocean to the littorals where mines are prevalent. Littoral waters, by definition, range from the shoreline out to water depths of

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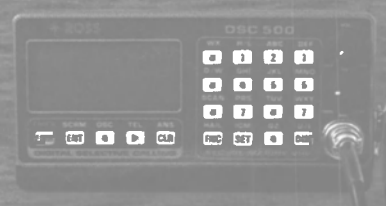

L-3 Communications welcomes Ross Engineering, the leader and revolutionary provider of DSC and AIS technologies, to our Aviation and Maritime products family. The agreement brings Ross' 20 years at the forefront of maritime port control together with L-3's solid leadership and management backbone. Learn more about what L-3 can do for you at www.L-3Com.com and you'll know why we say "Call L-3 First." For more information please call L-3 Communications Aviation Recorders at (941) 371-0811.

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The 13,000-lb RMV is launched using a davit that extends just beyond the ship's hull and lowers the vehicle into the water. Retrieval is the same procedure in reverse. At pre-programmed GPS coordinates, or on command from the host ship, the RMV can deploy and retrieve its variable depth sonar (shown as the white attachment with red fins under the RMV). The RMV is the principal component of the AN/WLD-1(V)1 Remote Minehunting System - to be deployed on U.S. Navy Arleigh-Burke class destroyers in 2005.

(All photos are permission of Lockheed Martin Naval Electronics & Surveillance Systems)

600 ft. At issue is the need by carrier and amphibious groups to dominate the littoral space, whether to project power or protect maritime shipping. Unrestricted access to, and maneuverability within, a littoral region's narrow and constricted geographic area are crucial if Navy and allied forces are to prevail.

Mines therefore cannot become showstoppers. In addition to executing other missions, ships captains and fleet commanders need to gain quickly the knowledge of the mine threat without having to wait for the arrival of dedicated MCM ships.

From this awareness evolved not only the need for improved MCM forces in the Navy as a whole, but also the more novel solution of battle group ships deploying their own MCM assets. For while forward-deployment of a limited number of dedicated minehunting and minesweeping ships in the Western Pacific and Arabian Gulf reduces the time to respond, the thinking is that any delay is unacceptable for many likely contingencies.

The new thinking around organic mine countermeasures was spelled out for the first time in 1995 when the Chief of Naval Operations drew up a concept of operations for organic offboard mine reconnaissance. It coincided with the ever-increasing threat to maritime and naval shipping from mines. The fourth edition (2001) of the U.S. Naval Mine Warfare Plan notes that the "number of countries with mines, mining assets, mine manufacturing capabilities, and the intention to export mines has grown dramatically in the past decade. More than 50 countries currently possess mines and mining capabilities, a 40 percent increase since 1986. Of these, at least 30 countries have demonstrated a mine production capability, and 20 have attempted to export these weapons."

Evolution of A Remote Minehunter

The evolution of a Remote Minehunting System (RMS) prior to WLD-1 dates back to the early 1990s when the USN began exploring options for mine reconnaissance from surface combatants.

A vehicle initially developed for hydrographic survey in the 1980s by Rockwell International was used by the Naval Surface Warfare Center to prove initial hydrodynamics, telemetry and the concept of towing a VDS behind a remotely operated vehicle. By 1994, the Navy had developed the first RMS prototype, which demonstrated mine reconnaissance using a VDS winch and pylon welded to the RMV's belly. Though launch and recovery was from shore, command and control was demonstrated from a military van aboard a Spruance class destroyer.

In 1996, the same prototype system vehicle was launched and recovered from another destroyer using a modified gravity davit. Later, in January 1997, during exercises in the Arabian Gulf, the system successfully detected, classified and localized training mines from the destroyer USS Cushing. Extensive at-sea Builder's Trails following in late 1998 showed the RMV could travel with full stability at speeds greater than 10 knots. Stability was a key USN requirement. A smooth riding RMV and VDS under water is crucial to eliminate the equivalent of camera shake, which otherwise would return fuzzy sensor imagery. In 1999, Lockheed Martin was awarded the WLD-1 design and development (Phase I) contract. Critical Item Tests begun in the summer of 2000 validated higher speeds, shipboard launch and recovery in varying sea states, and important RMV design characteristics, including control surfaces, stability/controllability algorithms, propulsor blade attachments and radiated noise measurements. Shore based RMV control and operations also were validated. A final series of tests in the winter of 2001-02 showed the RMV has the speed and endurance to perform with the VDS in both hull mount and towed modes, and can deploy and retrieve the VDS while underway. Company officials say these tests cumulatively paved the way for a successful Critical Design Review in December 2001.

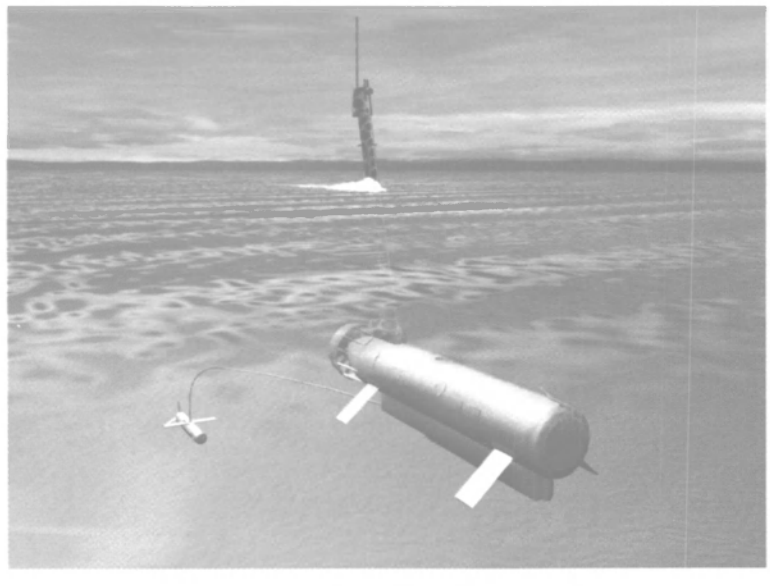
Concept of Operations

When a WLD-1 equipped destroyer enters a littoral zone where sea mines are suspected, mission planners will divide an area to be searched into sectors, and assign 'waypoints' to define the search track. The search area could be within line-of-site of the host ship or over the horizon. Waypoints (as determined by GPS coordinates) are programmed into the RMV before launch using the Mine Warfare Environment Decision Aids Library (MEDAL) system. Once a waypoint is reached, the RMV autonomously initiates pre-programmed commands, such as speed and course changes or VDS deployment and retrieval.

The 13,000-lb RMV is launched via an overboarding davit that extends just beyond the ship's hull. After the mast is raised and communications established, the davit lowers the RMV into the water. A sailor on the host ship uses a remote operator pack strapped to his waist to pilot the RMV far enough away from the ship's hull until the sonar operator can take control.

With its powerful Cummins diesel marine engine, the RMV transits just beneath the surface at sustained speeds in excess of 16 knots with only a few feet of mast extending above the water line. The RMV may conduct mine reconnaissance with its VDS hull mounted in shallow water, or automatically deploy the VDS at a programmed waypoint. The sonar search is conducted at speeds up to 12 knots.

A common sensor with the Airborne MCM community, Raytheon's AQS-20 VDS employs four different sonars (ahead-look, volume search, side-look and gap filler) to detect, localize and classify bottom, close-tethered and moored mines. Contacts classified by sonar-processing algorithms as 'mine-like' can be positively identified using the VDS' high-resolution elec-



The communications mast is the only feature visible above the water surface of the U.S. Navy's Remote Minehunting Vehicle (RMV), currently in the final stages of testing at Lockheed Martin. The RMV searches for sea mines by deploying and towing a variable depth sensor along a pre-programmed search track.

(All photos are permission of Lockheed Martin Naval Electronics & Surveillance Systems).

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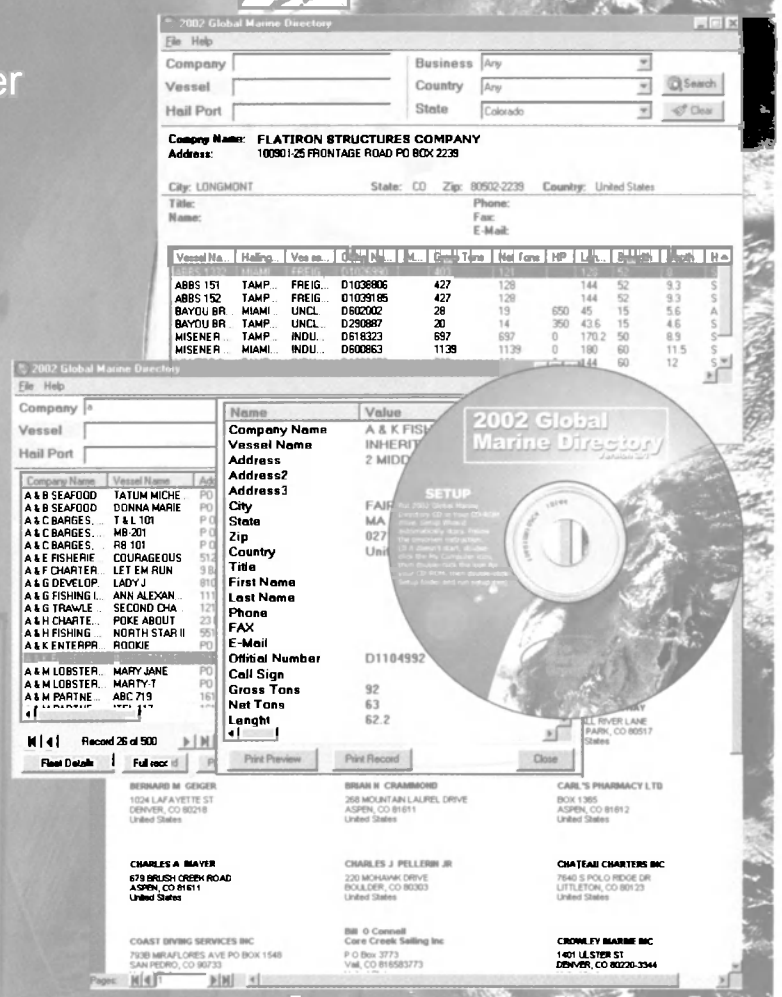

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tro-optical laser imager.

Sensor data and obstacle avoidance video imagery returned by the RMV via line-of-sight or over the horizon data links are monitored by a sonar operator using the host ship's AN/UYQ-70 sonar console, which links with ship's AN/SQQ-89 undersea warfare system. Image data is also stored in the RMV's on-board recorder for post mission analysis. Until recovered (approximately 24 hours or more later), or when commanded otherwise, the RMV will independently perform mine reconnaissance across the designated search area, allowing the host ship to conduct other operations. If necessary, the operator can use the console to manually adjust the RMV's course and speed while it searches for mines.

If an emergent threat to the host ship (a submarine for instance) requires use of the sonar consoles while the RMV is searching for mines, the ship's CO can command the RMV to continue autonomously, direct it to a new rendezvous point, or power down the system to "station keeping/sleep mode" until reactivated.

Multi Mission Capabilities

While the USN may be alone in its requirement for an organic approach to littoral mine reconnaissance, the applications for WLD-1 as a platform for multi-mission tasking are extensive and varied.

First to mind is its supplemental use as an intelligence collection device close in shore where it is more difficult to deploy a submarine. Lockheed Martin is currently evaluating the system's potential for Naval Coastal Warfare, Force Protection and Anti-Terrorism applications. Such shallow water missions would complement maritime coastal defense, as well as protection of ports, harbors and anchorages. Using the RMV with its VDS, regional defense forces could conduct active anti-submarine warfare (ASW) operations. Seabed mapping, Q-route surveying and shallow water battlespace profiling are other obvious applications. As a surface surveillance data collector close to shore, the RMV mast could be outfitted with high-resolution optical sensors, such as low-level light cameras, infrared sensors, and surface search radar.

The RMV could become a low-risk platform to collect communications, signal and electronic intelligence. It could fill in any coverage gaps by other collectors, such as submarines or satellites. The RMV could also serve as a communications relay between surface craft, other UVs and command centers. Future variants of WLD-1 may feature a lighter, smaller RMV with automated launch and recovery, increased sensor area coverage rate, and enhanced obstacle avoidance features. In many cases, the system would be launched from a pier or ship of opportunity, with data fed to a portable command and control van on shore.

Fleet Introduction and Acceptance

Fleet introduction of WLD-1(V)1 will occur after new tactical doctrine has been approved, and the system tested at sea by a DDG91 ship's company in 2004-5. Lessons learned from those tests will determine the best ways to incorporate WLD-1 operations and procedures for follow-on ships without adversely impacting their primary mission.

Arguably the biggest near-term challenge is to overcome ships captains' and fleet commanders' concern about having the system on board, particularly given the traditional reliance on dedicated minehunters to perform MCM.

Complementary to that goal is the need to train personnel to become expert in the technical, tactical and operational role of organic mine warfare.

On paper at least, a good indication of the evolving mindset toward mine countermeasures of the future is how the USN uses terminology. Already the term "organic" is giving way to the term "assigned" - the latter term implying greater permanency. So too the term "dedicated" as applied to fixed mine warfare forces, such as minehunting ships, is being replaced by the term "supporting" - as in supporting carrier and amphibious groups that will find and neutralize mines with their own "assigned" MCM assets.

Ultimately, operational success, not terminology, will convince COs of WLD-1's viability in battle conditions. But just as unmanned airborne vehicles have become indispensable battle tools, so too will unmanned semi-submersible vehicles like the RMV. The success of unmanned aerial vehicles in Afghanistan, and calls by President **George W. Bush** and U.S. Secretary of Defense **Donald H. Rumsfeld** for more "transforming technologies," should ensure WLD-1 gets top-level support.

The preceding article was first published in the April 2002 issue of World Defence Systems.

San Diego Shipyard Wins Ship Repair Contract

United Defense Industries, Inc. announced that the U.S. Navy's award to Southwest Marine (SWM) of the advanced planning segment of the contract for dry docking and pier side work on the USS LAKE CHAMPLAIN (CG-57), a Ticonderoga-class Aegis cruiser home-ported in San Diego. Southwest Marine is a member of United States Marine Repair, Inc. (USMR), which was acquired by United Defense last month.

The advanced planning segment of the contract is valued at $518,484. With funded options, the total contract value is in excess of $12 million. SWM is the prime contractor and has teamed with National Steel and Shipbuilding Company and Continental Maritime of San Diego to perform the work. The ship is scheduled to arrive at SWM on September 18, 2002, and work is expected to be completed on November 20, 2002.

Keppel Offshore and Marine Units Win Contracts

Keppel Corporation Limited, through its offshore and marine units in Keppel Offshore & Marine Ltd (Keppel O&M), has clinched contracts worth a total of $41 million from repeat customers.

Three contracts over $28 million are for the upgrades of jack-up rig Ensco 81 and barge drilling unit Ensco 1 from Ensco Offshore Company (ENSCO), and swamp barge Maera from PT Apexindo Pratama Duta, an Indonesian drilling contractor. Another contract is for a new Anchor Handling Tug/Supply (AHTS) vessel for Pacific Richfield Marine Pte Ltd, owner and operator of OSVs in the Asia and Pacific region.

U.S. Navy Awards $2.8M Contract To GD

The U.S. Navy has awarded Electric Boat a $2.8 million contract to perform planning work for maintenance on the USS Toledo (SSN-769). Electric Boat is a wholly owned subsidiary of General Dynamics. Under the terms of the contract, Electric Boat will immediately begin advanced planning for a 60-day maintenance period known as a Selected Restricted Availability (SRA). The SRA is scheduled to start at the Naval Submarine Base in Groton in April 2003.

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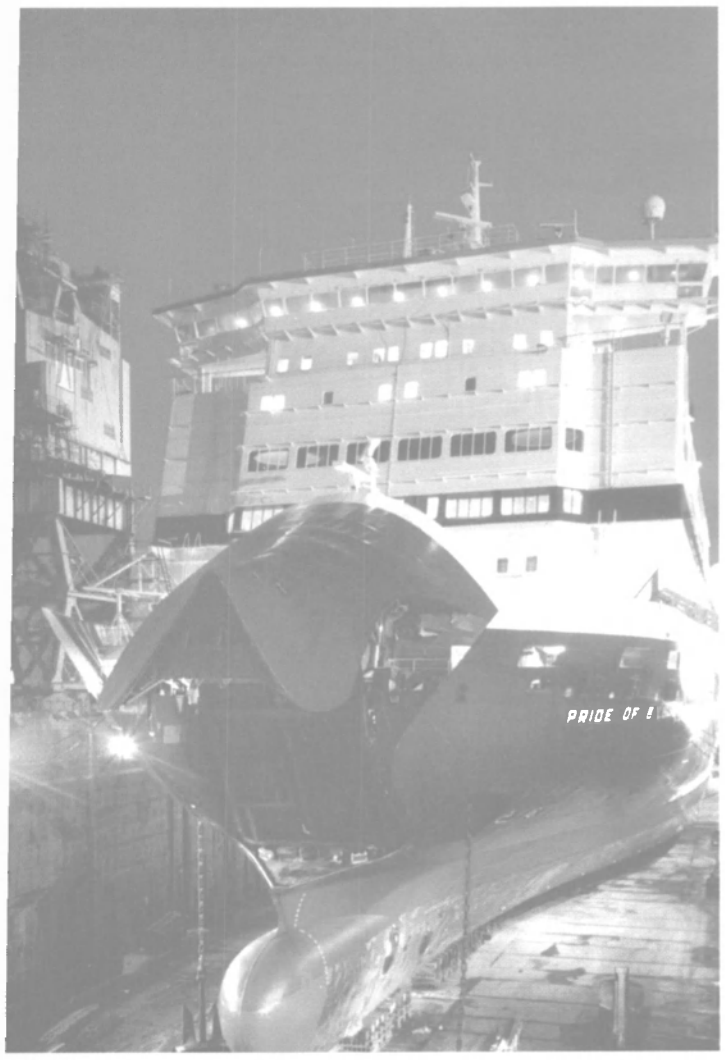

Product launches, company presentations and discussion-based conference and workshop formats will underline a "hands on" theme at Shiprepair & Conversion 2002, the 11th anniversary of the industry's leading trade fair which takes place in London's Grand Hall, Olympia, on November 27-28.

Innovations prompted by feedback from last year's show — which attracted more than 2,500 visitors and 300 exhibitors from 45 countries — include a fully-equipped presentation/demonstration area and a debate-led conference program, with delegate fees set at just $192 to provide value for money and broaden participation.

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Marine consultancy British Maritime Technology (stand C23) is using the presentation facility to host a briefing on its expanded surveying capability — the company has acquired P De Beer & Co — and the creation of a new business unit handling reliability, risk and safety management.

On stand B27, Furmanite will feature its new Scitech portable spark erosion kit, which enables stud removal on-site despite restricted headroom or very tough materials. The process was used recently when a cylinder head stud broke on P&O Stena's Provence, the job being completed within 24 hours while the ferry was in transit.

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Northwestern Shipepairers (C5), which started trading at six Merseyside sites in June last year, will focus on a major investment programme providing new workshop facilities, craneage and general infrastructure improvements at Bidston and Canada drydocks.

The 2002-3 Owners Guide to UK Yards will be available from the Shipbuilders and Shiprepairers Association (G5) together with case studies from its R&D and MasterClass yard improvement projects.

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Day two starts with maintenance debates covering coatings, corrosion, costings, methods, technologies, spares supply and planned maintenance. The concluding debates will focus on shipyard issues — setting up a new yard, alliances, improving performance, safety and risk, environmental standards and legal liabilities.

One-Day Workshop Wraps Up Contract Negotiation

In addition to the conference, a pre-conference workshop on negotiating for newbuilding, conversion and repair contracts is being held at the Hilton London Olympia on November 26. This one-day intensive workshop will examine the key issues and differences in all aspects of contract negotiation from both owner and shipyard perspectives.

Full exhibition, conference and workshop, organised by Lloyd's List Events are available on the event website - www.shiprepairex.com -which includes booking information and on-line registration. Stand space can also be reserved via **Mark Lewis** on Tel +44 (0)20 7553 1732.

New England's Fall Foliage Is Setting For SNAME 2002

This year's SNAME Annual Meeting and International Maritime Exposition blends the big city atmosphere of Boston's diverse culture and history with New England maritime history. The event will be held at the Westin Copley Place in Boston from Tuesday, September 24 - Friday, September 27. The exhibition, will bring together professionals from all corners of the maritime world, from both the technical and business sides.

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In addition, to the traditional display of the newest industry wares in the exhibition hall, SNAME 2002 will also feature a technical program featuring the most innovative developments in shipbuilding and ship design, as well as a new program on the hot topic of the times - maritime security. This new seminar will cover the need, as well as what steps need to be taken by the maritime industry to hinder potential terrorist attacks and/or threats.

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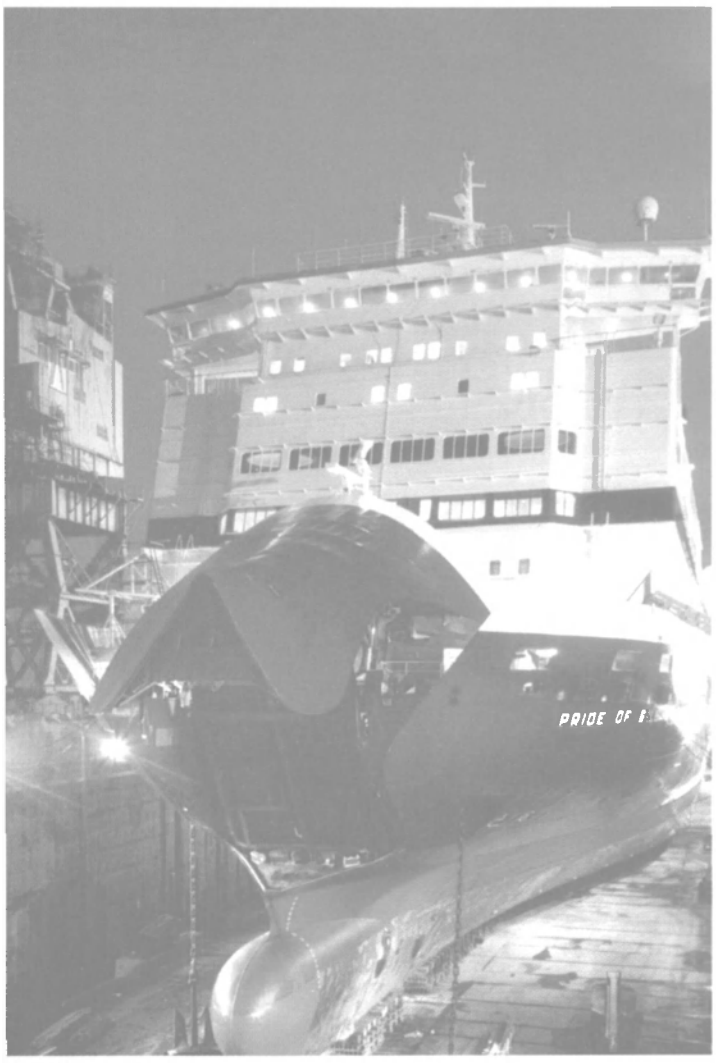

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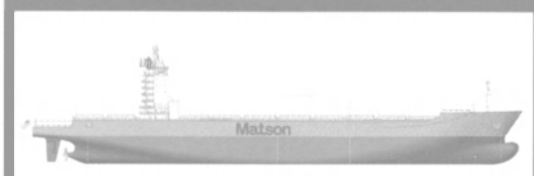

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Fleet Privatizations Expected Soon For Lithuanian Companies

Following are financial details of a planned fleet privatization in Lithuania. **JSC Klaipeda Transport Fleet (KTF)** (www.transfleet.lt) is one of the largest Lithuanian shipping companies, whose principal activities are transportation of refrigerated cargo by sea and lease of sea transport vessels. The authorized capital of the company as of December 31, 2001 amounted to about $38.4 million. KTF owns and operates 16 small- and medium-sized cargo reefers. The main cargo handled by the company includes frozen fish, meat, chicken, butter, fruits and vegetables. The capacity of KTF's vessels is from 85,000 to 470,000 cu. ft., the average capacity — 189,000 cu. ft. The total capacity of the fleet is 85,664 cu. m. According to this class of vessels, the company's fleet is the fourth largest fleet in the world. The main foreign competitors include Seatrade (U.S.), East Wind (U.S.), GRL (Global Reefer Transport, Great Britain) and other smaller companies. Thecompany is a shareholder in the Germany-based vessel chartering company Alpha Reefer Transport with 20 percent share in this company.

JSC Lithuanian Shipping Company (LSC) was established on June 27, 2001, following the reorganization of JSC Lithuanian Shipping Company (LISCO) by splitting it into two business entities: LISCO and LSC. The authorized capital of the company as of December 31, 2001, amounted to $57.3 million. At the end of 2001, after the reorganization, LSC owned 19 vessels (169.4 thousand DWT). In 2002, the company bought two more vessels (19,300 DWT). The main foreign LSC's competitors are Baltic and Scandinavian shipping companies.

Rutkauskas, Skyrius & Partners, a consulting firm in Vilnius, Lithuania, invites all parties interested in participation in privatisation to submit their Expression of Interest. The privatisation process is planned to start in October-November 2002. Contact person: ***Rimvydas Skyrius;*** *E-mail: rspconsult@takas.lt; tel: +370-5-212 30 15, +370-5-212 28 08; fax:+370-2-62 38 66.*

Table 1
Main features of the vessels of KTF

Name	Year built	Capacity	Speed
SEDA	1985	470000	15.5
IGNALINA	1983	466000	15.5
SEAFROST	1993	255000	15.5
ARGO	1985	181000	15.5
SATURNAS	1982	156000	13
VEGA	1982	153000	14.5
TUKANAS	1982	149000	14
PEGASAS	1980	137000	12
ORIONAS	1979	130000	13.5
PLUTONAS	1979	120000	13
RAMBYNAS	1985	107000	13
ZALGIRIS	1985	107000	13
LYRA	1991	237000	14.5
KASTYTIS	1978	85000	12.5
JUPITERIS	1978	85000	12.5
MARSAS	1989	189000	14.5

Key data on KTF's performance

Financial indices (mil.LTL)

	Dec. 31 '00	Dec. 31 '01
Assets	170,209	169,236
Sales and services	71,035	80,060
Total profit	11,405	9,482
Operational costs	4,999	5,117
Operational profit	6,406	4,365
Net profit	10,899	4,034

Table 2
Main features of the vessels of LSC

Ship name	Year built	DWT	Use
Daina	1998	5,423	Dry cargo
Audre	1997	5,423	" "
Akvile	1997	5,423	" "
Asta	1996	5,423	" "
Algirdas	1991	4,160	General cargo
Mindaugas	1992	4,160	" "
Voke	1990	5,985	" "
Musa	1993	4,480	" "
Veliuona	1973	4,054	" "
Medininkai	1974	4,054	" "
Kreva	1974	4,054	" "
Kap.Kaminskas	1978	14,632	Bulk cargo
Kap. Stulpinas	1981	14,550	" "
Kap. Simkus	1976	14,632	" "
Kap. Serafinas	1980	14,550	" "
Kap.Andzejauskas	1978	14,550	" "
Kap. Marcinkus	1977	14,632	" "
Kap. A. Lucka	1980	14,550	" "
Kap. Domeika	1979	14,632	" "
Staris*	1985	9,650	Dry cargo
Svilas*	1985	9,650	" "

* - vessels were purchased in 2002

Financial indices (mil.LTL)	2001.12.31
Assets	305.2
Sales and services	46.87

Company Profile

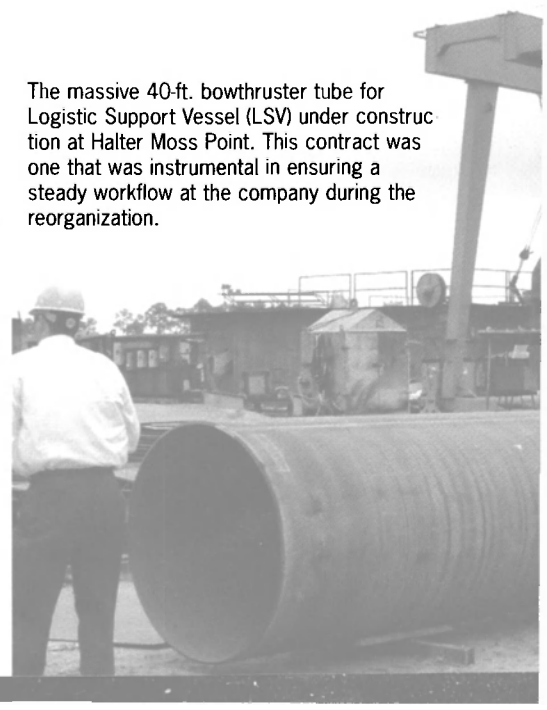
Halter is Back

Anil Raj, president and COO of Halter Marine, in many ways embodies the company for which he has worked for the last 15 years. Joining as the Director, Engineering, Production Controls and Procurement in 1987, Raj has relied on a solid technical foundation, first to help establish and continue the company's reputation as one of the world's most prolific builders of ships and boats, and second to help the company hang on — to customers as well as key technical and production staff, as the company navigated the tumultuous environs following its Chapter 11 filing of April 2001. Despite well-chronicled skepticism, Halter today sits on the verge of a remarkable rebound that could again make it a ubiquitous presence in both commercial and military marine construction.

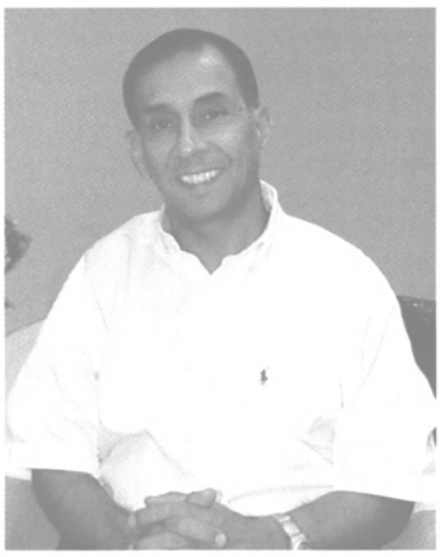
— by ***Greg Trauthwein***

"Every adversity has a blessing, "Raj said. While he readily admits that the period of Chapter 11 "has not been kind to the company," he revels in the fact that Halter Marine has, since its Chapter 11 filing delivered more that $250 million worth of vessels and won contracts, which including options are worth more than $275 million. While this level is a far cry from the amount of business conducted pre-Chapter 11 filing, he believes it a strong indicator of the company's willingness and ability to continue despite the financial problems, problems brought on primarily by drain on cash liquidity due to two bad contracts not associated to Halter, the vessel business unit of Friede Goldman Halter.

"At the time of the filing, the company had barely enough cash to meet two week's payroll and no credit line," Raj said. "The dedicated employees rallied around the need to find a solution. For some time prior to the filing the company's liquidity problem made it difficult to get materials to contracts. This caused the progress on the contracts to slow down. The resultant lack of progress and collection of milestone payments from customers further aggravated the liquidity problem. Immediately after filing, with no line of credit, we had to figure out how to "prime" this cash pump. We made some strategic decisions on how to do this combined with customer and supplier support, helped to put the company in a position where it actually started to accumulate cash."



The massive 40-ft. bowthruster tube for Logistic Support Vessel (LSV) under construction at Halter Moss Point. This contract was one that was instrumental in ensuring a steady workflow at the company during the reorganization.



Anil Raj, Halter Marine's president and COO

While the last couple of years have been little reason to celebrate for Halter, the fact that Raj and staff are still in Halter's Gulfport, Miss., offices, which is a veritable museum of vessels built over the last four decades, a testament to the nearly 3,000 built by the company since started by **Harold Halter** in 1951 (see related story on page 70), is accomplishment in itself. At the time of *Maritime Reporter's* visit, the company was close to the close of the deal, which would make Vision Technologies Kinetics, Inc. (VTK), a wholly-owned subsidiary of ST Engineering, the new owner of Halter Marine. VTK's $66 million winning bid gives it Halter Pascagoula, Halter Moss Point, Moss Point Marine, Halter Port Bienville, Halter Lockport and Halter Gulfport East, including the Corporate HQ and Gulfport Central. VTK is actually a unit within VT Systems. It is a unit that has DoD approval to conduct military work for the U.S. Considering Halter's federal contracts, it was decided to structure the acquisition in this manner. "When you have a foreign company, which owns a U.S. company doing military work, there is a well-defined structure to put up a firewall and maintain security," Raj said.

VT Kinetics has a U.S. DoD approved Special Security Agreement and necessary clearances to do classified work. Raj points out that the sale was also approved by the Presidential Committee for Foreign Investment in the U.S. VT Systems, spear headed by a retired U.S. Army four-star General, **John Coburn**, it also has aerospace operations in Mobile, Alabama, San Antonio, and Dallas, Texas. ST Engineering is a diversified company with extensions in marine, land, aerospace and electronics.

The Halter Marine acquisition is, in essence, the company's marine business in the U.S. While final plans regarding strategies for the former Halter Marine (to now be known as VT Halter) are yet set, Raj stated that it will be treated as an autonomous business unit from the Singapore unit. VT Halter intends to keep substantially all Halter personnel at the time of closing. This includes the management, technical personnel and production workers of Halter Marine.

Pride Restored

Bankruptcy humbles, to put it simply, and while the company retains a solid technical core and a reference list of more that 2,700 vessels, job one will be to re-instill the confidence and swagger that helped lead Halter to the mount

many years ago. Raj said that a number of owners withheld orders during the past year and a half due to the bankruptcy proceedings and the uncertain future of the company. He said that a good number of customers stayed the course, signing letters of intent, which turn into contracts once the bankruptcy matter was resolved. In addition, news of the pending deal with VTK he notes that "we have received more inquiry calls in the last week than we had in the previous three months combined." In total, he estimates that the company has approximately $2 billion worth of proposals currently being evaluated by customers.

Two customers instrumental in ensuring that there is continued work at the Halter yards to allow a steady, if not spectacular, stream of work to ensure that its key technical and production staff stayed adequately busy: the U.S. Army and NOAA, which awarded the company the contract to build one Logistic Support Vessel with an option for two additional units and up to four Fisheries Reserve Vessels. These two contracts, when options are exercised, are worth approximately $240 million.

While plans regarding the use of Halter facilities will evolve in the coming months, it is a good bet that the company will rely on diversity of product — both commercial and military — to regain its footing. On the defense side, it will be imperative for Halter to project a very "American" image, keeping an arm's length between it and its Singapore connection. Conversely, on the commercial side, the company will rely on the combined strengths inherent in having two strong units literally a world apart. "ST Engineering has a similar product line, but on the higher end and above," Raj said. Both companies have strong international presence, but ST Engineering also has the capabilities to serve the containership and frigate markets, for example. Doubters will surely persist, as the company seeks to retains its status as a leading builder in the GOM and beyond, but Raj is confident that the pieces are in place. "We are now well-capitalized, and we have been able to retain a most of our technical staff, helping to maintain the franchise value." In addition, the thousands of Halter-designed and -built vessels in operation provided the new owner an invaluable technical database it felt it could not pass. "We don't sell a boat or a ship to our customer... we sell a solution" Raj said. "We have seldom won a contract on low price; rather we have won contracts on our quality and custom solutions. These are aimed at providing superior value to our customers so they can be more competitive."

In Memoriam: Harold P. Halter

Harold P. Halter, a native of New Orleans, died Sunday, July 28, 2002. In 1956, after he and James Dubuisson built a 26-ft. pleasure boat in his back yard, they founded Halter Marine Services, Inc. on Bayou Sauvage in New Orleans East. Halter Marine was responsible for many innovative designs in the ship building industry. Crew boats, supply boats, and tug boats were designed and fabricated for the offshore oil industry. By 1978, Halter Marine was responsible for 49 percent of the world's production of supply boats. The business had grown to include 10 facilities in four states. In 1983, Mr. Halter sold the company to Trinity Industries. In recent years he continued his research and development of offshore boats and equipment and was granted patents on his designs in this area. Mr. Halter founded and served as president of the Louisiana Shipbuilding and Repair Association. He was a member of the City Club of New Orleans, International Trade Mart, Southern Yacht Club and Plimsoll Club.

(Source: Excerpted in part from the New Orleans Times Picayune)

Halter Moss Point: This Way is Up

Bill Skinner ... **Sibley Perry** ... **Eric Richards**.

Respectively the senior vice president of operations, the yard manager, and the NOAA project manager at Halter Moss Point, this trio represents nearly one century of marine industry experience, experience that will be crucial in returning all of Halter Marine to its pre-Chapter 11 form.

"It won't be long and our heads will be held high again, and we will be back to where we were," Richards said. By their own admission, the facility in Moss Point is not particularly large. But it is modern and offers what cannot be bought: a level of ship and boatbuilding experience that earns the highest accolades from the world's most discriminating customers.

Logistic Support Vessel

One customer who was instrumental in the continuation of operation of Halter Marine — the U.S. Army's Tank and Automotive Command (TACOM) — celebrated the laying of the keel of its new Enhanced Logistic Support Vessel (ELSV) in July. The 314 x 60 x 19 ft. (95.7 x 18.2 x 5.7 m) vessel — when completed in two years — will support TACOM logistical efforts on a worldwide basis. Halter has previously built for the U.S. Army six LSVs, six Large Tugs and 35 LCU-2000 Class Landing Craft Utilities.

"Halter has designed and built all of the U.S. Army's LSVs — this being number seven," said **Anil Raj**, Chief Operating Officer. "Two additional LSV's have been built previously for the Philippine Navy. We value the trust and confidence that the Army has placed in Halter's Team."

The yard also started construction of NOAA's (National Oceanographic and Atmospheric Administration) newest vessel the M/V Oscar Dyson. The $38.3 million vessel is scheduled for delivery in 36 months. The M/V Oscar Dyson is a state-of-the-art Fishing Research Vessel named in honor of **Oscar Dyson**, of Kodiak, Alaska. Mr. Dyson, a well-known fishing activist served as an industry advisor to government officials, including a congressional delegation.

The vessel will be homeported in Kodiak, Alaska as part of the NOAA fleet. The Office of Marine and Aviation Operations will operate the vessel. The vessel will measure 209 x 49 ft. (63.6 x 15 m), and a draft with the centerboard in an up position of 19 ft. (5.9 m). The vessels will house multiple laboratories and is designed with a 40-day endurance. In addition to this government work, Halter Marine recently launched Capella, an 80,000-barrel tank barge for J&L, Inc. The barge, the first project Halter has undertaken for J&L, was built at Halter's Gulfport, Miss. Yard. Delivery was scheduled for August 30. The barge is 332 ft. (101.1 m) long, with a beam of 74 ft. (22.5 m) and a depth of 25 ft. (7.6 m), and is built to U.S. Coast Guard standards under Sub-chapter D, as a tank barge certified to carry Grade A or lower bulk petroleum products. The barge also qualifies to be certified by the American Bureau of Shipping (ABS) under the +A1 Oil Tank Barge designation.

View of the Moss Point yard from the perspective of **Sibley Perry**, yard manager.

"the cost of preventing the ingress of contamination may only be 10 percent of what it will eventually cost once the contamination is allowed to enter lubricating oils."

- Sunoco's Contamination Counter Attack

Charles Pitt, Sunoco Chemicals
Lana Robin, PdMA

July/August 2001 Issue
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Stealthy ROV Keeps Divers Out of Danger

In Port Bustamante, Jamaica last year, three divers inspected the hull of vessels as part of the anti-narcotic procedure were killed to prevent them from investigating and discovering contraband. To cut the threat to divers and their families, Security Administrators Limited invested in VideoRay ROVs to begin diver-less inspections. Operated by one person on the dock or deck of a boat, the eight-lb. ROV (remotely operated vehicle) now inspects vessels sailing from Jamaica to the U.S.

The submersible vehicle, which is connected to a 500-ft. tether, is outfitted with a video camera that relays video from underwater to a monitor. VideoRay used in conjunction with scanning sonar and GPS can quickly and precisely locate and identify plumes of divers or targets. A manipulator arm that can be mounted to the submersible can pick up objects up to of 100 lbs./50kgs.

Steve van Meter, a Hazardous Duty Robotics Specialist from NASA/Kennedy Space Center, has worked on three missions with the U.S. Customs Contraband Enforcement team at Port Canaveral, Fla., to inspect ships for which the U.S. Customs had intelligence of carrying drugs. In the absence of dive teams to perform the searches, the VideoRay was sent into the bilge areas, the ballast tanks, and then on a complete survey of the bottom of the ship. During his survey of the bottom of the vessel, van Meter was looking for unusual spots and new welds on the barnacle-encrusted surface. He checked the prop shaft and bow thruster for places a package or parasitic devise could be stowed, and was also able to check the entire bottom and verify the propeller shaft condition without ever getting in the water. Van Meter has also worked with the Brevard County and Orange Country Sheriff's office dive teams to teach them how to use the VideoRay to search docks, piers, and ships.

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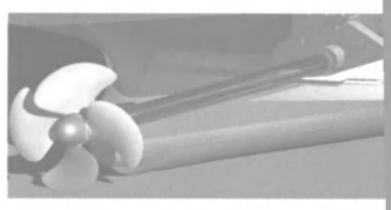
Alstom To Equip LNG With Electric Propulsion Technology



ALSTOM will reportedly be the first company in the world to install electric propulsion technology on a Liquid Natural Gas (LNG) carrier, which is being built at ALSTOM's Chantiers de l'Atlantique shipyard in France for the Gaz de France.The use of this technology on an LNG ship follows the company's successes on other ship types. The LNG ship, with a capacity of 74,000 cu. m., will be delivered to Gaz de France by the end of 2004. It will be propelled through a variable frequency main propulsion system, via a gearbox. The electric drive principally consists of two 9,550 kW, 1,200 rpm synchronous motors, supplied by two synchroconverters associated with a propulsion control and monitoring system.

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New Center for Fire and Evacuation Safety

Ever since the sinking of the Titanic, experts have occupied themselves with the question of how passengers can be evacuated from a ship in the fastest possible way. Passengers and crew rarely have a chance to prepare themselves for the consequences of a disaster. In this context, ongoing efforts are being made to further the tightening-up of the standards and procedures governing evacuation and safety on board ships. With the opening of a new research and training centre for fire and evacuation safety, Beele Engineering of Aalten (the Netherlands) expects to enhance its capability to contribute towards these efforts.

Going back to the Titanic disaster, the time available for crew and passengers to abandon ship has been significantly extended, among other things by the introduction of smoke and fire detectors as well as sprinkler systems. Even so, time and again it later emerges that in emergency situations there was 'just too little time'. The human panic factor plays a role here. Again and again, it becomes clear that both passengers and crew tend to panic when there is an outbreak of fire or a power failure. As a result of the panic, people take wrong evacuation routes and their sense of disorientation is only heightened. In the case of fire, the dense and suffocating smoke is an additional complicating factor.

In such cases, the significance of luminescent EXIT signs and pictograms indicating staircases, evacuation routes and deck plans becomes questionable. How many people will take the time to study the deck plan when they arrive on board an unfamiliar cruise ship? And will persons in a panic be in a fit state to recognize the signs and pictograms, which were developed in peace and quiet on the drawing board?

In the research and training center, all possible attempts are made to find the answers to these questions. At the heart of the new centre lies a demonstration mock-up facility covering approximately 500 sq. m. The facility is so constructed that a variety of practical situations can be simulated in a lifelike way. For instance, it can be used to simulate a ship's cabins and corridors, including raised areas and open spaces. Emergency situations can then be imitated by switching off all the lighting and playing sound recordings.

Under these conditions, the people present in the mock-up facility then have to find their way out. While they do so, the behavior of the test persons and the effectiveness of the evacuation route signposting system are recorded by means of infrared cameras and an audio system.

The mock-up is divided into two parts: one part is fitted with an evacuation route signposting system, while the other part has no signposting. In this way it can be determined to what extent the existing signs are effective, and in what respects these may require modification or even new product development. The actions of the 'fleeing' persons can be observed on closed-circuit TV screens from a control room, which is also used as a showroom.

Besides the evacuation research effort,

the center also acts as the headquarters for the general R&D effort of Beele Engineering. For this purpose a total area of 300 sq. m. is reserved for three laboratories in which light emission investigations, large-scale fire tests and mechanical tests are performed. The fire tests are intended to make it possible to examine the behavior during fire of various materials that are used in shipping. In addition, investigations are carried out into how fire is able to spread in a short time, and what measures can and must be taken in order to contain that spread. The light emission laboratory concentrates in particular on research into the effectiveness of luminescent evacuation route signs (pictograms etc.) in a wide range of lighting conditions.

The center is open not only to people who are professionally involved with fire, fire prevention and evacuation safety (firefighting personnel, safety professionals, surveyors, shipping authorities, etc.) but also to other interested people. For that purpose the center also contains a presentation theatre seating up to 45 persons.

Next year, Beele Engineering will have been engaged in the field of passive fire prevention for 30 years. The company's product range include the Yfestos range of products that glow in the dark, which was nominated for the category 'Best safety innovation' of the Cruise & Ferry Award.

In addition, the company supplies a versatile and comprehensive range of fire resistant, water-gas- and smoke-tight sealing systems for cable and pipe conduits. In the event of an outbreak of fire, these systems ensure as far as possible that the fire is contained and prevented from spreading.

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KMSS Receive Greek Type Approval For MBB

Kongsberg Maritime Ship Systems (KMSS) has received type approval from the Greek authorities for its Maritime Black Box (MBB) Voyage Data Recorder.

Designed and tested to IMO and SOLAS standards, the Protected Storage Unit can withstand an extreme amount of stress, while the Data Control Unit (DCU) operates the entire system.

In addition to the main units, KMSS also offer a Replay and Evaluation Unit (REU) that utilizes the data collected by the PSU and DCU for training purposes. It gives users a hands on view of how real-life situations should be dealt with and can also be used for other applications such as Radar and ECDIS image distribution, voyage reports, engine logs and the back-up of information to CD-Rom.

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L-3 Communications Acquires Ross

L-3 Communications has acquired substantially all of the assets of Ross Engineering, thus integrating the Ross product lines into the L-3 Communications' Aviation Recorders Division.

With operations headquartered in Sarasota, Fla., L-3 Communications Aviation Recorders will be leveraging Ross Engineering's experience in marine communications, and couple it with L-3's financial, engineering, manufacturing, and marketing resources. This will allow L-3 to become a major supplier of Universal Automatic Identification Systems (UAIS) and Digital Selective Calling (DSC) VHF radios to the maritime industry. This acquisition will also enable L-3 to extend its product portfolio into other new product areas within the maritime industry.

Lockheed Martin Renames Maritime Business

Lockheed Martin has re-named its Marine Traffic Management business to better reflect its capabilities in the areas of marine navigation, coastal and harbor surveillance and homeland security. The business, based in Syracuse, N.Y., now will be known as Maritime Safety, Security and Surveillance (MS3).

Technip-Coflexip Sells McNulty Yard

Technip-Coflexip has signed a Sales and Purchase Agreement related to the sale of its affiliates McNulty Offshore Ltd. and Captain Frank McNulty & Sons Ltd., to the Managing Director of McNulty Offshore Ltd. Technip-Coflexip had a 90 percent stake in both companies following the purchase of Aker Deepwater Company in January 2001.

According to the terms of this agreement, Technip-Coflexip has sold the Newcastle-based yard, together with all activities and resources dedicated to it, to McNulty's Managing Director. The transaction, the amount of which is undisclosed, is in line with Technip-Coflexip's previously announced program to dispose of non-strategic assets.

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U.S. Market: Foundation for the Future

*In part two of a two-part series, **William G. Schubert**, the new U.S. Maritime Administrator (MarAd), speaks with **H. Clayton Cook, Jr.** about the current standing and future direction of maritime activities in the United States.*

Cook: I'd like to pick up where we left off last time. You were explaining where matters stood concerning MarAd's monitoring the time chartering of U.S.-flag vessels by foreign nationals.

Let me say a few words for the benefit of our readers. As you and I both understand, the Shipping Act, 1916, requires that MarAd approve all transfers of U.S.-flag vessels, or interests in these vessels, to non-citizens. Time charters are such a transfer of interest, and time charters to foreign nationals require MarAd approval. Over the years since 1916, and until 1992, MarAd required the submission of such time charters for MarAd review prior to MarAd approval. With certain limited exceptions, this submission for review was eliminated in 1992 as a part of the Administration's deregulation efforts. And, MarAd issued a so-called "advance general approval" of all such charters. So, at the present time a foreign national can time charter a U.S.-flag vessel without MarAd's knowledge or any specific approval.

I see that MarAd has published the Federal Register Notice that you mentioned at our last meeting. The Notice reviews the history of the 1992 changes and states that any MarAd change in policy will require a further MarAd rulemaking proceeding. Would you comment?

Schubert: As I've said before, the world is a different place today from what it was in 1992. A time charterer determines what cargoes will be loaded and discharged and directs the vessel's schedules and its ports of call. A U.S.-flag vessel chartered to an unknown foreign national could present problems. The vessel is a U.S.-flag vessel, so one might assume that it doesn't pose any risks. But the foreign national could direct that the vessel be loaded in a fashion and directed to a location were there is the possibility of mischief. And, this could occur without the vessel's U.S. citizen master and crew being fully aware of what was going on.

You will forgive me if I don't comment further. As a first step we wish to obtain the industry's advice concerning what might be involved if MarAd returned to a case-by-case review. We will be receiving industry comments in response to our Federal Register Notice. We will review these comments, and discuss these matters with the Coast Guard and other concerned agencies, and go from there.

OPA '90 TANKERS

Cook: When we closed last time you were beginning to speak about your commitment to work with the Navy, our U.S. shipbuilding and repair yards, labor, our U.S. commercial vessel operators, and Congress to develop a unified long-term strategy to maintain our shipyard capacity. Could we pick up on that?

Schubert: Yes. MarAd needs to address the issues of U.S. shipyard productivity, modern shipyard infrastructure, R & D investment, and training of a sufficient number of skilled workers. I want to work with our U.S. shipyards in identifying opportunities in our domestic trade, and in then turning these opportunities into successful projects. Everyone agrees that our shipyards need to identify vessel designs that they can build in series in order to achieve adequate economies of scale. The Kvaerner Philadelphia Shipyard may be headed in that direction with its container vessel design. I believe this can be done in meeting our needs for Oil Pollution Act of 1990 (OPA 90) product tankers and with other vessel designs.

Cook: There has been a good deal of discussion concerning a "short fall" of tankers sufficient to meet OPA 90 needs. How would you define the "short fall" problem? What can MarAd do to assist in solving the problem?

Schubert: The General Accounting Office's Year 2000 report on OPA 90 compliance recommended that MarAd monitor the progress being made to replace single-hull vessels with double- hull vessels, and keep the relevant House and Senate Committees advised of the progress being evidenced in meeting OPA 90 requirements.1 MarAd issued a report on this subject "U.S. Tank Vessel Markets, Impact of OPA-90 Double Hull Requirements," this past June.

The report is available to interested parties on line at www.marad.dot.gov\statistics, so I won't go into all of the detail here.2 Briefly, however, in performing the required analyses, it is necessary to break the industry down into four sections: domestic crude carriers, domestic product tankers, coastal tank barges, and foreign flag tankers serving our U.S. product import trades.

The Alaska crude oil trades are the primary source of demand for the U.S. crude carriers. The oil companies involved in Alaska production have undertaken the OPA 90 responsibility here. At the close of 2001 there were eight new double hull crude carriers on order with more than enough capacity to meet OPA 90 year 2005 requirements. So we can rest easy on this aspect of OPA 90 compliance.

The OPA 90 problem, which is the subject of widespread concern, is the apparent short fall in U.S.-flag product tankers. These vessels are engaged the historic U.S. Gulf Coast to north of Hatteras, and in Florida and West Coast trades, and in movements on the West Coast itself. These trades have been declining in recent years and will continue to decline.

The shorter runs in these trades became the province of tug tank barge services some years ago. More recently, with increases tank barge productivity, and the introduction of articulated tug barge combinations with larger barges, there has been some substitution of

these barges for product tankers on the longer runs as well. So this factor must be considered.

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2 Interested parties may also obtain copies of the MarAd report by contacting MarAd's Office of Statistical and Economic Analysis, William B. Ebersold, Director, at 202 366 2267.

Pictured in the Background: The launching of M.V. Midnight Sun, the first commercial dry cargo vessel to built in the U.S. occurred last month at NASSCO in San Diego, Calif.

KMSS Receive Greek Type Approval For MBB

Kongsberg Maritime Ship Systems (KMSS) has received type approval from the Greek authorities for its Maritime Black Box (MBB) Voyage Data Recorder.

Designed and tested to IMO and SOLAS standards, the Protected Storage Unit can withstand an extreme amount of stress, while the Data Control Unit (DCU) operates the entire system.

In addition to the main units, KMSS also offer a Replay and Evaluation Unit (REU) that utilizes the data collected by the PSU and DCU for training purposes. It gives users a hands on view of how real-life situations should be dealt with and can also be used for other applications such as Radar and ECDIS image distribution, voyage reports, engine logs and the back-up of information to CD-Rom.

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L-3 Communications Acquires Ross

L-3 Communications has acquired substantially all of the assets of Ross Engineering, thus integrating the Ross product lines into the L-3 Communications' Aviation Recorders Division.

With operations headquartered in Sarasota, Fla., L-3 Communications Aviation Recorders will be leveraging Ross Engineering's experience in marine communications, and couple it with L-3's financial, engineering, manufacturing, and marketing resources. This will allow L-3 to become a major supplier of Universal Automatic Identification Systems (UAIS) and Digital Selective Calling (DSC) VHF radios to the maritime industry. This acquisition will also enable L-3 to extend its product portfolio into other new product areas within the maritime industry.

Lockheed Martin Renames Maritime Business

Lockheed Martin has re-named its Marine Traffic Management business to better reflect its capabilities in the areas of marine navigation, coastal and harbor surveillance and homeland security. The business, based in Syracuse, N.Y., now will be known as Maritime Safety, Security and Surveillance (MS3).

Technip-Coflexip Sells McNulty Yard

Technip-Coflexip has signed a Sales and Purchase Agreement related to the sale of its affiliates McNulty Offshore Ltd. and Captain Frank McNulty & Sons Ltd., to the Managing Director of McNulty Offshore Ltd. Technip-Coflexip had a 90 percent stake in both companies following the purchase of Aker Deepwater Company in January 2001.

According to the terms of this agreement, Technip-Coflexip has sold the Newcastle-based yard, together with all activities and resources dedicated to it, to McNulty's Managing Director. The transaction, the amount of which is undisclosed, is in line with Technip-Coflexip's previously announced program to dispose of non-strategic assets.

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U.S. Market: Foundation for the Future

*In part two of a two-part series, **William G. Schubert**, the new U.S. Maritime Administrator (MarAd), speaks with **H. Clayton Cook, Jr.** about the current standing and future direction of maritime activities in the United States.*

Cook: I'd like to pick up where we left off last time. You were explaining where matters stood concerning MarAd's monitoring the time chartering of U.S.-flag vessels by foreign nationals.

Let me say a few words for the benefit of our readers. As you and I both understand, the Shipping Act, 1916, requires that MarAd approve all transfers of U.S.-flag vessels, or interests in these vessels, to non-citizens. Time charters are such a transfer of interest, and time charters to foreign nationals require MarAd approval. Over the years since 1916, and until 1992, MarAd required the submission of such time charters for MarAd review prior to MarAd approval. With certain limited exceptions, this submission for review was eliminated in 1992 as a part of the Administration's deregulation efforts. And, MarAd issued a so-called "advance general approval" of all such charters. So, at the present time a foreign national can time charter a U.S.-flag vessel without MarAd's knowledge or any specific approval.

I see that MarAd has published the Federal Register Notice that you mentioned at our last meeting. The Notice reviews the history of the 1992 changes and states that any MarAd change in policy will require a further MarAd rulemaking proceeding. Would you comment?

Schubert: As I've said before, the world is a different place today from what it was in 1992. A time charterer determines what cargoes will be loaded and discharged and directs the vessel's schedules and its ports of call. A U.S.-flag vessel chartered to an unknown foreign national could present problems. The vessel is a U.S.-flag vessel, so one might assume that it doesn't pose any risks. But the foreign national could direct that the vessel be loaded in a fashion and directed to a location were there is the possibility of mischief. And, this could occur without the vessel's U.S. citizen master and crew being fully aware of what was going on.

You will forgive me if I don't comment further. As a first step we wish to obtain the industry's advice concerning what might be involved if MarAd returned to a case-by-case review. We will be receiving industry comments in response to our Federal Register Notice. We will review these comments, and discuss these matters with the Coast Guard and other concerned agencies, and go from there.

OPA '90 TANKERS

Cook: When we closed last time you were beginning to speak about your commitment to work with the Navy, our U.S. shipbuilding and repair yards, labor, our U.S. commercial vessel operators, and Congress to develop a unified long-term strategy to maintain our shipyard capacity. Could we pick up on that?

Schubert: Yes. MarAd needs to address the issues of U.S. shipyard productivity, modern shipyard infrastructure, R & D investment, and training of a sufficient number of skilled workers. I want to work with our U.S. shipyards in identifying opportunities in our domestic trade, and in then turning these opportunities into successful projects. Everyone agrees that our shipyards need to identify vessel designs that they can build in series in order to achieve adequate economies of scale. The Kvaerner Philadelphia Shipyard may be headed in that direction with its container vessel design. I believe this can be done in meeting our needs for Oil Pollution Act of 1990 (OPA 90) product tankers and with other vessel designs.

Cook: There has been a good deal of discussion concerning a "short fall" of tankers sufficient to meet OPA 90 needs. How would you define the "short fall" problem? What can MarAd do to assist in solving the problem?

Schubert: The General Accounting Office's Year 2000 report on OPA 90 compliance recommended that MarAd monitor the progress being made to replace single-hull vessels with double- hull vessels, and keep the relevant House and Senate Committees advised of the progress being evidenced in meeting OPA 90 requirements.1 MarAd issued a report on this subject "U.S. Tank Vessel Markets, Impact of OPA-90 Double Hull Requirements," this past June.

The report is available to interested parties on line at www.marad.dot.gov\statistics, so I won't go into all of the detail here.2 Briefly, however, in performing the required analyses, it is necessary to break the industry down into four sections: domestic crude carriers, domestic product tankers, coastal tank barges, and foreign flag tankers serving our U.S. product import trades.

The Alaska crude oil trades are the primary source of demand for the U.S. crude carriers. The oil companies involved in Alaska production have undertaken the OPA 90 responsibility here. At the close of 2001 there were eight new double hull crude carriers on order with more than enough capacity to meet OPA 90 year 2005 requirements. So we can rest easy on this aspect of OPA 90 compliance.

The OPA 90 problem, which is the subject of widespread concern, is the apparent short fall in U.S.-flag product tankers. These vessels are engaged the historic U.S. Gulf Coast to north of Hatteras, and in Florida and West Coast trades, and in movements on the West Coast itself. These trades have been declining in recent years and will continue to decline.

The shorter runs in these trades became the province of tug tank barge services some years ago. More recently, with increases tank barge productivity, and the introduction of articulated tug barge combinations with larger barges, there has been some substitution of

these barges for product tankers on the longer runs as well. So this factor must be considered.

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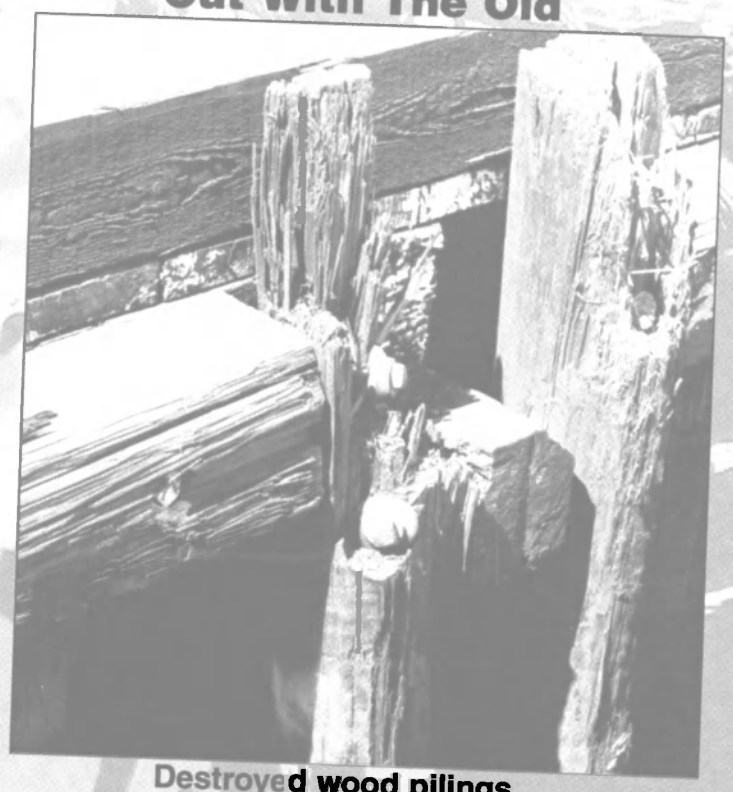
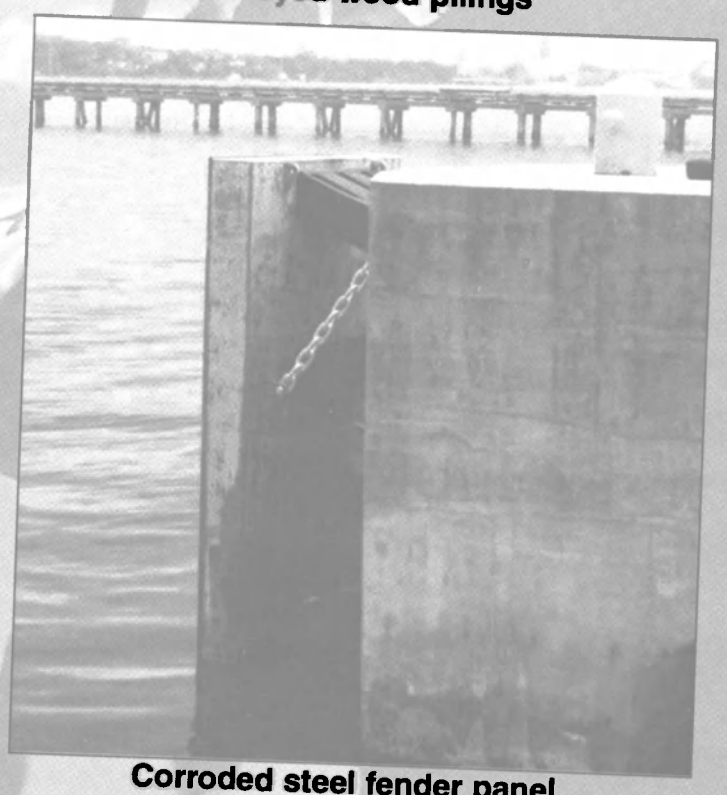


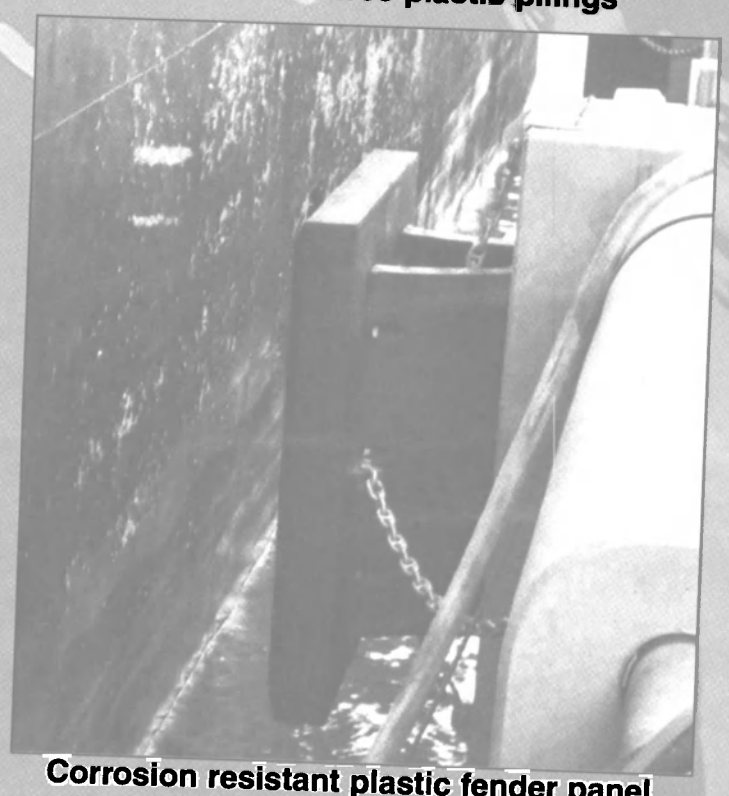
Destroyed wood pilings

In With The New

Maintenance free plastic pilings



Corroded steel fender panel



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Cook: That is a fairly large daily hire cost burden to overcome. What role can MarAd play in assisting the U.S.-flag operators as they seek to solve this problem?

Schubert: Perhaps MarAd can be a useful intermediary. We need to see what can be done to reduce the U.S. operator's costs to a level where they generate daily rates that the market will sustain. You can look at the daily rate as composed of vessel operating cost and vessel capital cost components. There is not much that we can achieve in reductions in operating costs.

So, we must focus on the capital cost component. This can be broken into two parts, the cost of the vessel and the cost of financing the vessel.

We need to address shipyard prices and financing costs. The starting point for the first issue might be a standard product tanker design that could be built in series by one or more U.S. shipyards. I am planning meetings on this subject, first with U.S.-flag operators to gage their sense of the market and their thoughts about a standard design, next with potentially interested shipbuilders, and finally with petroleum company users, and with the U.S. Navy which may itself be in need of this size tanker.

Next we need to focus on sources for equity and debt to facilitate lower cost financing. The Office of Management and Budget (OMB) has advised MarAd that it will have no objection to our renewing our capital construction fund (CCF) proposals this fall as we go into the 2004 budget cycle. There is almost $1.4 billion of U.S. citizen shipowner money on deposit there. The owners have already set this money aside for shipbuilding. Much of this money might be available for use as equity for product tanker construction.

This could be used in combination with borrowings from whatever financing sources will be available at that time. The important point to understand is that these financing costs may be almost as important as the shipyard price in the daily rate computation.

Cook: That is an ambitious program for action. I might like to deal a bit further with the subject of the

sources for vessel debt financing, but let's move on. What is your time table?

Schubert: I expect to have completed the first of these meetings, with the U.S.-flag operators, this month. These meetings will have been accomplished before your subscribers will read about them in this interview. We will follow on from there and establish an appropriate schedule and time lines.

Coastwise Trailer Movements

Cook: In your March 14th FY 2003 authorization testimony you spoke about the traffic congestion problems that the U.S. is facing, and about Coastwise shipping as one means of dealing with the problem. Would you explain the problem as you see it?

Schubert: The most highway traffic congested section of the United States is our Northeast Corridor. These 13 states and the District of Columbia contain 27 percent of entire U.S. population. Population density is comparable to that of the fifteen countries in the European Union. New Jersey's exceeds that of the EU's most densely populated country The Netherlands.

Your readers who have driven Inter-

state 95 are aware of the problem today. But, matters are going to get much worse. Current studies predict a doubling of freight traffic by 2010 and a tripling by 2030. Looking at 2010, these studies indicate that, after taking into account rail freight service expansions, we are going to be adding 10,000 more trucks to I-95 per day — which is the equivalent of adding one more truck every 270 yards from Maine to Florida. Let me add that similar problems exist in the I-5 and I-10 corridors.

Do you know that it typically costs about $32 million to add a single mile of four lane interstate highway, and about $100 million per interchange? This does not include the cost of land acquisition. So, it's clear that we can't build out of the problem with additional highway construction.

Cook: What can be done?

Schubert: For the I-95 corridor the obvious answer is water transportation. These water routes are existing "highways" that are almost entirely unused. These water highways, I believe that you have called them "W-95s," can be placed in service with only the modest costs of roadstead and terminal construction, and of the vessels involved. These W-95 highways do not require regular maintenance and periodic resurfacing. Further, FHWA advises us that if we can reroute a substantial portion of the heavy trailers in this fashion we will reduce the costs of highway and bridge maintenance.

Cook: A moment ago you mentioned the European Union. You have recently come back from a trip to the EU where you were looking at their use of water transport. Can you say a word about that?

Schubert: Yes, in contrast to our situation, in Europe today 40 percent of the freight moved within the EU is moved by water. Further, the EU has an ambitious "motorways of the sea" initiative designed to increase the share of water borne carriage between EU members. The Europeans have focused on the lower environmental and social costs of waterborne transportation of freight as important elements in EU strategic planning. I believe that these benefits are fairly obvious, and that the Europeans are on the right track.

Much of the attention on this subject has been focused on the transport of sea containers coming into the U.S. at a port like Port Newark and then being transferred up or down the Coast. Actually, the more important problem on I-95 is with the purely domestic moves in the large 53 foot trailers. Taking these 53 footers off of I-95, and off the metropolitan bypasses like I-495, would do a great deal to alleviate congestion and the reduce the potential for accidents. Air quality would be a major benefactor. Trailers with hazardous materials transported in this fashion would be removed from bridge and tunnel transit as well as bypassing major metropolitan centers.

Cook: How do you get this started?

Schubert: First, we need to work within DOT with the Federal Highway Administration (FHWA) and the Office of the Assistant Secretary for Transportation Policy (OST Policy), and then work with the Administration, to make Coastwise shipping a part of our national transportation system planning. For example, we are exploring opportunities for the inclusion of the water mode in Tea 21, and its inclusion in the six year surface transportation authorization bill that is now being considered by Congress. We are working with FHWA and OST Policy, and with the Administration, on these issues.

MarAd and FHWA are working develop critical cargo data statistics in freight movements within the United States which will illustrate the viability of Coastal shipping markets. This information will be provided to the National Ports and Waterways Institute (NPWI) for use in the fourth and final phase of their study of the East, Gulf and West Coasts. This study will identify location pairs and cargo volumes where water transportation can be most easily introduced. We expect the results of this NPWI study to be available in late 2002 or early 2003.

MarAd and FHWA are planning a conference on Coastal "short sea" shipping in New York City for this November. We expect conference participation from across the spectrum of those concerned. The conference will explore the dynamics of a robust U.S. Coastal shipping system, the job and entrepreneurial opportunities that such a system would offer participants, and the benefits that would accrue to everyone in the reduction of highway congestion and improvements in air quality.

We expect this conference to bring the most interested stakeholders together. The objective will be to identify Coastwise shipping opportunities, and terminal, roadstead and vessel designs, and to discuss problems and solutions; the "how" of developing successful Coastwise systems.

We hope to achieve a consensus, which will provide the support neces-

UNITED STATES BANKRUPTCY COURT
SOUTHERN DISTRICT OF NEW YORK

In re	:	**Chapter 11 Case Nos.**
BETHLEHEM STEEL	:	**01-15288 (BRL) through**
CORPORATION, et al.	:	**01-15302, 01-15308 through 01-15315 (BRL)**
Debtors.	:	**(Jointly Administered)**

NOTICE OF BAR DATE REQUIRING FILING OF PROOFS OF CLAIM ON OR BEFORE SEPTEMBER 30, 2002 AT 5:00 P.M. (EASTERN TIME)

TO ALL PERSONS AND ENTITIES WITH CLAIMS AGAINST ANY OF THE DEBTOR ENTITIES LISTED IN THE ANNEXED SCHEDULE A:

PLEASE TAKE NOTICE THAT on July 31, 2002, the United States Bankruptcy Court for the Southern District of New York (the "Court") having jurisdiction over the chapter 11 cases of the debtor entities listed in the annexed schedule A (collectively, the "Debtors") entered an order (the "Bar Date Order") establishing **September 30, 2002, at 5:00 p.m. (Eastern Time)** (the "Bar Date"), as the last date and time for each person or entity (including, without limitation, each individual, partnership, joint venture, corporation, estate, trust, and governmental unit) to file a proof of claim against any of the Debtors. The Bar Date Order and the Bar Date, as well as the procedures set forth below for the filing of proofs of claim, apply to the claims described below against the Debtors that arose prior to October 15, 2001, the date on which each of the Debtors commenced a case under chapter 11 of title 11, United States Code (the "Bankruptcy Code").

1. WHO MUST FILE A PROOF OF CLAIM

You **MUST** file a proof of claim to share in the estate if you have a claim that arose prior to October 15, 2001, and it is not one of the types of claims described in section 2 below. Acts or omissions of the Debtors that arose before October 15, 2001, may give rise to claims against the Debtors notwithstanding that such claims may not have matured or become fixed or liquidated prior to such date.

Under section 101(5) of the Bankruptcy Code and as used herein, the word "claim" means: (a) a right to payment, whether or not such right is reduced to judgment, liquidated, unliquidated, fixed, contingent, matured, unmatured, disputed, undisputed, legal, equitable, secured, or unsecured; or (b) a right to an equitable remedy for breach of performance if such breach gives rise to a right to payment, whether or not such right to an equitable remedy is reduced to judgment, fixed, contingent, matured, unmatured, disputed, undisputed, secured, or unsecured.

2. WHO NEED NOT FILE A PROOF OF CLAIM

You need not file a proof of claim if:

A. You have **already** properly filed, with the Clerk of the United States Bankruptcy Court for the Southern District of New York, a proof of claim against the applicable Debtor or Debtors utilizing a claim form which substantially conforms to the Proof of Claim form tailored for these cases or Official Form No. 10;

B. Your claim is listed on the Debtors' Schedules (as defined below) and is **not** described as "disputed," "contingent," or "unliquidated," **and** your claim is asserted against a specific Debtor, and you do **not** dispute the specific Debtor against which your claim is asserted, and you do **not** dispute the amount or nature of your claim in each case as identified in the upper right-hand corner of the enclosed Proof of Claim. Creditors holding claims which are listed in the Schedules without reference to a particular Debtor shall be required to file a Proof of Claim. Annexed hereto as Schedule B is a list of the names under which the Debtors conduct or previously conducted business within the previous six years, the names of associated Debtors, and their respective case numbers;

C. Your only claim is under sections 503(b) or 507(a)(1) of the Bankruptcy Code as an administrative expense of any of the Debtors' chapter 11 cases;

D. Your claim has already been paid or otherwise satisfied in full by any of the Debtors;

E. You are a Debtor and you have a claim against another Debtor;

F. You hold a claim that has been allowed by an order of the Court entered on or before the Bar Date;

G. You are a present or former employee of one of the Debtors or, with respect to benefits claims, any spouse or beneficiary thereof (**Note:** a separate Bar Date will be established at a later date for the assertion of claims by present and former employees and, with respect to benefits claims, their spouses and beneficiaries); or

H. Your claim is limited exclusively to the repayment of principal, interest, and/or other applicable fees and charges (a "Debt Claim") on or under any bond or note issued by the Debtors pursuant to an indenture qualified under the Trust Indenture Act of 1939 (the "Debt Instruments"); *provided, however*, that (i) the foregoing exclusion in this subparagraph shall not apply to the Indenture Trustee under the applicable indenture (the "Indenture Trustee"), (ii) each Indenture Trustee shall be required to file one proof of claim, on account of all of the Debt Claims on or under the applicable Debt Instruments on or before the Bar Date, and (iii) any holder of a Debt Claim wishing to assert a claim, other than a Debt Claim, arising out of or relating to a Debt Instrument shall be required to file a proof of claim on or before the Bar Date, unless another exception in this paragraph applies.

YOU SHOULD NOT FILE A PROOF OF CLAIM IF YOU DO NOT HAVE A CLAIM AGAINST THE DEBTORS, OR IF THE CLAIM YOU HELD AGAINST THE DEBTORS HAS BEEN PAID IN FULL, RELEASED OR WAIVED.

THE FACT THAT YOU HAVE RECEIVED THIS NOTICE DOES NOT MEAN THAT YOU HAVE A CLAIM OR THAT THE DEBTORS OR THE COURT BELIEVE THAT YOU HAVE A CLAIM.

3. EXECUTORY CONTRACTS AND UNEXPIRED LEASES

Any person or entity that has or may have a claim arising from the rejection of an executory contract or unexpired lease as to which the order authorizing such rejection is dated on or before July 31, 2002, the date of the Bar Date Order, must file a proof of claim based on such rejection on or before the Bar Date to share in the estate. Any person or entity that has or may have a claim arising from the rejection of an executory contract or unexpired lease as to which the order authorizing such rejection is dated after the date of the Bar Date Order must file a proof of claim on or before such date as the Court may fix in the applicable order authorizing rejection of such contract or lease.

4. WHEN AND WHERE TO FILE

Except as provided for herein, all proofs of claim must be filed so as to be received on or before September 30, 2002 at 5:00 p.m. (Eastern Time), at the following address:

IF SENT BY MAIL	**IF SENT BY MESSENGER OR OVERNIGHT COURIER**
United States Bankruptcy Court	**United States Bankruptcy Court**
Southern District of New York	**Southern District of New York**
Bethlehem Steel Claims Processing	**Bethlehem Steel Claims Processing**
P.O. Box 5043	**One Bowling Green**
Bowling Green Station	**New York, New York 10004-1408**
New York, New York 10274-5043	

(together, the "Bethlehem Steel Docketing Center").

Proofs of claim will be deemed timely filed only if **actually received** by the Bethlehem Steel Docketing Center on or before the Bar Date. Proofs of claim may **not** be delivered by facsimile, telecopy transmission, or electronic mail transmission.

5. WHAT TO FILE

If you file a proof of claim, your filed proof of claim must (i) be written in English, (ii) be denominated in lawful currency of the United States, (iii) conform substantially with the enclosed proof of claim or Official Form No. 10, (iv) indicate the Debtor against which you are asserting a claim, and (v) be signed by the claimant, or if the claimant is not an individual, by an authorized agent of the claimant.

YOU SHOULD ATTACH TO YOUR COMPLETED PROOF OF CLAIM FORM COPIES OF ANY WRITINGS UPON WHICH SUCH CLAIM IS BASED, IF VOLUMINOUS, ATTACH A SUMMARY.

EXCEPT WITH RESPECT TO CLAIMS OF THE TYPE SET FORTH IN SECTION 2 AND THE SECOND SENTENCE OF SECTION 3 ABOVE, ANY CREDITOR WHO FAILS TO FILE A PROOF OF CLAIM ON OR BEFORE THE BAR DATE OF SEPTEMBER 30, 2002, FOR ANY CLAIM SUCH CREDITOR HAS OR MAY HAVE OR WISHES TO ASSERT AGAINST ANY OF THE DEBTORS WILL BE FOREVER BARRED, ESTOPPED, AND ENJOINED FROM ASSERTING SUCH CLAIM (OR FILING A PROOF OF CLAIM WITH RESPECT TO SUCH CLAIM) AGAINST SUCH DEBTOR, AND SUCH DEBTOR, ITS ESTATE, AND ITS PROPERTY WILL BE FOREVER DISCHARGED FROM ANY AND ALL INDEBTEDNESS OR LIABILITY WITH RESPECT TO SUCH CLAIM, AND SUCH HOLDER SHALL NOT BE PERMITTED TO VOTE ON ANY CHAPTER 11 PLAN OR PARTICIPATE IN ANY DISTRIBUTION IN SUCH DEBTOR'S CHAPTER 11 CASE ON ACCOUNT OF SUCH CLAIM, OR TO RECEIVE FURTHER NOTICES REGARDING SUCH CLAIM.

6. THE DEBTORS' SCHEDULES AND ACCESS THERETO

You may be listed as the holder of a claim against one or more of the Debtors in the Debtors' Schedules of Assets and Liabilities (collectively, the "Schedules"). To determine if and how you are listed on the Schedules, please refer to the descriptions set forth in the upper right hand corner of the enclosed proof of claim form(s) regarding the nature, amount, and status of your claim(s). If you received postpetition payments from the Debtors on account of your claim(s), the enclosed proof of claim form(s) will reflect the net amount of your claim(s) (i.e., reduced by the postpetition payments), as and to the extent such net amount is listed in the Schedules. If the Debtors believe that you hold claims against more than one Debtor, you will receive multiple proofs of claim forms, each of which will reflect the nature and amount of your claim against each such Debtor, as listed in the Schedules. **As noted above, if you agree with the nature, amount, and status of your claim(s) as described in the enclosed proof of claim form(s), and you do not dispute the Debtor identified on the Proof of Claim against which your claim is asserted, you do not need to file a proof of claim. However, if you intend to file one or more proofs of claim, you must do so before the Bar Date in accordance with the procedures set forth in this Notice.**

Copies of the Schedules may be examined by interested parties on the Court's electronic docket for the Debtors' chapter 11 cases, which is posted on the Internet at **www.nysb.uscourts.gov** (a PACER login and password are required). Copies of the Schedules may also be examined by interested parties between the hours of 9:00 a.m. and 4:00 p.m., Eastern Time, at the office of the Clerk of the Bankruptcy Court, United States Bankruptcy Court for the Southern District, One Bowling Green, Room 511, New York 10004-1408.

The Bethlehem Steel Docketing Center may be contacted at 1-888-498-7764 if there are questions concerning the filing, amount, nature, or processing of a proof of claim.

A CLAIMANT SHOULD CONSULT AN ATTORNEY REGARDING ANY OTHER INQUIRIES, SUCH AS WHETHER THE CLAIMANT SHOULD FILE A PROOF OF CLAIM.

DATED:
July 31, 2002

New York, New York Harvey R. Miller (HM 6078)
Jeffrey L. Tanenbaum (JT 9797)
George A. Davis (GD2761)
WEIL, GOTSHAL & MANGES LLP
767 Fifth Avenue
New York, New York 10153
(212) 310-8000
ATTORNEYS FOR THE DEBTORS
AND DEBTORS IN POSSESSION

SCHEDULE A
LIST OF DEBTOR ENTITIES

Name of Debtor	**Case Number**
Bethlehem Steel Corporation	01-15288 (BRL)
Alliance Coatings Company, LLC	01-15289 (BRL)
BethEnergy Mines Inc.	01-15290 (BRL)
Bethlehem Cold Rolled Corporation	01-15291 (BRL)
Bethlehem Development Corporation	01-15292 (BRL)
Bethlehem Rail Corporation	01-15293 (BRL)
Bethlehem Steel de Mexico, S.A. de C.V.	01-15294 (BRL)
Bethlehem Steel Export Company of Canada, Limited	01-15295 (BRL)
Bethlehem Steel Export Corporation	01-15296 (BRL)
BethPlan Corporation	01-15297 (BRL)
Chicago Cold Rolling, L.L.C.	01-15298 (BRL)
Eagle Nest Inc.	01-15299 (BRL)
Encoat-North Arlington, Inc.	01-15300 (BRL)
Energy Coatings Company	01-15301 (BRL)
Greenwood Mining Corporation	01-15302 (BRL)
HPM Corporation	01-15308 (BRL)
Kenacre Land Corporation	01-15309 (BRL)
LI Service Company	01-15310 (BRL)
Marmoraton Mining Company, Ltd.	01-15311 (BRL)
Mississippi Coatings Limited Corporation	01-15312 (BRL)
Mississippi Coatings Line Corporation	01-15313 (BRL)
Ohio Steel Services Company, LLC	01-15314 (BRL)
Primeacre Land Corporation	01-15315 (BRL)

SCHEDULE B
All Other Names Used By the Debtor and its Debtor Affiliates in the Last 6 Years

Bethcon
BethForge Division
Bethlehem Plant Coke Oven Division
Bethlehem-Lukens Plate Division
Bethlehem Works
Brandywine Security Company
Burns Harbor Division
Burns Harbor Galvanized Products Division
CENTEC
Chesapeake Energy Services, Inc.
Galvanized Products Division
EGL Steel Inc.
Lackawanna Coke Division
Lackawanna Galvanized Division
LI Flex Force
L-S II Electro-Galvanizing Company
LGI
Lukens, Inc.
Lukens Steel Company
PST
Pennsylvania Steel Technologies Division
Sparrows Point Division
Structural Products Division
Washington Plant/Stainless Steel Division
Washington Specialty Metals, Inc.
Washington Specialty Metals Corporation

NOTICE TO PROPOSERS
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CITY OF BOSTON

BOSTON FIRE DEPARTMENT

FOR THE PERFORMANCE OF THE FOLLOWING SERVICES: TO PROVIDE ALL DESIGN, LABOR, MATERIAL, EQUIPMENT, PARTS AND FACILITIES TO CONSTRUCT AND DELIVER ONE (1) FIRE AND RESCUE VESSEL WITH A MAXIMUM LENGTH OF EIGHTY (80) FEET.

The City of Boston (the City), acting by its Fire Commissioner (The Official), invites proposals from interested and highly qualified parties (Offerors) to perform the services generally described above, and particularly set forth in the Request For Proposals.

All proposals shall be submitted in strict conformance with the Request for Proposals (RFP) which may be obtained at Boston Fire Department Headquarters, Office of the Executive Assistant, 115 Southampton Street, Boston, MA, 02118. The documents are also available to be mailed by calling (617) 343-3630. RFP documents may be obtained commencing at 10 A.M. on Monday, August 26, 2002 and will be available to all interested parties who present a $50 certified, treasurer's or cashier's check payable to the City of Boston for each set. RFP's must be returned in good condition within thirty days of the bid opening in order for the bidder to have the $50 check returned. A preproposal meeting is scheduled for 10 A.M. on September 25, 2002 at the same location. Proposals shall be accepted until 12 o'clock Noon on Friday, October 25, 2002 at the same location.

The RFP sets forth both price and non-price evaluation criteria. Price proposals shall be submitted in a separate sealed envelope and must be priced in strict conformance with the instructions set forth in the RFP.

FAILURE TO SUBMIT CLEARLY MARKED SEPARATE SEALED PRICE AND NON-PRICE PROPOSALS SHALL RESULT IN DISQUALIFICATION OF THE ENTIRE PROPOSAL.

A refundable proposal deposit in the amount of a $2,000 certified, treasurer's or cashier's check is required from each offeror and shall accompany the non-price proposal when submitted to the City.

The maximum time for selection of a proposal is 120 days after the deadline for submission of proposals.

The Official shall not open the proposal publicly, but shall open the Non-Price Proposals in the presence of one or more witnesses within 24 hours of the above deadline for submission of proposals. The Official may open the Price Proposals at a later time and in any case shall open the Price Proposals so as to avoid disclosure to the individuals evaluating the Non-Price Proposals.

The award of this contract shall be subject to the approval of the Mayor of Boston.

Paul A. Christian
Fire Commissioner

sary for a coordinated program to develop commercially viable Coastal shipping routes to serve the East, Gulf and West Coasts.

Cook: What sorts of financing are available to get these Coastal short sea systems underway? Will the conference address the financing aspects of these systems?

Schubert: Yes, conference speakers will address the financing aspects. One of the most important financing sources for terminal and roadstead construction in non-attainment areas is Congestion Mitigation Air Quality (CMAQ) money. Most East Coast locations will qualify for CMAQ help, as will some locations on the Gulf and West Coats. However, these projects will have to "get in line" behind existing highway projects, and the timing may be a problem. There are other sources as well.

Cook: What about financing for the vessels?

Schubert: We are exploring various alternatives. As I mentioned earlier, OMB has advised us that it will have no objection to our renewing our CCF program requests this fall. There is almost $1.4 billion of U.S. citizen shipowner CCF money on deposit already set aside for shipbuilding. Some of this money might be available as equity. This could be used in combination with borrowings from whatever financing sources are available at that time.

Cook: I'm pleased with your advice on these CCF program requests. But I'm not necessarily encouraged by what you are saying about sources for debt. In transactions in which I have been involved, the debt portion of the financing has often been the most difficult problem. But let's move on to our next topic.

A consulting firm advising a Connecticut port city in planning a Coastal waterborne barge service has told me that they do not believe these Coastal services can be successful so long as the Harbor Maintenance Tax (HMT) is applied to the moves. This group's study concludes that a container movement from Port Newark to the Connecticut port city could be done by sea without any deterioration in delivery time, and at a lower cost than by truck. But, it then concludes, that the estimated cost of the HMT makes the movement by barge more expensive than the movement by truck. They use as an example a 40 foot sea container containing manufactured products with a value of $176,000. They say that the tax on this single container would amount to $220.

Schubert: I can't speak to your specific example. However, MarAd has studied the HMT issue. It is a serious issue. Of course, movements to and from Alaska, Hawaii and Puerto Rico are exempted. But movements between other states are not. The HMT issue is one that MarAd and FHWA will have to examine more closely as we develop our models for commercially viable Coastal shipping routes.

Passenger Ferry Projects

Cook: Let's turn to the subject of ferries. In your March 14th FY 2003 authorization testimony you spoke about the congestion problems faced by commuters and the availability of CCF monies for the financing of ferries. Would you outline your thinking on this subject?

Schubert: Ferries are becoming increasingly important as a means for commuter transportation. Selected urban locations like New York and Boston have seen new ferry services introduced after a 30 or more

year hiatus. In New York City prior to the events of September 11th non- subsidized ferry operators were providing 30,000 passenger trips per day between multiple locations in northern New Jersey and Manhattan. Today, these passenger figures have more than doubled. The City has announced its intention to lead in the development of a regional passenger ferry transportation plan with the construction of what The New York Times has described as a "flotilla" of new ferry terminals.

In San Francisco commuter ferry services were never entirely discontinued in the Post World War II period. We are seeing the expanding re-institution of various cross Bay services to provide commuting alternatives to the bridges and the Bay Area Rapid Transit (BART) system. A Blue Ribbon Committee of business and political leaders has developed a plan for "the world's best" high speed Bay Area water transit system with a fleet of 70 boats. In late August, the state chartered Water Transit Authority announced a scaled back 44 boat version of that Blue Ribbon plan calling for the expansion of capacity by existing ferry services, and the addition of seven new routes.

The reasons for these developments are the same as those, which we have already discussed, crowded highways and gridlock in tunnel and bridge crossings. We are unlikely to see a newly constructed Lincoln Tunnel or Golden Gate Bridge during our lifetimes.

MarAd's Title XI Program has had a significant impact in New York. There, through the use of Title XI, the principal operator has been able to reduce its annual debt service payments by roughly one half. And, they have been able to maintain a competitive rate structure in a service that is privately owned and operated without any operating subsidy from New York City or New York State. MarAd is proud of this. We are currently working on new ferry projects with several other groups.

We believe that changes in the CCF regime of the sort that I presented in my March authorization testimony would probably be beneficial here. The extension of CCF along those lines could provide money for immediate ferry construction from existing CCF deposits. It would also enable ferry operators to accumulate the money needed for fleet expansion on a more rapid, before tax, basis. We are looking at this and other options, and also working with FHWA to identify alternative means to access the capital that will be needed for ferry construction.

Cook: I understand that MarAd is a participant in an Administration initiative called the Marine Transportation System. Would you tell us about that?

Schubert: The Marine Transportation System (MTS) is a U.S. Department of Transportation effort to identify and study our waterways as an integrated national system. The objective is to develop a national plan for waterborne transportation to meet 21st century needs. The MTS project was initiated in 1998. MarAd and the U.S. Coast Guard have played leading roles in the MTS Task Force work to improve coordination of waterborne transportation efforts at the national, regional and local levels. There are now pubic and private sector committees, and an MTS National Advisory Council, a chartered non-federal body, whose purpose is to advise the Secretary of Transportation on MTS issues.

MarAd continues as an active participant and chairs the public sector subcommittee on ferries. We are working to bring together at MarAd the expertise of the 6 or 7 federal agencies that have an impact on ferry operations. In this way the private sector parties interested in a project will be able to come to MarAd and obtain all the information necessary for ferry project development.

MarAd is also working with FHWA, the U.S. Coast Guard, the Passenger Vessel Association (PVA), the San Francisco Bay Area Water Transit Authority and several metropolitan planning authorities, to develop the agenda for a ferry conference to be held in conjunction with the PVA annual meeting in San Diego in early 2003. Representatives from all of our existing ferry vessel operators, and from most projects that are in progress, will be in attendance. It should provide a useful venue for a MarAd report of its MTS and other ferry related action to the private sector.

Schubert: I'm afraid our time is up. I appreciate your coming in. I've enjoyed our two meetings and the opportunity that they will provide to make contact with *Maritime Reporter* readers.

Cook: Before I leave, I see that you have a picture on your desk of what look like two Labrador retrievers. Could you tell our readers a little bit about them?

Schubert: They are Labrador retrievers. One is a Golden and the other a Chocolate. Their names are Cody and Samson. Now that Gail and I are settled in a house in Annapolis we are able to have them with us.

About the Author

H. Clayton Cook, Jr., B.S. Princeton University, LLB The University of Virginia. Mr. Cook served as General Counsel of the U. S. Maritime Administration from 1970 to 1973, where he was responsible for the implementation of the Merchant Marine Act of 1970, and the drafting of the Federal Ship Financing Act of 1972. Upon completing his government service, Mr. Cook joined Cadwalader, Wickersham & Taft as the partner responsible for the development of that firm's Washington Maritime practice. Mr. Cook continues his law practice today as Counsel to Bastianelli, Brown & Kelley, Chartered, in that firm's Washington, D.C. offices. He is also a partner in Management & Transportation Associates, Inc., a management consulting firm based in Essex, Conn. Mr. Cook's email address is PlimsollDC@aol.com.

People

Pacific Fisherman Shipyard Elects Myrseth President

The board of directors of Pacific Fishermen, Inc. has elected new officers, including:

Robert Myrseth as president; **Warren Aakervik, Jr.** as vice president; **Ann Salvesen** as secretary/treasurer; and **Doug Dixon** as general manager.

The election of officers followed the election at the Annual Shareholders Meeting of the following three new members of the board of directors for three-year terms: **Gunnar Ildhuso, Sr.,** Crab and trawl fishing pioneer and owner of the F/V Margun and F/V Gunmar; Jack Knutsen, longline fisherman and owner of the halibut and blackcod schooner F/V Grant; and **Jerry Horn,** past board member and office manager of Pacific Fishermen, Inc.

Richardson Joins Waller Marine

Waller Marine has appointed **Wayne Richardson** as Sales and Marketing manager, bringing to the organization, more than 25 years of experience in the offshore and marine industry.

He will oversee all marketing and sales communication for Waller Marine, Inc., one of the leaders in the design technology of barge-mounted power plants, GTL Plantships and offshore marine vessels.

*In the August 2002 edition of Maritime Reporter & Engineering News, the article, "Get Ready for the New OPA 90," the e-mail address for contact person **Rick Fernandes** was listed incorrectly. The correct address is rick@jmsnet.com.*

Correction

The information published in the July 2002 edition "Marine Diesel Directory" for Caterpillar Motoren GmbH & Co. KG was incorrect. The correct details are as follows.

Caterpillar Motoren GmbH & Co. KG
Falckensteiner Str. 2, 24159 Kiel/Germany; P. O. Box, 24157 Kiel/Germany,
Tel. +49 (0) 431 3995-01, Fax +49 (0) 431 3995-2193
E-mail: ju_marketing@CAT.com; Internet: http://www.mak-global.com

Model	Cycle	Cylinders	Bore (mm)	Stroke (mm)	Mean Piston (m/s)	Speed (rev/min)	Output (kW/cyl)	Output range (kW)	Bmep (bar)	Sfoc (g/kWh)
MaK M 20	4	6,8,9 L	200	300	9.0/10.0	900/1000	170/190	1020 - 1710	24.1/24.2	186 - 190
MaK M 25	4	6,8,9 L	255	400	9.6/10.0	720/750	290 - 308	1800 - 2700	24.5 - 23.5	182 - 183
MaK M 32 C	4	6,8,9 l	320	480	9.6	600	480	2880 - 4320	24.9	178
	4	12,16 V	320	420	10.1 - 10.5	720 - 750	480/500	5760 - 8000	23.7	180
MaK M 43	4	6,7,8,9 L	430	610	10.2/10.5	500/514	900	5400 - 8100	24.4/23.7	176
	4	12,16,18 V	430	610	10.2/10.5	500/514	900	10800 - 16200	24.4/23.7	176

Bender Shipbuilding & Repair Promotes Pinkham

Bender Shipbuilding & Repair Co. Inc. and Tampa Bay Shipbuilding & Repair Company have promoted **Michael Pinkham** to Ship Repair Sales Manager for both the Mobile and Tampa yards.

The Sales and Marketing Departments of both companies have been combined to more efficiently and economically service customer accounts. Pinkham brings his many years of ship repair sales, production and estimating experience to this position. He will be responsible for coordinating the efforts of Sales currently working for both yards in the domestic market, as well as coordinating opportunities from the international markets.

Port Authority Receives Approval

The Port Authority has received approval from the Army Corps of Engineers to deepen a section of the Kill van Kull to 50 ft., launching the agency's ambitious $1.8 billion project to dredge the region's harbor channels to 50 feet and maintain its ranking as the leading East Coast destination for shippers from around the world.

Under eight separate dredging contracts, the Corps and the Port Authority are working together to deepen the Kill Van Kull from 40 to 45 ft. In the near term, the Corps' new action will allow the Port Authority to augment one of those contracts to deepen a section of the Kill van Kull around Bergen Point to 50 ft.

The work, being done between Bayonne and Staten Island, will save time and money by allowing the deepening work to be completed during the scope of a single project, rather than in two separate projects.

In the long-term, the decision by the Corps makes similar project consolidations possible to achieve 50-ft. depths faster throughout the Port.

The 45-ft. Kill Van Kull deepening project is scheduled to be completed by the end of 2004. The Port Authority is working with the Army Corps and other federal and state regulatory agencies toward the goal of completing the 50-foot project by 2009.

MOL Promotes Two

MOL (America) Inc. has promoted **Diana Jackson** and **JoAnn Yourcheck** to Director level positions.

Jackson, who was promoted to the position of Director, Equipment Control for North America, Caribbean, and Central America is currently based in Seattle, Wash., and will soon relocate to the company's office located in the Chicago suburb of Elmhurst, Ill.

Yourcheck has been promoted to a newly created position, Director of Business Processes for North America, Caribbean, Central and South America.

New York Firm Building in Louisiana

September 11 set things back all over the world and especially in New York. But now a maritime firm in that city has a new tug building at Thoma-Sea Boat Builders in Houma Louisiana. The model bow tug, essentially a sister ship to one delivered last January, is a 3,400-hp ocean-going tug, 100 x 32 ft. (30.4 x 9.7 m) with a molded depth of 14 ft. (4.2 m). Delivery is scheduled for approximately January 2003.

Designed by Frank Basil's Entech and Associates of Houma La. the boat will be powered by a pair of 16-cylinder Cummins KTA50 main engines rated for 1700 HP at 1,800 rpm.

The engines will turn into Rentjes WAF-772 gears with rations of 7.087:1 and turning 87-in. Sound propellers in 88-inch Rice nozzles.

The boat is designed for a bollard pull of 60 tons.

People

Palmer Johnson Mourns Loss

The people of Palmer Johnson Yachts, as well as the international maritime community are mourning the loss of Chairman Emeritus **Mike Kelsey, Sr.,** who passed away on July 21, 2002.

Kelsey was largely responsible for building the company into one of the world's leading custom yacht brands, as a yacht builder and also a provider of yacht refit/repair services, brokerage, chandlery and related support services.

Kelsey moved to Sturgeon Bay, Wis., from Texas in 1962, when he became vice president of service and repair for Palmer Johnson. He quickly rose to president and then chairman of the company.

Ryan Assumes SUNY Maritime Presidency

Vice Admiral **John R. Ryan** assumed the presidency of the State University of New York Maritime College during a ceremony held aboard Empire State VI while it was docked in Dublin, Ireland. Formerly the Superintendent of the U.S. Naval Academy, Vice Admiral Ryan is

the College's 32nd president since its founding in 1874. Prior to serving as the 56th Superintendent of the United States Naval Academy, Vice Admiral Ryan was the Commander of the Maritime Surveillance and Reconnaissance Force, U.S. Sixth Fleet/Commander, Fleet Air Mediterranean/Commander, Maritime Air Forces located in Naples, Italy.

KMSS Appoints New President

Subsequent to the completion of Per Branstad's two-year assignment to organize and integrate the three companies, which together now comprise an important part of Kongsberg's Marine and Offshore Operations, Branstad will now return to his specialist field within Kongsberg in the development of the Maritime Training Business.

Lars Gørvell-Dahll has assumed the role as president of KMSS, setting his sights firmly on developing the company worldwide and especially within the Asian market, which is already the center of the world ship building industry. Gørvell-Dahll is highly experienced in international shipbuilding having worked for many years based in Indonesia, Singapore and Hong Kong. After graduating from the Royal Norwegian Naval Academy he spent five years in the Navy reaching Lt. Commander and Chief Engineer.

Celebrity Names Hancock As Marketing Head

Celebrity Cruises appointed senior marketer **Steven Hancock** to lead intensified marketing efforts for the premium brand. In his new role, Hancock will assume broad-reaching responsibilities for consolidating Celebrity's brand messaging and widening its customer base.

Hancock has a unique background and specialty qualifying him for his new job. He has spent the last two decades at financial services leader Citigroup, where he rotated among fast-moving, start-up business groups, with the sole focus of accelerating growth.

SENESCO Expands Management Team


Gordon W. Fletcher

Southeastern New England Shipbuilding Corporation (SENESCO) has appointed four new executives in a move prompted by the company's rapid growth over the past six months.

The new executives include the company's first CFO and other senior level financial and operations staff.


Edward S. Kracunas

New members of the executive team include **Gordon W. Fletcher,** who was appointed as SENESCO's first CFO.

SENESCO also elected **Edward S. Kracunas** as vice president of Operations. Kracunas will work directly with company president and CEO **Robert Jarvis** in overseeing day-to-day operations at the shipyard.


Christine Mouris

Christine Mouris was appointed as accounting manager directly reporting to the new CFO, and **Jonathan S. Cutone** will serve as SENESCO's senior project manager.


Jonathan S. Cutone

TT Club Appoints Lewin COO

TT Club, has appointed **Colin Lewin** as COO, effective October 1, 2002. Lewin, currently Asia Pacific regional manager for TT Club, will take over the operational management of underwriting and claims in order to leave CEO **Paul Neagle** free to manage the strategic development of the business following its planning initiative last year with Ernst & Young.


Colin Lewin

SOCP to Meet in Castine

The Ship Operations Cooperative Program (SOCP) is scheduled to hold a meeting on October 16-17, 2002, in Castine, Maine.

Agenda highlights include a U.S. Coast Guard Advisory Workshop on the Reengineering of the Marine Licensing and Documentation Program and an SOCP Mariner Administrative Smart Card Project Demonstration.

Metro Stevedore Appoints Two

Metropolitan Stevedore Co., a West Coast general and bulk cargo contract stevedore and terminal operating company, has elected **John R. Hampton** as vice president and CFO; and **Philip Poggi** as controller.


John Hampton

Hampton, who holds an M.B.A. from Pepperdine University, began his career with Metropolitan in 1993 as its maintenance manager. In 1997, he was promoted to marketing representative and relocated to the corporate office in Wilmington, Calif.


Philip Poggi

Poggi joined Metropolitan Stevedore Co. in July 1994 as its senior accountant, supervising the general accounting department. When the cost accounting and general accounting departments were consolidated in 1999, he was promoted to financial reporting manager. Prior to joining with Metro, Poggi handled various accounting and finance functions at First Interstate Bank.

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The listings above are an editorial service provided for the convenience of our readers.

SENESCO Expands Management Team


Gordon W. Fletcher

Southeastern New England Shipbuilding Corporation (SENESCO) has appointed four new executives in a move prompted by the company's rapid growth over the past six months.

The new executives include the company's first CFO and other senior level financial and operations staff.


Edward S. Kracunas

New members of the executive team include **Gordon W. Fletcher,** who was appointed as SENESCO's first CFO.

SENESCO also elected **Edward S. Kracunas** as vice president of Operations. Kracunas will work directly with company president and CEO **Robert Jarvis** in overseeing day-to-day operations at the shipyard.


Christine Mouris

Christine Mouris was appointed as accounting manager directly reporting to the new CFO, and **Jonathan S. Cutone** will serve as SENESCO's senior project manager.


Jonathan S. Cutone

TT Club Appoints Lewin COO


Colin Lewin

TT Club, has appointed **Colin Lewin** as COO, effective October 1, 2002. Lewin, currently Asia Pacific regional manager for TT Club, will take over the operational management of underwriting and claims in order to leave CEO **Paul Neagle** free to manage the strategic development of the business following its planning initiative last year with Ernst & Young.

SOCP to Meet in Castine

The Ship Operations Cooperative Program (SOCP) is scheduled to hold a meeting on October 16-17, 2002, in Castine, Maine.

Agenda highlights include a U.S. Coast Guard Advisory Workshop on the Reengineering of the Marine Licensing and Documentation Program and an SOCP Mariner Administrative Smart Card Project Demonstration.

Metro Stevedore Appoints Two

Metropolitan Stevedore Co., a West Coast general and bulk cargo contract stevedore and terminal operating company, has elected **John R. Hampton** as vice president and CFO; and **Philip Poggi** as controller.


John Hampton

Hampton, who holds an M.B.A. from Pepperdine University, began his career with Metropolitan in 1993 as its maintenance manager. In 1997, he was promoted to marketing representative and relocated to the corporate office in Wilmington, Calif.


Philip Poggi

Poggi joined Metropolitan Stevedore Co. in July 1994 as its senior accountant, supervising the general accounting department. When the cost accounting and general accounting departments were consolidated in 1999, he was promoted to financial reporting manager. Prior to joining with Metro, Poggi handled various accounting and finance functions at First Interstate Bank.

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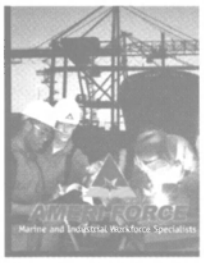
Ameri-Force

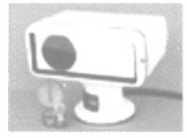
Ameri-Force was founded in 1991 to service the need for skilled craftsmen and general labor in Jacksonville, Fla. Today, Ameri-Force, Inc. has expanded to eight branch offices located in the Mid-Atlantic, Southeastern and Gulf Coast States and provides between 1600 and 2000 supplemental workers to the marine, industrial and construction sectors each week.



Circle No. 101
www.maritimereporterinfo.com

Arion International

The Model 850 Marine Infrared Thermal Imaging Camera is designed for the patrol boat, RIB, harbor patrol, pilot boat, police boat, and commercial and work boat market. The waterproof pan/tilt Housing contains a Raytheon uncooled AS Silicon Microbolometer and a 9-degree lens to provide superior over-water performance. The Model 850 operates from 12 VDC (24 VDC available) and can be used to augment Radar navigation; provide collision avoidance imagery; and to aid in search/rescue operations.



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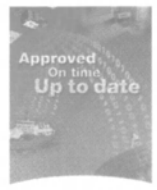
Chartco

The ChartCo system, which is widely fitted onboard SOLAS vessels to ensure the prompt receipt of critical navigation and weather data, can also be used to receive daily and weekly news. Using the Inmarsat Point to Multipoint Service, satellite broadcast provides an efficient methof of providing ships crews with up to date news while at sea. This information service is available at competitive fixed rates and does not detract from satellite communications system availability for operational and commercial traffic.



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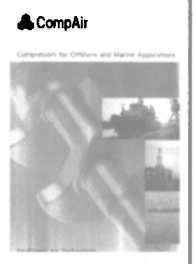
CompAir

Since 1898, CompAir has been designing, manufacturing and installing compressed air and gas systems for specialized markets and becoming synonymous with the high standards of quality and long term support capabilities. Their range of seawater, freshwater and air cooled high, medium and low pressure air and gas compression systems comply with all internationally recognized approval standards.



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Future Pipe

The Future Pipe Group is a globally operating group of companies specializing in high performance glass reinforced polyester (GRP), glass reinforced epoxy (GRE) systems, polyethylene and concrete pipe as well as storage tanks, floats for the dredging industry, and coring tubes for the offshore exploration and onshore markets. The Group has manufacturing facilities located in The Netherlands, Dubai, Abu Dhabi, Lebanon, Eygpt and Qatar — a production and delivery capability serving any location.

Circle No. 105
www.maritimereporterinfo.com

Holly Hoist

The Single-Boom Davit was developed with the experience gathered in nearly 50 years of designing and manufacturing boat hoists for private and government users. It rotates on precision machined bushings. Baseplates are designed with a minimal flare to increase deck space. The davit swings 360 degrees and is designed for general cargo lifting. All electronics and coating are designed to height and reach requirements provided by the user and in capacities ranging from 500 lbs. to 7,000 lbs.

Circle No. 106
www.maritimereporterinfo.com

Integro

Integro manufactures a rugged line of Stick Welding Extensions, Whips and Ground Clamp Assemblies, and a complete Welding Pre-Heat System for preheating structural steel. Integro also manufactures Temporary Power Cords, Hand Lights and Lighting Streamers that are used to build and overhaul ships. All of Integro's products are rubber molded and designed for tough marine conditions. Integro's products are used at most major Shipyards and are known for safety and reliability.

Circle No. 107
www.maritimereporterinfo.com

Jotron

Jotron Electronics has introduced a new multi-purpose strobe light to be used as a personal safety equipment. The new handy pocket-sized rugged strobe light incorporates the very latest technology. and AQ-5 has two light sources: a high intensity xenon strobe light plus a low power torch. It has 36,000 Pk lumen with a range of up to 6nm and still an endurance of 12 hours of continuous strobe operation. It runs on twin standard AA batteries for easy replacement.

Circle No. 108
www.maritimereporterinfo.com

King Engineering

KING-GAGE LiquiSeal transmitters monitor ballast, fuel and service tanks. Mounts external to tank or compartment with a simple air purge connection to measure hydrostatic pressure created by liquid depth. Compatible with integrated monitoring and control systems, the 4-20 mA output signal can be transmitted several thousand feet using twisted pair cabling.

Circle No. 109
www.maritimereporterinfo.com

Lalizas

For the past 20 years Lalizas has been manufacturing and providing high quality marine accessories and safety equipment to commercial and recreational vessels around the world. Through a well-established distribution network Lalizas is ready to equip your vessel with the necessary safety equipment as required by the latest regulations.

Circle No. 110
www.maritimereporterinfo.com

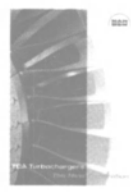
Leslie Controlls

Leslie Controls' Class DOT three-way control valve is now available. It is suitable for both converging and diverging liquid flow service. The one-piece body eliminates the tailpiece and extra gasket joint associated with conventional 3-way control valves. Spring-loaded Teflon chevron stem packing eliminates the need for periodic adjustment. Cage-guided trim reduces stem load, increases valve stability and is easily removed from the top of the valve. Since there is no need to remove the DOT from the line to replace the trim, lower maintenance cost and less down time is achieved.

Circle No. 111
www.maritimereporterinfo.com

MAN B&W

The MAN B&W Diesel Group presents two new engine developments as well as the next turbocharger generation at SMM trade fair (Vessel Marine Ocean Engineering) held in Hamburg, Hall 6, Stand 6001. The international business group proves its right to technology leadership with the title "Prime Movers." The central exhibits at the stand are a huge piston of the K98MC two-stroke engine — the largest engine worldwide, and a product of the completely new developed TCA exhaust gas turbocharger series.



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Brooke Ocean Technology

The Moving Vessel Profiler (MVP) is a system designed by Brooke Ocean Technology and Bedford Institute of Oceanography to collect water column data while a vessel is underway. The system is now being used around the world to calibrate multibeam mapping systems and for scientific applications. Brooke Ocean Technology Limited is an internationally recognized leader in the field of Ocean profiling, Launch and Recovery Systems and seafloor Data Collection Systems.

Circle No. 113
www.maritimereporterinfo.com

Nauticast

NautiCast AG is an AIS-Systems specialist, catering for the maritime and inland waterway industries. NautiCast is globally launching its AIS-Transponder, the X-Pack DS, and will enhance its AIS offering with base, and repeater stations by spring 2003. NautiCast production is ISO 9001 certified and outsourced to Siemens AG Austria. The X-Pack DS fully complies with all IMO and SOLAS regulations.

Circle No. 114
www.maritimereporterinfo.com

Anchor Lamina

Powerful hydraulic drilling equipment makes a 2-in. hole in seconds, yet is compact and portable. It is heavy-duty, easy to operate and needs less maintenance than electric equipment. Drill and tap vertically or horizontally. Five heads are available, with a variety of quick-change tools.

Circle No. 115
www.maritimereporterinfo.com

Reiss

Reiss Manufacturing manufactures silicone rubber seals, gaskets, tubing, grommets, shielding, sound insulation and bellows for the Marine industry. Ronsil silicone rubber can be formulated to withstand temperatures from 178 to 600 degrees. Silicone rubber is not affected by UV, ozone, minerals, many chemicals and oils, and it does not take a compression set as many organic rubber seals because of the fluctuations of outside ambient temperatures.

Circle No. 116
www.maritimereporterinfo.com

Products

Severn Trent de Nora

Severn Trent De Nora offers Electrochlorination systems for water and wastewater disinfection. Our OMNIPURE systems are the only marine sewage systems that oxidize sewage in the electrochemical cell while producing NaOCL. The United States Coast Guard (USCG) and the International Maritime Organization (IMO) certify each unit in the product line.

Circle No. 117
www.maritimereporterinfo.com

ShipTech

With the objective to profile its services and competences, ShipTech Marine Consultants (Naval Architects & Marine Engineers) issued their new company brochure. Consultants looks forward to servicing existing and new customers.

Circle No. 118
www.maritimereporterinfo.com

Shoes for Crews

This past January, Shoes For Crews increased its exclusive $3,000 Slip & Fall Warranty to $5,000 per accident. All Shoes For Crews footwear feature a patented slip-resistant sole that grips wet, greasy, and oily floors to reduce (or eliminate) slips & falls. Shoes For Crews introduces the new Steel Toe Voyager for men and women which areengineered for traction and safety with hi-tech SFC IIITM Slip-Resistant Soles. The Voyager features a steel toe cap meeting ANSI Z41.1991 standards bearing a class 75 rating, rugged 360 degree stitched down construction and reinforced rubber toe and heel covers.

Circle No. 119
www.maritimereporterinfo.com

SMIT

In cooperation with its Norwegian partner, pump specialist Frank Mohn, SMIT has completed a number of highly successful operations involving the recovery of oil and chemicals from vessels located on the seabed at 'greater depths.' The completion of this operation earned SMIT and Frank Mohn the internationally acclaimed Seatrade Award in the Countering Marine Pollution category.

Circle No. 120
www.maritimereporterinfo.com

Spence

Spence Engineering has improved the Figure 15LC Safety Valve with a new pull ring for easier testing. These ASME Section VIII UV certified valves are a cost effective solution for bulk hauling railroad and truck tank cars. Figure 15LC Safety Valves provide tight shutoff, sharp popping and closing action as well as a high degree of repeatability. Proper alignment of seating surfaces is assured by the integral inlet and body casting.

Circle No. 121
www.maritimereporterinfo.com

Superior-Lidgerwood-Mundy

SLM Corp. has been manufacturing a variety of deck machinery including capstans, hoists, winches, anchor windlasses and steering gears for the marine market for over 125 years. Lidgerwood has a reputation for quality and service, providing provide top notch technical services and repair parts, as well as new equipment.

Circle No. 122
www.maritimereporterinfo.com

Tru Marine

Tru-Marine was established in Singapore in 1977 as a general shiprepairer. In 1990, the company repositioned itself by directing its resources towards the development of turbocharger servicing, drawing on the experience and expertise of the key personnel. Today, the company is a full service provider for turbocharger servicing, capable of handling all makes and types of turbochargers. They employ innovative solutions to repair and restore damaged or worn parts, which have successfully prolonged their useful life.

Circle No. 123
www.maritimereporterinfo.com

Unicord

Unicord is a full line manufacturer of rope, cordage, and tying twine products for recreational marine, hardware houseware, sporting goods, commercial, industrial fisheries and OEM markets. With satellite plants in Mexico and headquartered in Chicago, Unicord is one of the fastest growing companies in the industry.

Circle No. 124
www.maritimereporterinfo.com

Vickers

Vickers has introduced a new biodegradable sterntube oil — Hydrox Bio 68, meeting OECD 301B specifications and non-toxic to the acquatic environment. Encompassing seven years to develop and trial, Bio 68 is emulisfiable and reduces water ingress.

Circle No. 125
www.maritimereporterinfo.com

Superbolt

The new edition of Superbolt's "Solutions to Bolting Problems" catalog is now available. The catalog contains technical information on mechanical stud/bolt tensioners including high temperature designs, updated installation and removal procedure and many application examples. Superbolt products retrofit your existing nuts and bolts and require only hand torque wrenches to tension bolts tighter than any other method. They eliminate the need for hydraulic wrenches, sledgehammers and heating methods commonly used.

Circle No. 126
www.maritimereporterinfo.com

GM Instrumentation

GM Instrumentation now offers the 0600 Dry Block Calibrator that features accuracy control, quick heat up and cool down, easy to operate and is fully portable. It is offered at the price of $1,495. GM Instrumentation also offers a full range of pressure and temperature instrumentation to suit all marine applications.

Circle No. 127
www.maritimereporterinfo.com

Geislinger

Geislinger GmbH is located in Salzburg, Austria and produces torsional vibration dampers as well as elastic damping couplings for diesel and gas engines. Geislinger products are used for the propulsion of ships, powerplants, trains and hydraulic excavators. They are reducing torsional vibrations and protect the shafts, camshafts and crankshafts as well as the gears.

Circle No. 128
www.maritimereporterinfo.com

Quantic

ShipMan is a powerful computerized database program for tracking ship configuration, spare parts, preventive maintenance, ship technical documentation, and a shore-based warehouse. The software is user friendly and can be used on a LAN by multiple users. Quantic can easily modify the software to accommodate your specific operating requirements.

Circle No. 129
www.maritimereporterinfo.com

Voith

A rotating tube at the end of the fin provides a specific boundary layer influence for a flow acting on the ship's hull and a considerable increase of lift. Thus in the indirect method even higher transverse forces are reached. In the model test the principle has been successfully proven. The increase compared to a conventional Voith Water Tractor is 18 percent. A conversion requires a relatively small expenditure only.

Circle No. 130
www.maritimereporterinfo.com

Thermax

Thermax, non-combustible, non-toxic, marine construction boards are used worldwide for joiner bulk heads, panels, liners, ceilings, door and furniture cores. Thermax has all major regulatory body certificates (USCG, Canada, DNV et al) and meets the requirements of IMO/SOLAS resolutions. Thermax is sold, distributed, warehoused laminated and cut to size in North America by PSI.

Circle No. 131
www.maritimereporterinfo.com

Omnithruster

For 25 years, Omnithruster has been designated as a leading company in the development of (waterjet) maneuvering systems. Omnithruster's unique patented designs, which provide diverse maneuverability and auxiliary propulsion, have been the installation choice on vessels worldwide.

Circle No. 132
www.maritimereporterinfo.com

Maritime Progress

To help owners comply with the recent revisions to SOLAS 74, Maritime Progress Ltd. has introduced a new SOLAS Training Manual. Complying with Regulation 35 of Chapter III of SOLAS 74 and its Protocols of 1978/1988 as set out in the latest SOLAS Consolidated Edition, the SOLAS Training Manual is approved by U.K, Maritime & Coastguard Agency and the Bahamian Administration. The Manual gives all members of the crew vital information on the types of lifesaving equipment provided on the ship.

Circle No. 133
www.maritimereporterinfo.com

In-Place Machining

Crankshaft Grinding of Crankpins and Main Journals while the Crankshaft is in the engine, Optical and Laser measurement of Main Bearing Bores, Line Boring, Metalstitch repair of broken or cracked Cast Iron, machining Water Jackets, all types of on-board machining is accomplished by In-Place Machining Company.

Circle No. 134
www.maritimereporterinfo.com

Schottel

Schottel's product range embraces 360° steerable propulsion systems rated at up to 30MW maneuvering devices, and also complete conventional propulsion packages. Through our worldwide sales and service network we offer economical and reliable solutions for every imaginable maritime application.

Circle No. 135
www.maritimereporterinfo.com

Alstom

Alstom is a global specialist in energy and transport infrastructure. The "A" Series is designed to combine attributes of previous generation of DP systems with the benefits of continuous technological advancements as well as increased processing power and speed.

Circle No. 136
www.maritimereporterinfo.com

Desmond-Stephan

Desmond-Stephan's Swirl-Off is a tool that can remove paint, rust, scale and other hard coatings from almost any hard surface. Features for this tool include: built-in safety guard, balanced design for easy operation, operates underwater, environmentally safe, fits 5/8 in. - 11 shaft, no lubrication or maintenance required, drive adaptors for 3/8 in. or .5 in. drill chuck available and cutters for all models are interchangeable and self-cleaning

Circle No. 137
www.maritimereporterinfo.com

USFilter

USFilter has released a four-page, brochure describing the company's CAPAC corrosion protection systems for fixed structures. The brochure provides a general overview of the CAPAC system, describing its history, benefits and uses. The brochure contains a descroption ofdifferent fixed-structure application where CAPAC systems can be beneficial: vessels; offshore production and drilling platforms; jetties and piles; and power plants.

Circle No. 138
www.maritimereporterinfo.com

Liebherr

LIEBHERR-Werk Nenzing GmbH, located in Austria, was founded in 1976 for the purpose of designing, selling, manufacturing and providing after-sales service for ship and offshore cranes. Since then the product range has extended to include crawler cranes, as well as harbor mobile cranes.
The network of Liebherr service stations throughout the world provides a continuous and reliable after-sales service for all our customers.

Circle No. 139
www.maritimereporterinfo.com

Hellan

Hellan Strainers remove all types of solids (such as algae, zebra mussels, sand, grit, debris, machine cutting chips, etc.) from various fluids. They are extremely popular due to their reliability, efficient operation and cost savings. Instead of trapping solids like conventional basket strainers (which necessitate frequent basket removal for cleaning), the Hellan Strainer discharges solids from the flow without disassembly. This reduces operational and maintenance costs and permits continuous flow of fluids.

Circle No. 140
www.maritimereporterinfo.com

Micro-Surface

Micro-Surface Finishing Products, Inc. manufactures Micro-Mesh, a cushioned abrasive cloth, liquids, and related products. The Micro-Mesh Kits are designed for the removal of scratches from acrylic and plastic surfaces. All of the kits contain Micro-Mesh cushioned abrasive, one or both of thepolishing liquids, and easy to follow step by step instructions.

Circle No. 141
www.maritimereporterinfo.com

Clampco

Clampco Products, Inc., a Wadsworth-based manufacturing company, offers its heavy duty T-bolt clamps to marine equipment designers. The clamps connect or seal hose lines and are suitable for exhaust systems, engine applications, and more. The clamps are available in marine grade 316 stainless steel. Along with the band, users may specify 316 stainless steel components such as bolts, nuts, and trunnions. For applications that don't require marine grade stainless,

Circle No. 142
www.maritimereporterinfo.com

Servomex

Servomex Co., Inc., announced a contract with Lyondell Chemie Nederland B.V. for 48 of its new Servomex 2200 paramagnetic oxygen transmitters. The 2200 paramagnetic oxygen transmitters will be used on Lyondell's new POSM (Propylene Oxide Styrene Monomer) plant, due to be commissioned in the third quarter of 2003. Each Servomex 2200 paramagnetic oxygen transmitter consists of a measurement transmitter and a separate microprocessor-based control unit capable of accepting inputs from on to six transmitters

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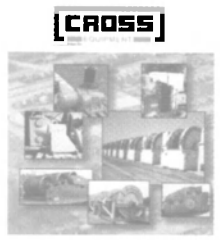
Cross



Cross Equipment Incorporated is a world wide equipment company, is located near the gulf coast in Houma, La. Their inventory includes a wide variety of makes and models of winches and deck equipment to meet your specific needs. The Cross Equipment Inventory includes: Winches, Levelwinds, Diesel HPU, Spooling Units, Deck Equipment, Hose /Umbilical Reels, Fairleads, Sheaves and Blocks.

Circle No. 144
www.maritimereporterinfo.com

Duramax

For over 30 years, DURAMAX MARINE Johnson Commercial Dock Bumpers have been a preferred brand of extruded rubber boat and dock fenders by commercial marine professionals around the world. The Johnson brand name is associated with quality and reliability that goes beyond Duramax Marine has experience with drilling mounting holes in the Johnson Commercial Dock Bumper. Our proprietary process creates cleanly cut access and base holes, as well as, beveled or chamfered cuts on the piece ends.

Circle No. 145
www.maritimereporterinfo.com

Eagle

Building on the popularity and success of the FishEasy CD sonar line, Eagle Electronics has introduced the unprecedented new FishEasy 2 that offers the power and performance of a high-end fish finder, and the affordability of a low-end unit. Touting the newest styling, display technology, and enhanced features, the FishEasy 2 for 2002 is the most economical, easiest-to-use, and best performing fish finder value available today, with a choice of three models: FishEasy 2, FishEasy 2 Portable, and Fish Easy 2T with water surface temperature sensor.

Circle No. 146
www.maritimereporterinfo.com

Inmarsat

Inmarsat Ltd., has approved Fleet F77, its new maritime Mobile ISDN and Mobile Packet Data service, for commercial service. Type-approved hardware is now available for use from manufacturer Thrane & Thrane, and Telenor and Xantic Land Earth Stations have been authorized in all four ocean regions. Fleet F77 combines the high quality and speed of a 64kbit/s Mobile ISDN service with the world's first global, high-speed, maritime Mobile Packet Data service via satellite

Circle No. 147
www.maritimereporterinfo.com

Hamilton

With over 30,000 waterjet units installed around the world, Hamilton Jet represents the latest in waterjet technology. They are the preferred choice for the efficient propulsion of a wide range of high speed work and patrol boats, fast passenger ferries, crew boats, fire boats, fishing vessels and landing barges.

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BUYER'S DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER. 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 assumes no responsibility for errors. If you are interested in having your company listed in this Buyer's Directory Section, contact Mike Lowe at (212) 477-6700.

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ACTUATORS, VALVE
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AIR CONDITIONING AND REFRIGERATION
Adrick Marine, 81 Mahan St., W Babylon NY 11758
Bailey Refrigeration, 4986-1 Euclid Road, Virginia Beach, VA 23462
Cospolich Refrigeration, 14695 Highway 61, Norco LA 70079
Flagship Marine 2427 SE Dixie Highway, Stuart, FL 34996
Port-A-Cool, P.O. Box 2108, Center, TX 75935
Stork Bronswerk Inc., 3755 C boul.Matte, Brossard, Quebec Canada J4Y2P4
Taylor Made Environmental PO Box 15299 Richmond, VA 23227
AIRHORNS/SIGNALING EQUIPMENT
Kahlenberg Marine, P.O. Box 358, Two Rivers, WI 54241
ALARMS, FACTORY MUTUAL-APPROVED
NREC 1701 Engineers Rd Belle Chase, LA 70037
SELCO 353 A Asbury Commons Dr., Atlanta, GA 30338
ALUMINUM BOATS
Island Boats 6806 Highway 90 East New Iberia LA 70560
Sea Ark Marine PO Box 210 Monticello AR 71655-0210
William E Munson Co., 18130 Sunset Way, Edmonds WA 98026
ANCHORS AND CHAINS
Crandall Dry Dock Engineers Inc., P.O. B. 505804, MA 02150
GJ Wortelboer Jr. B.V. PO Box 5003, 3008 AA Rotterdam, Netherlands
Washington Chain Inc., Box 3645, Seattle, WA 98124
AUTOMATED SELF UNLOADING
Seabulk Systems Inc., Suite 100, 3751 Shell Road, Richmond, British Columbia, CANADA V6X2W2
AUTOPILOT SYSTEMS
Beier Radio1990 Industrial Ave Harvey, LA 70058
ComNav Marine Ltd., #15-13511 Crestwood Place, Richmond,BC V6V 2G1
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851
BALLAST
Ballast Technologies .,4620 S. Coach Dr., 85714 , Tucson, AZ
Redland Genstar Inc., Executive Plaza IV, Hunt Valley, MD 10912-1031
BARGE RENTALS
Cashman Equipment, Three Dolphin Way, Boston, MA 02210
BEARING—Rubber, Metallic, Non-Metallic
American Babbitt Bearing PO Box 3069 Rt 2 Huntington, WV 25702
Craft Bearing 2506 58th St Hampton, VA 23661
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Orkot Composites., 2535 Prairie Rd., Unit D, Eugene, OR 97402
Sohre Turbomachinery 132 Gilbertville rd PO Box 889 Ware, Mass 01082
Thordon Bearings Inc., 3225 Mainway, Burlington, Ont., CANADA L7M 1A6
Vesco Plastics, P.O. B. 40647, Cleveland 2022 SOUTH AFRICA
BILGE SYSTEMS
Fast Systems 14040 Santa Fe Trail Dr. Lenexa, Kansas 66215-1284
BLOCKS & RIGGING
Skookum, P.O. Box 280, Hubbard, OR 97032
BOILERS (HEAT RECOVERY)
Deltak LLC 2905 Northwest Blvd Ste 150 Plymouth MN 55441 USA
BOATBUILDER
Allen Marine PO Box 1049 Sitka, AK 99835
Hike Metal, Box 698, Wheatley, ON Canada N0P 2P0
Kvichak Marine, 469 NW Bowdoin Pl.,Seattle WA 98107
Sea Ark Marine PO Box 210 Monticello AR 71655-0210
Washburn Doughty, P.O. Box 296, E.Boothbay ME 04544
BOLLARDS
Maritime International. 100 E. Vermilion Street #212, Lafayette, LA 70501
BRIDGE SUNSCREENS
Martek Marine Blinds, Unit 46, Century Business Centre, Maversway, Rotherham, South Yorkshire, S63 5DA
BROKERS
Marcon International, Inc., P.O. Box 1170, Coupeville, WA 8239-1170
Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960
BRUSHES
Sohre Turbomachinery Inc 132 Gilbertville Rd PO Box 889 Ware, MA 01082-0889
BULKHEAD SEALS/PANELS
CSD North America, 880 Candia Rd., Unit 10, Manchester, NH 03109
Thermax, 15006 Shaw Rd., Tampa, FL 33625-5500
Thermax 3115 Range Rd Temple, TX 76501
BUOYS
Datrex, P.O. Box 1150, Kinder, LA 70648
Urethane Products 9076 Rosecrans Ave Bellflower, CA 90706
BUTTERFLY VALVES
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CABLE TRANSIT SYSTEMS
CSD North America, 880 Candia Rd., Unit 10, Manchester, NH 03109
CALIBRATIONS
Standard Calibrations Inc., 908 A Ventures Way, chesapeake VA 23320
CAD/CAM SYSTEMS
Albacore Research, 4196 Kashtan Place, Victoria, B.C. Canada V8X4L7
Autoship Systems Corp., #403, 611 Alexander St., Vancouver, BC, Canada V6A1E
Creative Systems, Inc., P.O. B. 1910, Port Townsend,WA 98368
Kockums Computer Systems AB, PO Box 50555, S-202 15 Malmo SWEDEN
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
Ship Motion Associates, 10 Danforth St., Portland, ME 04101-4567
CAP TREADS
Washington Aluminum, 1330 Knecht Ave., Baltimore, MD 21229
CAPSTANS
G.J. Wortelboer Jr. BV, P.O.B. 5003, 3008 AA Rotterdam, Netherlands
Superior Lidgerwood Mundy, 1101 John Ave., Superior, WI 54880
CARGO MONITORING & CONTROL SYSTEM
Hermatic Inc., 4522 Center St., Deerpark, TX 77536
CAST IRON REPAIR
In-Place Machining 1929 N. Buffum St. Milwaukee, WI 53212
CHAINS
Crandall Drydock Engineers PO Box 505804 Chelsea, MA 02150
Washington Chain, P.O. Box 3645, Seattle, Wa. 98124
CHEMICALS
Uniservice Americas 57174 Hardin Rd, Slidell, LA 70461
CLASSIFICATION SOCIETY
Lloyds Register 71 Fenchurch St London EC3M 4BS
CNC PLATE CUTTING
Advanced Fabricating Inc PO Box 3721 Galveston, TX 77552
COATINGS / CORROSION CONTROL / PAINT
American Safety Technologies 565 Eagle Rock Ave Roland NJ 07068
Anker Marine Paints, 21 Charles Street, Westport, CT 06880
Aqua-Dyne, 3620 W. 11th St., Houston, TX 77008
Chesapeake Specialties Products, 5055 North Points Blvd, Baltimore Md 21219
Chugoku Marine Paints PO Box 73 4793ZH Finaart The Netherlands
DeFelsko Corporation, 802 Proctor Avenue, P.O Box 676, Ogdensburg,NY 13669
Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502
Ferro Corp., 1301 North Flora St., Plymouth, IN 46563
Flow International corp., 23500 64th Ave. south Kent, WA 98032
Jamestown Distrib., P.O. Box 348, Jamestown, RI 02835
Jotun Paints Inc, 1401 Severn St., Baltimore,MD 21230
Mascoat Products, 10890 Alcott Unit 102 Houston, TX 77084
Nace Int'l, 1440 South Creek Dr., Houston, TX 77043
Resto Motive Laboratories PO Box 1335 Morristown, NJ 07962-1235
Sherwin Williams, 101 Prospect Avenue, Cleveland OH 44115
Wasser High Tech Coatings, 8041 South 228th St., Kent, WA 98032
COMMUNICATIONS SERVICE
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Maritel Marine Communications, 16 E. 41st St., NY, NY 10017
Maritime Telecommunications Networks, Inc., 3044 N Commerce Pkwy Miramar FL 33025
COMPOSITE PILINGS
Hardcore Composites 618 Lambsons Lane New Castle DE 19720
COMPOSITE FENDERING SYSTEM
Hardcore Composites 618 Lambsons Lane New Castle DE 19720
COMPOUNDS
Philadelphia Resins, P.O. Box 309, Montgomeryville, PA 18936
COMPRESSORS
Hatlapa Uetersener Maschinenfabrik Tornescher WEG 5-7 D-25436 Uetersen, Germany
COMPRESSOR PARTS
CMP Corporation, P.O. Box 15199, Oklahoma City, OK 73155
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Creative Systems, Inc., P.O. B. 1910, Port Townsend, WA 98368
Fleet Technology, 311 Legget Dr., Karata, Ontario, Canada K2K 1Z8
Lloyd's Register, 100 Leadenhall St., London, England EC3A 3BP
MIL Systems, 200-1150 Morrison Drive, Ottawa, Ontario K2H 8S9
Navigator PC, Plantation Technology Park, 6601 N.W. 14th St. Suite 4, Plantation, FL 33313
Ship Motion Associates, 10 Danforth St., Portland, ME 04101
COMMUNICATIONS
Beier Radio1990 Industrial Ave Harvey, LA 70058
Japan Radio, 1011 SW Klickitat Way, Bldg B, Suite 100, Seattle,WA 98134
Mackay Comm Inc 2721 Discovery Dr Raliegh NC 27616-18
Rydex: An Inmarsat Ventures Co., 130-13111 Banler Place, Richmond,BC V6V2J1
COMPUTER SOFTWARE SYSTEMS
Autoship Systems Suite 312-611 Alexander St Vancouver BC V6A1E1
Spec Tec Professor Koth's Vey 1366 Lysaker Norway
CONSOLE - GMDSS
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
Japan Radio, 1011 SW Klickitat Way, Bldg B, Suite 100, Seattle WA 98134
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851
CONSULTANTS
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Elliot Bay Design Group 5301 Shishole Ave NW Ste 200 Seattle WA 98107
Hornblower Marine PO Box 112476 Campbell CA 95001
CONTAINER LIFT SPREADERS
Tandemloc Inc.,824 Highway 101, Havelock, NC 28532
CONTROL SYSTEM - Monitoring/Steering
Beier Radio1990 Industrial Ave Harvey, LA 70058
Electronic Marine Systems, 800 Ferndale Pl., Rahway, N.J. 07065
Electrowave USA, 6125 W. Sam Houston Pkwy Ste 406, Houston,TX 77041
Governor Control Systems, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315
G.R. Bowler 2261 Lake Rd, Ontario, NY 14519
Kobelt Manufacturng Co., Ltd., 8238-129 street, Surrey, B.C V3W0A6
Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
MMC International, 60 Inip Dr, Inwood NY 11096
Motor Services Hugo Stamp, 3190 S.W. Launderdale, FL 33315
Prime Mover Controls 3600 Gilmore Way Burnaby CANADA V5G 4R8
Scientific Marine Services, Inc., 101 State Pl., Suite N, Escondido, CA 92029
Stork Kwant, P.O. Box 23, 8600 AA Snnek, Netherlands
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CORROSION CONTROL
Spectrum Trading 108-B Oak St Alpharetta GA 30004
Gardner Denver Water Jetting Systems 8807 Emmett Rd. Suite 100 Houston, TX 77040
Ultra Strip 3515 SE Lionel Terrace Staurt, FL 34996
COUPLERS- Tug & Barge
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COUPLINGS
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American Vulkan, P.O. Drawer 673, Winter Haven, FL 33882
Centa Corp., 815 Black Hawk Dr., Westmont, IL 60559
Geislinger, Hallwanger Landesstr.3, 5300 Hallwang,Salzburg, Austria
Geislinger Corporation, 200 Geislinger Drive,Battle Creek, MI 49015
Lo-Rez Vibration Control, Ltd., 186 West 8th Ave., Vancouver, B.C. V5Y1N2
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MMC Int'l, 60 Inip Drive, Inwood, NY 11096
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Holly Hoist Corp., P.O. Box 86, St. Clair Shores, MI 48080-0086
Liebherr-Werk Nenzing Gmbh PO Box 10 A6710, Nenzing Austna
Mi-Jack Products, 3111 West 167th Street, Hazel Crest, IL 60429
Westmont Industries, 10805 Painter Ave.,Santa Fe Springs, CA 90670
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CRANKSHAFT REPAIR
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Waltz & Krenzer, 91 Willenbrock Rd., Oxford, CT 06478
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Bug-O-Systems, Inc., 3001 W. Carson St., Pittsburgh, PA 15204
DAMPERS
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DATA RECORDERS
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E.H. O'Neill, 1405 Chippendale Rd., Lutherville, MD 21093
DECK MACHINERY — Cargo Handling Equipment
Edgewater Machine & Fabricators, P.O. Box 358, Edgewater, FL 32132-0358
Hatlapa Uetersener Maschinenfabrik Tornescher WEG 5-7 D-25436 Uetersen, Germany
Intercontinental Engineering, P.O. Box 9055, Kansas City, MO 64168
Lantec, 5827 Production Way, Langley, B.C. V3A 4N5 Canada
Markey Machinery, P.O.Box 24788, Seattle WA 98124
Rapp Hydema, 4433 27th Avenue West, Seattle WA 98199
Seabulk Sytems 3851 Shell Rd Ste 200 Richmond, BC Canada V6X-2W2
Skookum, Inc., P.O. Box 280, Hubbard, OR 97032
Smith Berger Marine Inc., 7915 10th Ave. S., Seattle, WA 98108
Superior Lidgerwood-Mundy, 1101 John Ave., Superior, WI 54880
Timberland Equipment Ltd. & Almon Johnson, 459 Industnal Avenue, Woodstock, ON N4S7Z2 Canada
W.W. Patterson 3 Riversea Rd Pittsburg, PA 15233
DESALINATION - REVERSE OSMOSIS
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Pall Rochem, 5775 Rio Vista Drive, Clearwater, FL33760-3114
Reverse Osmosis of South Florida, 12301 SW 133 Court, Miami, FL 33186
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DIESEL CYLINDER INDICATORS
Kiene Diesel, 325 S. Fairbanks St., Addison, IL 60101
DIESEL ENGINE ANALYZER
FCS, Inc., 22 Main Street, Centerbrook, CT 06409
DIESEL ENGINE — Spare Parts & Repair
Caterpillar, Inc., Engine Div., P.O. Box 610, Mossville, IL 61552-0610
Deutz Canada Inc., 4420 Garand St., Montreal, Que. H4R 2A3
GE Marine Engines 1 Neuman Way Cincinnatti, OH 45215
Giro Engineering Limited, Talisman,Duncan Road,Park Gate,Southampton,Hants SO31 7GA England
Goltens Manne, 322 Broad Ave., Wilmington, CA 90744
H P International, Inc., 3812 W. Linebaugh Ave., Tampa, Fl 33624
Industrial Estate, New Territories, HONG KONG
MAN B&W Diesel AG, Stadtbachstrasse 1, D-86153 Augsburg 1. GERMANY
MAN B&W Diesel A/S, Teglholmsgade 41, DK-2450 Copenhagen SV, DENMARK
MAN B&W Diesel, 17 State St., New York, NY 10004
Marine Exhaust Systems of Alabama, P.O. Box 698, 757Nichols Ave., Fairhope, AL 36533
Marine Turbo & Diesel Inc 1090 7th St Richmond CA 94801
Manso USA, Inc., 100 Davidson Ave., Somerset, NJ 08873
Motor-Service AB, Box 2115, S-144 04 Ronninge, SWEDEN
Motor Services Hugo Stamp, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315
NREC 1701 Engineers Rd Belle Chase LA 70037
Reagan Equipment, 2550 BelleChase Hwy., Gretna, LA 70054
Rolls -Royce Commercial Manne Houston 10255 Richmond Ave
Scandana Americas Bkg., 502 Empire St., Greehfield Park, J4V1V7 Canada
Wartsila Diesel, 201 Defense Highway, Annapolis, MD 21401
DIESEL ENIGINE OVERHAUL
Goltens - NY Corp., 160 Van Brunt St., Brooklyn, NY 11231
Governor Controls Systems 3190 W. 4th Ave Ft Lauderdale FL 33315
Marine Turbo & Diesel Inc 1090 7th St Richmond CA 94801
DIESEL FUEL DECONTAMINATION (www.bunkerbuyer.com)
Algae X Intnl PO Box 4011 Ft Myers Beach, FL 33932
PRI 3750 Hacienda Blvd., Suite A Davie, FL 33314
DIGITAL TORQUE METER SYSTEMS
Instruments, Computers & Controls 78 Londonderry Tpke Hookset NH 03106
DISTRESS SIGNALS
Datrex, Inc., P.O. Box 1150, Kinder, LA 70648
DIVING & SALVAGE
Bisso Marine Co. P.O. Box 4113, New Orleans, LA 70178
H.J. Merrihue, P.O. Box 23123, New Orleans LA 70183
DOCK FENDERING SYSTEMS
Plastic Pilings Inc., 1485 South Willow Ave., Rialto, CA 92376
DOORS - MARINE & INDUSTRIAL
Juniper Int'l.,72-15 Metropolitan Ave., Middle Village, NY 11379
Manly Manne, PO Box 86788, N. Vancouver B.C. Canada V7L 4L3
Mapeco , Inc., 90 Forest Ave., Locust Valley, NY 11560
Walz & Krenzer, 91 Willenbrock Rd., Unit B4, Oxford CT 06478
DRIVES
Allied Systems 2300 Oregon St Sherwood OR 97140
DRUG TEST KITS
Sun State Specialty K-9s, Inc.,1500 Beville Road, Daytona Beach, FL 32114
DRY DOCKS-Design
Crandall Dry Dock Engineers Inc., P.O. Box 505804, Chelsea, MA 02150
Heger Dry Dock Engineers, Inc., 13 Water St., Holliston, MA 01746
ELECTRICAL EQUIPMENT
Callenberg Equipment 2010 N. Miami Ave, Miami, FL 33127
MMC International, 60 Inip Dr. Inwood NY 11096
ELECTRONIC INFORMATION SUPPORT
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolboton, NORWAY
Scientific Marine Svcs., 101 State PL, Ste. P, Escondido, CA 92029
ELECTRICAL INSTRUMENTS
Selco USA, 2508 Lake Brook Ct., Atlanta, GA 30360
ELECTRONIC CHARTS
C-Map Commercial 133 Falmouth Rd., Mashpee, MA 02649Manne Electronics
Edgewater Machine & Fabricators, P.O. Box 358, Edgewater, FL 32132-0358
NOAA Office of Coast Survey, 1315 East-West Hwy .Silverspring, MD 20910
Solutions, 1522 Crabappie Cove, Jacksonville, FL 32225
ELECTRONICS
C-MAP, P.O. Box 212, 4371 Egersund Norway
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
Sure Seal Connections, 3951 South Plaza Dr. Suite 240, Santa Ana, CA 92704
Standard Horizon, 10900 Walker St., Cypress, CA 90630
ELEVATORS
C-Map Commercial, 133 Falmouth Rd., Mashpee, MA 02649
EMPLOYMENT
All American Marine P.O. Drawer 191237 Tillman's Corner, AL 33619
Military Sealift Command PO Box 120 Code APM-124 Virginia Beach,VA 23458-0120
Peter D. Juan ESQ. 14 Lafayette Court. Greenwich Ct 06830
ENGINEERING SERVICES / MARINE ENGS
Callenberg Equipment 2010 N. Miami Ave, Miami, FL 33127
Scientific Manne Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
U.S.M.M.A., 300 Steamboat Rd, Kings Point, NY 11024
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GMT Electronics, 171 Main Street, South River, NJ 08882
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851
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Mansco USA, Inc., 100 Davidson Ave., Somerset, NJ 08873
ENGINES
GE Manne Engines, 1 Neuman Way, Cincinnati, OH 45215
BF Goodrich 701 White Ave., Beloit, WI 53111
Wartsila NSD Corporation, box 252, Vasa, finland Fin-65101
EVACUATION SYSTEMS
DBC, 12351 Bridgeport Rd., Richmond, BC Canada
Fleet Technology 311 Legget Dr Kanata Ontano K2K 1Z8
EVAPORATORS
Alfa-Laval Separation, Inc., 955 Mearns Rd., Warminster, PA 18974
Sasakura Engineenng, 7-32 Takeshima, 4-chome, Nishiyodogoaw, KY Osaka555, Japan
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EXPANSION JOINTS
Elasto Valve Rubber Products 1691 Pioneer Rd Sudbury ONTARIO Canada P3G 1B2
Silex Inc 6659 Ordan Dr Mississauga ON CANADA L5T 1K6
EXTRUDED RUBBER PRODUCTS
Clean Seal Inc., P.O. Box 2919, South Bend, IN 46680
FAIRING COMPOUND
Philadelphia Resins, P.O.B. 309, Montgomeryville, PA 18936
FANS - VENTILATORS - BLOWERS
Jon M. Liss Associates, Inc., 411 Borel Ave., San Mateo, CA 94402
FASTENERS
Jamestown Distributors, P.O. Box 348, Jamestown, RI 02835
Superbolt, P.O.B. 683, Carnegie, PA 15106
FENDERING SYSTEMS/BUOYS - Dock & Vessel
Dolphin USA 2241 Barraud Ave Norfolk, VA 23504
Duramax Marine, 16025 Johnson St., P.O Box 67, Middlefield, OH 44062-0067
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Maritime International, 100 E. Vermilion Street #212, Lafayette, LA 70501
Plastic Pilings Inc., 1485 South Willow Ave., Rialto, CA 92376
Poly-Hi-Solidur, 2710 American Way, Ft. Wayne, IN 46899
Schuyler Rubber Co., 16901 Woodred Rd., Woodinville, WA 98072
Seaward Int'l P.O. Box 98, Clearbrook, VA 22624
Ultra Poly, Inc., 2926 South Steele St., Tacoma, WA 98409
Urethane Products 9076 Rosecrans Ave Bellflower, CA 90706
Viking Fender Co., 1160 State St., Perth Amboy, NJ 08861
FILTERS/FILTER SYSTEMS (www.bunkerbuyer.com)
Algae X Int'l, PO Box 4011, Ft. Myers Beach, FL 33932
Boll Filter, 15 International Drive, East Granby, CT 06026
G.E.T., Inc., 3135 Golden Avenue, Long Beach, CA 90806
Hellan Strainer 3249 East 80th St Cleveland, OH 44104
FIRE & SAFETY PRODUCTS
Brookdale International, 1-8755 Ash St., Vancouver BC, V6P6T3
DBC Marine Safety Systems, 101-3760 Jacombs Rd. Richmond, BC, Canada V6V1Y6
Fr Fassmer &Co D-27804 Berne/Motzen, Germany, IndustriestraBe2
IFSTA/Fire Service Programs, 9030 N. Willis, Stillwater, OK 74078-8045
IMSSCO Corporation, 2040 Harbor Island Drive, Suite 201 A, San Diego,CA 92101
Port Canaveral Marine Fire Fighter Academy, Canaveral Port Authority, P.O. Box 267, Cape Canaveral, FL 32920
Zero International 415 Concord Ave Bronx, NY 10455
FLANGES
Jesse Engineenng, 5225 7th St. E. Tacoma, WA 98424
FLOW CONTROLS
Hoffer Flow Controls 107 Kitty Hawk Lane, Elizabeth City, NC 27906
FLUID SEALING AND PACKING
The Delamar Company, Highway 60 Rte 4, Dillwyn, VA 23436
FUEL ADDITIVES
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FUEL DECONTAMINATION (www.bunkerbuyer.com)
Algae X Int'l, PO Box 4011, Ft Myers Beach, FL 33932
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Power Research Inc 3750 Hacienda Blvd Ste A, Davie, FL 33314
FULL SERVICE SHIPYARD & REPAIR
Marisco, Ltd. 91-607 Malakole Rd Kapolei, HI 96707-1831
GALLEY EQUIPMENT
Cospolich Refrigerator Co.,PO Box 1206 Destrehan LA 70047
Dutchess Baker's Machinery Co., 1101 John Ave, Superior WI 54880
Jamestown Metal Marine Sales, Inc., 4710 Northwest Second Ave, Boca Raton, FL 33431
Lang Manufacturing Co., 6500 Merrill Creek Pkwy, Everett, WA 98023
GANGING & SAMPLING
Hermatic Inc., 4522 Center St., Deerpark, TX 77536
GAS TURBINES
GE Manne Engines 1 Neuman Way Cincinnatti, OH 45215
GANGWAYS
Washington Aluminum 1330 Knech Ave Baltimore, MD 21229
GASKETS & TREADS
Zero International 415 Concord Ave Bronx, NY 10455
GEARS & GEAR REPAIR
Goltens - New York Corp., 160 Van Brunt St., Brooklyn, NY 11231
The Falk Corp., PO Box 492, Milwaukee, WI 53201-0492
GENERATORS
Reagan Equipment, 2550 BelleChase Hwy.,Gretna LA 70054
GENERATOR CONTROLS
Con-Select Inc PO Box 8745 Mandville, LA 70471
Selco USA, Inc.,2508 Lake Brook CT. Atlanta, GA 30360
GMDSS — GEAR BOXES & BEARINGS
Beier Radio, 1990 Industrial Ave Harvey, LA 70058
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
Renk AG, Goegginger Street 73, 86159 Augsberg, Germany
GOVERNORS
Motor Services Hugo Stamp, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315
GPS
Leica Navigation 23868 Hawthorne Blvd Torrance CA 90505-5908
Standard Horizon, 10900 Walker St., Cypress, CA 90630
GROUNDINGS
Sohre Turbomachinery 132 Gilbertville Rd PO Box 889 Ware, Mass 01082-0889
HATCHES AND DOORS
Byrne Rice & Turner 1172 Camp St, New Orleans, LA 70130
Juniper Int'l.,72-15 Metropolitan Ave., Middle Village, NY 11379
Manly Marine, P.O. Box 86788, N. Vancouver, BC V7L 4L3 Canada
HEAT EXCHANGERS
Alfa-Laval Separation Inc., 955 Mearns Rd., Warminster, PA 18974
Tranter, Inc., P.O. Box 2289, Wichita Falls, TX 76307
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Algae X Int'l, PO Box 4011, Ft. Myers Beach, FL 33932
HIGH SPEED FERRY BUILDERS
Incat Australia (Pty) Ltd.,18 Bender Drive, Hobart 7009, Australia
HOISTS
Holly Hoist Corp., P.O. Box 86, St. Clair Shores, MI 48080-0086
HORNS/WHISTLES
Airchime Mfg. Co. Ltd., 5478 267th Street, Gloucester Industrial Estate, Langley, B.C. Canada V4W 3S8
Kahlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241
Kockum Sonics, Inc., 933 Industry Rd., Ste105, Kenner, LA 70062
HOSES/HOSE FITTINGS
JGB Enterprises, Inc. 115 Metropolitan Drive, Liverpool, NY 13088
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Allied Systems 2300 Oregon St, Sherwood OR 97140
Cunningham Marine Hydraulics 201 Harrison St, Hoboken NJ 07030
Offshore Inland 3521 Brookdale Dr.S. Mobile AL 36618
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Stearns Manufacturing, PO Box 1498, St Cloud, MN 56302-1498
INSURANCE SERVICES
WQIS, 80 Broad St. 21st Flr., New York, NY 10004
INCINERATORS
Therm-Tec Inc., PO Box 1105, Tualatin, OR 97062
INFLATABLES
Willard Marine, 1250 Grove St., Anaheim, CA 98286
INSTRUMENTATION
Hoffer Flow Controls, 107 Kitty Hawk La., Elizabeth City, NC 27906
INSULATION
Claremont 174 State St., Meriden, CT 06450
E.H. O'Neill 1405 Chippendale Rd., Lutherville MD 21093
Lit Industries, 516 Costner School Rd.,Bessemer City, NC 28016-9801
Mascoat Products, 10890 Alcott, Unit 102, Houston, TX 77043
Pacor, Inc., P.O. Box 107, Westville, NJ 08093
Shannon Enterprises of WNY Inc., 162 Sweeny St., North Tonawanda, NY
Superior Energies Inc., 3115 Main Avenue, Groves TX 77619
INTERIORS
Custom Ship Interiors, inc., P.O. Box 882, Solomons, MD 20688
Hopeman Brothers, P.O. Box 820, 435 Essex Ave., Waynesboro, VA 22980
Insulations, Inc., Rt. 5, 12360 Leisure Rd, Baton Rouge, LA 70807
Jamestown Metal Marine 4710 NW 2nd Ave., Boca Raton, Fla. 33431-4870
Maritime Services Corp., 3457 Guignard Drive, Hood River, OR 97031
ISOLATORS
Lo-Rez Vibration Control, Ltd., 186 West 8th Ave., Vancouver B.C. V5Y 1N2
JOINER—Watertight Door—Paneling—Ceiling System—Decking
Custom Ship Interiors, Inc. P.O. Box 882, Solomons MD 20688
Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980
Maritime Services Corp., 3457 Guignard Drive, Hood River, OR 97031
Panel Specialists, Inc./Thermax, 3115 Range Rd., Temple, TX 76501
Walz & Krenzer, 91 Willenbrock Rd., Unit B4, Oxford CT 06478
K-9 DETECTION
Sun State Specialty K-9s, Inc.,1500 Beville Road, Daytona Beach, FL 32114
KEEL COOLERS
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
R.W. Fernstrum & Co., 1716 Eleventh Ave., Menominee, MI 49858
The Walter Machine Co., Inc., 84-98 Cambridge Avenue, Jersey City, NJ 07307
LASER ALIGNMENT
Boland Industrial & Consulting Services, P.O.B. 91360, Mobile, AL 36691
LUDECA 1425 NW 88th Ave Miami FL 33172
LAUNDRY EQUIPMENT
Richard Galley Supply, PO Drawer 4035, Houma, LA 70361
LEAK REPAIR
Indumar Products Inc 2500 Tanglewilde, Suite 260, Houston TX 77063
LIFEBOATS/RAFTS
DBC Marine Safety Systems, 101-3760 Jacombs Rd. Richmond, BC, Canada V6V1Y6
Edgewater Machine & Fabricators, P.O. Box 358, Edgewater, FL 32132-0358
Fassmer & Co.D-27804 Berne/Motzen, Germany, IndustriestraBe2 v
Norsafe AS, P.O. Box 115, N-4818 Faervik, Norway
Viking Life Saving Equipment, 1625 N. Miami Ave., Miami, FL 33136
Willard Marine Co., Inc., 1250 N. Grove St., Anaheim, CA 92806
Wolong International, 151 Chin Swee Road #03-14, Manhattan House, Singapore 169876
LIFEBOAT SERVICING
Technolibre Pte.Ltd., 51 Shipyard Road, Singapore 628139
LIFEBOAT TESTING
Water Weights, Inc., 5139 Brook St., Suite E, Mont Claire, CA 91763
LIFESAVING EQUIPMENT
Viking Life Saving Equipment, 1625 N. Miami Ave., Miami, FL 33136
LIFT EQUIPMENT
Mi-Jack Products, 3111 West 167th Street, Hazel Crest, IL 60429
LIFT EQUIPMENT TESTING
Water Weights Inc., 5139 Brooks St., Suite E, Montclair, CA 91763
LIGHTING SYSTEMS / EQUIPMENT
ACR Electronics, Inc., 5757 Ravenswood Rd., Ft. Lauderdale, FL 33310-5247
Archway Marine, 4501 Swan Ave., St. Louis, MO 63110
Goltens Marine, 160 Van Brunt St., Brooklyn, NY 11231
Kockum Sonics, Inc., 933 Industry Rd., Ste105, Kenner, LA 70062
L.C. Doane, P.O.Box 975, Essex CT 06426
Pauluhn Electric Mfg. Co., Inc. P.O. Box 53, Pearland, TX 77588
LINE & NET CUTTERS
Spurs Manne, 201 SW 33rd St., Ft. Lauderdale, FL 33315
LIQUID OVERFILL PROTECTION SYSTEMS
King Engineering Corp., P.O. Box 1228, Ann Arbor, MI 48106
LOAD MEASURING EQUIPMENT
Water Weights Inc. 5139 Brook St Ste E Mont Claire, CA 91763
LOAD TESTING
Water Weights Inc. 5139 Brook St Ste E Mont Claire, CA 91763

LUBRICANTS/LUBRICATION SYSTEMS
Benjamin R. Vickers & Sons Ltd., Airedale Mills, 6 Clarence Road, Leeds, W.Yorkshire England, UK L510 IND
Exxon Mobil Marine Lubricants, 3225 Gallows Rd Fairfax, VA 22037
Companion Products, Inc., 2040 Johnson Ct. Unit A, Kingston, IL 60145-0009

MACHINERY MAINTENANCE, REPAIR AND TESTING
Goltens - New York Corp., 160 Van Brunt St., Brooklyn,NY 11231
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27604-1851

MANAGEMENT SYSTEMS & SERVICE
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
PCS Marine, 174 Colonnade Road S., Nepean, Ontario K2E715

MARINE CONSULTANTS
Boland Industrial & Consulting Services, P.O.B. 91360, Mobile, AL 36691
Hall Associates of Washington, Inc., P.O. Box 1554, Mukileo, WA 98275
PCS Marine, 174 Colonnade Road S., Nepean, Ontario K2E715

MARINE CONSTRUCTION/REPAIR
Sundial Marine, 5605 N.E. Sundial Road, Trautdale, OR 97060

MARINE CRANES
Liebherr-Werk Nenzing GMBH, P.O. Box A6710, Nenzing, Austria

MARINE DECKING & FLOORING
E.H. O'Neill, 1405 Chippendale Rd., Lutherville, MD 21093
Flexible Decking, 2708 N. Australian Ave. Ste. 9, West Palm Beach, FL 33407
Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807
Slipnot Safety Flooring WS Molnar Co. 2545 Beavfait St., Detroit, MI48207

MARINE ELECTRONICS
ACR Electronics, Inc., 5757 Ravenswood Rd., P.O. Box 5247, Ft. Lauderdale, FL 33310-5247
Beier Radio, 1990 Industrial Ave Harvey, LA 70058
Callenberg Engineering 2010 N. Miami Ave, Miami, FL 33127
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
GMT Electronics, 171 Main Street, South River, NJ 08882
Hatteland Display, Bogstadveien 19, N-0355 Oslo, Norway
JRC, 1011 SW Klickitatway Bldg B, Suite 100, Seattle WA 98134
Jotron Electronics, Box 85, NO-3280TJODALYNG, Norge
Kockum Sonics, Inc., 933 Industry Rd., Ste105, Kenner, LA 70062
Leica Navigation, 23868 Hawthorne Blvd., Torrance CA 90505-5908
Marine Electronic Solutions, 1522 Crabapple Cove, Jacksonville, FL 32225
Raytheon Marine GmbH, High Seas Products, Postfach 1166 D-24100 Kiel, Germany
(Distributor for Raytheon) Klein Navigation, 11 Klein Drive, Salem NH 03079
Saab Marine Electronics AB, Box 13045, 402 5Goteborg,SWEDEN
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolboton,NORWAY
Scientific Marine Services, Inc., 101 State Pl., Suite F,Escondido, CA 92029
Standard Horizon, 10900 Walker St., Cypress, CA 90630

MARINE ENGINEERING
Elliot Bay Design Group, 5301 Shilshole Ave. NW, Ste. 200, Seattle, WA 98107

MARINE EQUIPMENT
Baltic Spare Services Ltd 8 Astronodomow St., 80-299 Gdansk,Poland
Byrne Rice & Turner 1172 Camp St New Orleans, LA 70130
Commercial & Marine Products, 3924 Forest Dr., #11, Columbia,SC 29204
Plastic Pilings Inc., 1485 South Willow Ave., Rialto, CA 92376
Scardana Americas Bkg., 502 Empire St., Montreal, Greenfield Park, j4v1v7
Superior Lidgerwood-Mundy, 1101 John Ave., Superior, WI 54880
Waterman Supply, P.O.Box 596, Wilmington, CA 90748

MARINE HARDWARE
HMS Marine Hardware, 333 W.Merrick Road, Valley Stream, NY 11580-5219

MARINE MANAGEMENT
Hornblower Marine, PO Box 112476, Campbell, CA 95001

MARINE RADIOS
Standard Horizon, 10900 Walker St., Cypress, CA 90630

MARINE SERVICES
Conam Inspection, 192 International Blvd., Glendale Heights, IL 60139

MARINE SHAFTING
Kahlenberg Bros, P.O. Box 358, Two Rivers, WI 54241

MARINE THERMAL IMAGER
Arion International 720 Glen Eagle Drive #100 Winter Springs, FL 32708

MARITIME TRAINING & SCHOOLS
Marine Safety Int'l., Marine Terminal Laguardia Airport, NY 11371

METAL ALLOY DISTRIBUTORS
Diversified Metals 49 Main St Monson, MA 01057

METERS
Selco USA, 2508 Lakebrook Ct., Atlanta, GA 30360

MONITORING SYSTEMS
GR Bowler 2261 Lake Rd Ontario, NY 14519
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851

MOORING LINES
Bayer Faser Building F18 DV Marktg Monofil 41538 Dormagen, Germany
Samson Rope Technologies 2090 Thordon St Ferndale, WA 98248

MOORAGE FACILITY
Sea Ark Marine, PO Box 210, Monticell,o AR 71655-0210
Washington North Tongue Point 1300 Dexter Ave., N. Ste 205 Seattle, WA 9810

MOTOR PROTECTION
Marine Safe Electronics, 261 Millway Ave. #12, Concord Ontario L4K 4K9

MOUNTING SYSTEMS
Lo-Rez Vibration Control, Ltd., 186 w 8th Ave., Vancouver B.C. Canada V5Y 1N2
Machine Support 1932 Mill Pond Dr Chesapeake, VA 23320

NAVAL ARCHITECTS, MARINE ENGINEERS
A.K. Suda , Inc., 3004 19th St., Metairie, LA 70002-4989
Advanced Marine Enterprises, 1725 Jefferson Davis Hwy., Arlington, VA 22202
Alan C. McClure Associates, Inc., 2600 South Gessner, Houston, TX 77063
Band, Lavis, & Associates, 900 Ritchie Hwy, Suite 203, Severna Park, MD 21146
Bay Engineering, 253 N. First Ave., Sturgeon Bay, WI 54235
C. Baxter & Associates, P.O. Box 9006, Mobile, AL 36609
CDI Marine Co., 9550 Regency Square Blvd. Ste. 400, Jacksonville, FL 3222
CT Marine, 56 Crooked Trail, Rowayton, CT 06853
Cunningham & Walker, 1762 Providence Hollow Lane, Jacksonville, FL 32223
DeJong & Lebet, Inc., 1734 Emerson Street, Jacksonville, FL 32207
Designers & Planners, 2120 Washington Blvd. Ste.200, Arlington, VA 22204
Elliot Bay Design Group 5301 Shishole Ave NW Ste 200 Seattle WA 98107
Fleet Technology, 311 Legget Dr., Karata, Ontario, Canada K2K 1Z8
George G. Sharp, Inc., 100 Church St., New York, NY 10007
Gibbs & Cox, Inc., 50 West 23rd St., New York, NY 10010
Guido Perla & Assoc., 720 3rd Ave., Ste. 1200, Seattle, WA 98104
James S. Krogen, 799 Brickelli Plaza Ste. 701, Miami, FL 33131
Jamestown Marine Service, Marine Science & Tech Center 1084 Shennecossett Rd Groton, CT 06340
John J. McMullen Associates, Inc., 4300 King St., Suite 400, Alexander, VA 22302
John W. Gilbert & Assoc., Inc., 199 State St., Boston, MA 02109
Kvaerner Masa Marine Inc., 201 Defense Highway, Suite 202, Annapolis, MD 21401
M. Rosenblatt & Son, Inc., 2341 Jefferson Davis Hwy, Arlington, VA 22202
Marine Design & Operations, Inc., 225 E. 1st Ave., Roselle, NJ 07203
Maritech, Seacliff, Bay Road, Newmarket, NH 03857
Maritime Design, 13000 Sawgrass Village Circle, Ponte Vedra Beach, FL 32082
MCA Engineers, Inc., 2960 Airway Ave., #A-103, Costa Mesa, CA 92626
McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Biloxi, MS 39535-4454
MH Systems 10951 Sorrento Valley Rd#2FSan Diego CA 92121
MIL Systems, 200-1150 Morrison Drive, Ottawa, Ontario K2H 8S9
Nautical Designs, Inc. 2101 S. Andrews Ave,Suite 202, Fort Lauderdale FL 33316
R.D. Jacobs & Associates, 11405 Main St., Roscoe, IL 61073
R.J. Mellusi & Co., 71 Hudson St, New York, NY 10013
Sargent & Herkes, 225 Baronne St., Suite 1405, New Orleans LA 70112
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
Sea School, 10812 Gandy Blvd, St. Petersburg, FL 33702
Seaworthy Systems Inc., P.O. Box 965, Essex, CT 06426;
The Glosten Assoc. Inc., 600 Mutual Life Bldg., 605 First Ave., Seattle, WA 98104
TIMSCO, P. O. Box 91360, Mobile AL 36691
Washburn Doughty, P.O. Box 296, E. Boothbay, ME 04544

NAV/COMM EQUIPMENT
Beier Radio 1990 Industrial Ave, Harvey LA 70058
C-Map/Commercial, 133 Falmouth Rd., Mashpee, MA 02649
C-Map, P.O. Box 212 4371 Egersund Norway
St. Johns, Newfoundland, Canada A1A 2GB
Chartco, New North Road, Hainault, Ilford Essex, 166 2UR England,UK
Electronic Marine Systems, 800 Ferndale Pl., Rahway, N.J. 07065
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
Mackay Communications, 3691 Trust Dr., Raleigh, NC 27616
Scandinavian Micro Systems P.O. Box 155, N-1411, Kolboton, NORWAY
Standard Communications, P.O. Box 92151, Los Angeles, CA 90009
Transas Marine USA, 19105 36th Ave. W. St. 101, Linwood, WA8036

NAVIGATION
Comnav Marine Ltd.,#15-13511 Crestwood Pl., Richmond, BC V6V2G1
D&B Technologies, 1400 S.Orland Ave., Winter Park, FL 32789
Kongsberg Maritime Ship Systems AS, PO Box 1009 3194, Horten, Norway
Transas Marine USA 19105 36th Ave West Ste 101 Lynwood, WA 98036

NOISE & VIBRATION
Soundcoat, 1 Burt Dr., Deer Park, NY 11729

NOZZLES/NOZZLE SYSTEMS
Harrington Marine, 6720 124th Ave., Fennville, MI 49408
NautiCAN Research and Develop.,P.O. Box 428-115 Kelvin Grove Way, Lions Bay,BC V0N 2E0

OFFSHORE MARINE CONSTRUCTION
Amfels 5177 Richmond Ave Ste 1065 Houston TX 77056

OFFSHORE TOWING
Tidewater, 601 Poydras Street, New Orleans, LA 70130

OIL—MARINE—ADDITIVES—TESTING
Exxon Mobil Oil Corporation, 3225 Gallows Road, Fairfax, VA 22037-0001

OIL/WATER SEPARATORS
Alfa-Laval Separation, Inc., 955 Mearns Rd., Warminster, PA 18974-0556
MMC International, 60 Inip Dr, Inwood NY 11096
Sasakura Engineering, 7-32 Takeshima, 4-chomNishiyodogoaw,KY, Osaka555, Japan

PAINTS/ANTI-FOULANTS
Jotun Paints Inc, 1401 Severn St., Baltimore,MD 21230
Wasser High Tech Coatings, 8041 South 228th St., Kent, WA 98032

PAINT REMOVAL
Ultra Strip Systems 3515 SE Lionel Terrace Stuart, FL 34996

PARTS LOCATOR SERVICE
Inventory Locator Service 3965 Mendenhall Rd, Memphis, TN 38115

PFD's (Personal Flotation Devices)
Stearn's Mfg Co. PO Box 1498 St Cloud, MN 56302-1498

PHOTOLUMINESCENT PRODUCTS
Datrex, P.O. Box 1150, Kinder, LA 1064

PIPE FITTINGS/CUTTINGS/CONNECTING/ SYSTEMS
GS-Hydro U.S., 1395 Bluehills Ave.,Bloomfield CT. 06002
Jesse Engineering, 5225 7th St. East., Tacoma, WA 8424
Neptune Research, 1685 Latham Rd., West Palm Beach, Fl 33409
Norma Products (U.S.) Inc. 31132
Century Drive, Wixmon, MI 48393

PIPE LEAK REPAIR
Indumar Products Inc 2500 Tanglewilde Suite 260 Houston TX 77063
CSD North America 88o Canada Rd, Manchester, NH 03109

POLLUTION CONTROL PRODUCTS
Enecon Corporation, 125 Baylis Rd., Melville, NY 11747-3800

PORTABLE FOAM APPLICATORS
IMSSCO Corporation, 2040 Harbor Island Drive, Suite 201 A, San Diego,CA 92101

PORTABLE VENTILATORS
Americ Corp 1910 E. Devon Ave Elk Grove Village, IL 60007

PORT DEVELOPMENT
RTM Star Center, 2 W.Dixie Hwy., Dania, FL 33004
Saskura Engineering, 7-32 Takeshima,4-chome,Nishiyodogoaw,KY, Osaka555, Japan

PRECISION FLAME CUTTING/SAWING
Ronson Technical, 2146 B Flintstone Dr., Tucker, GA 30085

PRESSURE INDICATORS
Lehman & Michaels GmbH & Co. kg.
Marlow Ring 4, D-22525 Hamburg Germany

PREVENTATIVE MAINTENANCE
Marine Safe Electronics 37 Staffern Dr Concord Ontario L4k 242

PROPELLERS—Repairs
Kahlenberg Bros, P.O. Box 358, Two Rivers, WI 54241
Rice Propeller, Av Rios Espinoza No. 88, Col. Benito Juarez,Mazatlan, Sin, Mexico 82180

PROPULSION EQUIPMENT
ABB Drives Inc., P.O. Box 372, Milwaukee, WI 53201-0372,
ABB Industry Oy, P.O. Box 185, 00381 Helsinki, FINLAND
ABB TURBOCHARGER, INC.,1460 Livingston Avenue, North Brunswick, NJ 08902
AlstomPower Conversion, 3 Ave. Des Trois Chenes 90018 Belfort Cedex France
Avtron Mfg.7900 E Pleasant Valley Rd Independence OH 44131
Brunvoll A/S, P.O. Box 370, N-6401, Molde, Norway
Caterpillar, 100 NE Adams Street, Peoria, IL 61629-2320
Centa Corp., 8185 Cass Ave., Darien, IL 60561
Fincantieri. Diesel Engines Div—GMT, Bagnoli della Rosandra 3334, Trieste, ITALY
Geislinger Corporation, 200 Geislinger Drive,Battle Creek, MI 49015
Goltens Worldwide, 160 VanBrunt St., Brooklyn, NY 11231
Harbormaster Marine Inc., 31777 Industrial Rd., Livonia, MI 48150
Harrington Marine, 6720 124th Ave.,Fennville, MI 49408
Jan Verhaar Omega Thrusters 2340 AC Oegstgeest Holland
Jan Verhaar Omega Thrusters, P.O. Box 119, 2340 AC Oegstgeest, NETHERLANDS
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Kaplan and Association, 30808 Crest Forest, Farmington MI 48331
Karl Senner Inc., 25 W Third, Kenner LA 70062
Konrad 1421 Hanley Rd Hudson WI 54016-9376
LA.ME.srl, Marine Division, Via Della Fornace 4, Opera (MI) Italy
Lo-Rez Vibration Control, 186 West 8th Ave., Vancouver, BC CANADA, V5Y 1N2
MAN B&W Diesel, 17 State St., New York, NY 10004
MAN B&W Diesel A/S, Ostervej 2, DK-4960 Holeby, 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-86153 Augsburg 1 GERMANY
Mapeco , Inc., 91 Willenbrock Rd., Unit B4, Oxford CT 06478
Markisches Werk, P.O. Box 1442, D-5884 Halver GERMANY
Omnithruster Inc., 30555 Solon Ind. Pkwy., Cleveland, OH, 44139
Orion Corp., 1111 Cedar Creek Rd., Grafton, WI 53024
Propulsion Systems Inc 601 NE 26th Court, Pompano Beach, FL 33064
Rolls -Royce Commercial Marine Houston 10255 Richmond Ave Ste 101 Houston TX 77042
Schottel Inc., 675 Industrial Blvd., Sugar Land, TX 77478
Schottel Gmbh & Co, KG-Mainzer Strasse 99-D-56322-Spay GERMANY
Schottel-Werft, Manizer Strasse 99, D-56322 Spay/Rhein, GERMANY
Siemens Electric Ltd. 1180 Courtney Park Rd, Mississauga, Ontario Canada
The Falk Corp., PO Box 492, Milwaukee, WI 53201-0492
Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck, NY 11021
Voith Schiffstechnik GMBH & Co., PO Box 2011, 89510 Heidenheim Germany
Wartsila Lips, 3617 Koppens Way, Chesapeake, VA.,23323
ZF Marine Group 3131 SW 42nd St., Ft. Lauderdale. FL 33312

PUMP—Repair—Drives
Advanced Environmental Systems, 2 Sutton Rd., Webster, MA 01570
Byrne Rice & Turner 1172 Camp St, New Orleans, LA 70130
Fybroc-Div.of Met-Pro, PO Box 144, Harleysville, PA 19438
Reagan Equipment, 2550 BelleChase Hwy.,Gretna LA 70054
Scardana Americas Bkg., 502 Empire St., Greefield Park, J4V1V7 Canada

RADIATION DETECTION
Thermo Electron, 6801 Cochran Rd., Solon, OH 44139

RADARS —ARPAS
Ampco Pumps Co.,4424 West Mitchell St., Milwaukee WI 53214
Beier Radio 1990 Industrial Ave., Harvey, LA 70058
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
Kelvin Hughes Ltd New North Rd Hainavlt, Ilford Essex 1G6 2UR

REFER COMPRESSORS
CMP Corporation, P.O. Box 15199. Oklahoma City, OK 73155

REFRIGERATION
RTF Manufacturing 793 Route 66 Hudson,NY 12534

REMOTELY OPERATED VEHICLES
VideoRay LLC, 415 Engleview Blvd., Exton, PA 19341

REPLACEMENT PARTS
CMP Corporation, P.O. Box 15199, Oklahoma City, OK 73155

REPLACEMENT TREADS
Washington Aluminum, 1330 Knecht Ave., Baltimore, MD21229

REVERSE OSMOSIS
GET Inc 3135 Golden Ave LongBeachCA

RH PROPULSION
Goltens, 160 Van Brunt St., Brooklyn, NY 11231

RIGID INFLATABLE BOATS
Willard Marine, Inc. 1250 N. Grove St., Anaheim, CA 92806

ROPE—Manila—Nylon—Hawsers—Fibers
Cortland Cable Co., 44 River St.(PSR), Cortland, NY 13045-0330
Marlow Ropes, South Road, Hailsham, E. Sussex, BN27335
Pelican Rope Works, 4001 W.Cariage Way,Santa Ana,CA 92704
Puget Sound Rope, 1012 Second St., Anacortes, WA 98221
Samson RopeTech. 2090 Thordon St Ferndale,WA 98248

ROTATING EQUIPMENT
FCS, Inc., 22 Main Street, Centerbrook, CT 06409

RUDDER BEARINGS & BUSHES
Duramax Marine, 16025 Johnson St., PO Box 67, Middlefield, OH 44062-006
Orkot Composites., 2535 Prairie Rd., Unit D, Eugene, OR 97402
Thordon Bearings, Inc., 3225 Mainway, Burlington, Ontario L7M 1A6

SAFETY & ENVIRONMENTAL SOLUTIONS
Total Marine Solutions 4350 Oaks Rd, Ste 501, Fort Lauderdale, FL 33314

SAFETY MANAGEMENT CONSULTANTS
Modern Maritime 67 Bow Street, Ste. 3, Portsmouth, NH 03801

SAFETY PRODUCTS
Brookdale International, 1-8755 Ash St., Vancouver BC, V6P6T3
D&B Technologies, 1400 S.Orland Ave., Winter Park, FL 32789
DBC Marine Safety 101 3760 Jacombs Rd Richmond BC V6V146
Fab En Co, Inc 2012 Karbach Houston, TX 77092
Liferaft Systems of Australia 5 Sunmont St Derwent Park Tasmania, Australia 7009
Walport"WUSA"39-5A Dover Rd SouthToms River NJ 08757
L3 Communications PO Box 3041 Sarasota FL 34320-3041
N.Vancower, Bc Canada VZP 3n4
Norwegian Maritime Equip. AS, Box 244, NO-5460 Husnes, Norway
Slipnot Safety Flooring WS Molnar Co. 2545 Beavfait St Detroit, MI 48207
Stearns Mfg Co PO Box 1498 St Cloud, GA 56302-1498
Viking Life Saving, 1625 N. Miami Ave., Miami, FL 3313

SANITATION DEVICE—Pollution Control
Byrne Rice & Turner 1172 Camp St New Orleans, LA 70130
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111
Headhunter Inc.,4100 Ravenswood Road, Ft. Lauderdale, FL 33312
Hydroxyl systems Inc., 9800 McDonald Park Road, Sidney, BC V8L 3S8
Microphor, 452 E. Hill Rd., Willits, CA 95490

SATELLITE COMMUNICATIONS
Beier Radio 1990 Industrial Ave, Harvey,LA 70058
Comsat Maritime Services, 6560 Rock Spring Dr Bethesda MD 20817-1146
Furuno USA, Inc., 4400 N.W. Pacific Rim Blvd, Camas WA 98607
KVH Industries Inc., 50 Enterprise Center, Middletown, RI 02842
Land Sea Systems, 509 Viking Drive ,Suite KLM, Virginia Beach, VA 23452
Mackay Communications, 3691 Trust Dr., Raleigh, N.C. 27616
Nera Salcom AS, Box 91, NO-1375 Billingstad, Norway
Norwegian Telecom, Postboks 6701 St. Olivs Plass, N-0130, Oslo, Norway
Stratos. 150 Metcalfe St., Suite 1900, Ottawa, Ontario K2P 1P1 Canada

SCARIFIERS
Desmond-Stephan, P.O.B. 30, Urbana, OH 43078

SEALS
Circle Seal Controls Inc., 2301 Wardlow Circle, P.O. Box 3300 Corona, CA
Duramax Marine, 16025 Johnson St., Middlefield, OH 44062
Orkot Inc., 2535 Prairie Rd., Unit D, Eugene, OR 97402
Sure Seal Connections, 3951 South Plaza Dr. Suite 240, Santa Ana, CA 92704

SEATING
H.O. Bostrom 818 Progress Ave Wankesha, WI 53186

SELF UNLOADING SYSTEMS
Seabulk Systems 3851 Shell Rd Ste 200 Richmond CANADA V6X 2W2

SENSORS
Electronic Marine Systems, 800 Ferndale Pl., Rahway, N.J. 07065

SEPARATORS- LUBE OIL/FUEL OIL (www.bunkerbuyer.com)
Westfalia 100 Fairway Court Northvale NJ 07647

SHAFT HORSEPOWER MEASURING SYSTEM
FCS, Inc., 22 Main Street, Centerbrook, CT 06409
Instruments, Computers & Controls 78 Londonderry Tpke Hookset NH 03106

SHAFT SEALS
Duramax Marine, 16025 Johnson St., Middlefield, OH 44062

SHAFTS
American Vulkan, 2525 Dundee Rd., Winter Haven, FL 33884
Geislinger Corporation, 200 Geislinger Drive,Battle Creek, MI 49015

SHIP LIFTS
Synchrolift Inc., Two Datran Center, 9130 S. Dadeland Blvd., Miami, FL 33156-7850

SHIP MANAGEMENT
Eurasia Group, 22A Floor Chinachem Exchange Sq., 1 Hoi Wan St., Quarry Bay Hong Kong

SHIPBOARD HUMAN RESOURCES
PO 101073 Ft Lauderdale, FL 33310

SHIPBOARD TESTING
Dayton T. Brown, 555 Church St., Bohemia, NY 11716

SHIPBUILDING—Repairs, Maintenance, Drydocking
Allen Marine PO Box 1049 Sitka, AK 99835
Astilleros Espanoles, S..A. Ochandiano, 14-16 28023 El Plantio SPAIN
Atlantic Marine, Inc.,P.O. Box 3202, Mobile, AL 36652
Atlantic Marine, Inc., 8500 Heckscher Dr., Jacksonville, FL 32226
Atlas Metal Sales, 1401 Umatilla St., Denver CO 80204
Ameri-Force Inc.,3266 Talleyrand Ave.,Jacksonville, FL 32206
Austal USA 100 Dunlap Dr Mobile AL 36602 USA or PO Box 1049, Mobile, AL 36633
Bender Shipbuilding & Repair, P.O. Box 42, Mobile AL 36601
Bisso Marine Co., P.O.Box 4113, New Orleans, LA 70178
Blount Marine, 461 Water St., Warren, R.I. 02885
Bollinger Lockport & Larose, P.O. Box 250, Lockport, LA 70374
Curacao Drydock Co.,Box 3012, Willemstad, Curacao, Netherlands Antilles
Cascade General Inc., 5555 N. Channel Ave., Bld. 71, Portland,OR 97217
Eastern Shipbuilding Group, 2200 Nelson Street, Panama City, FL 32402
Fincantieri Spa Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY
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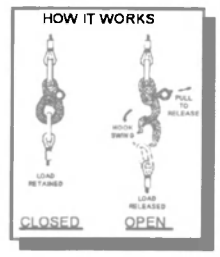

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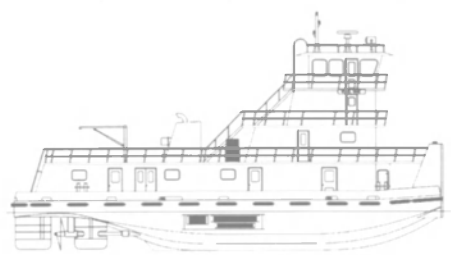

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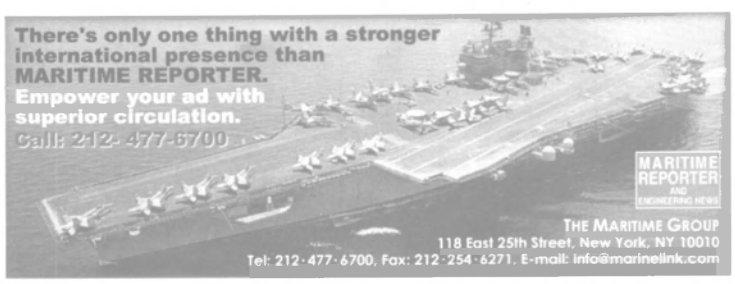

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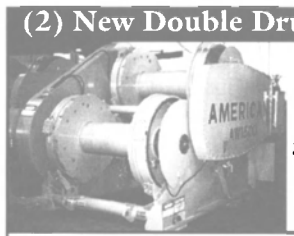

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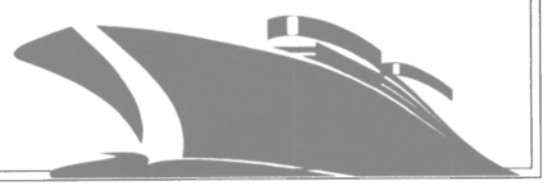

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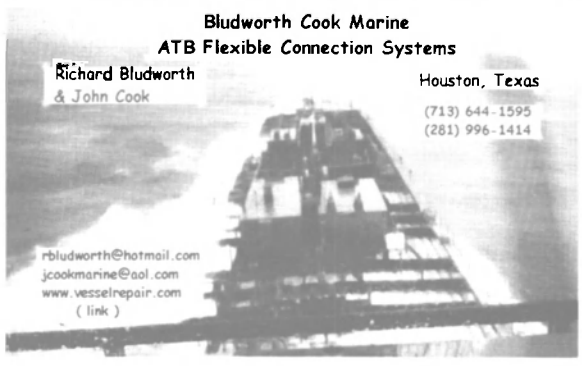

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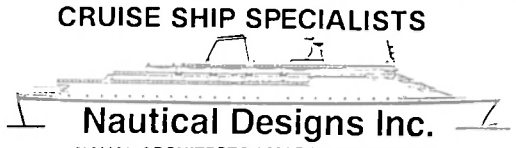

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The Cooper Bearings Group is a full service supplier with over 100 years of product knowledge and marine propulsion expertise.

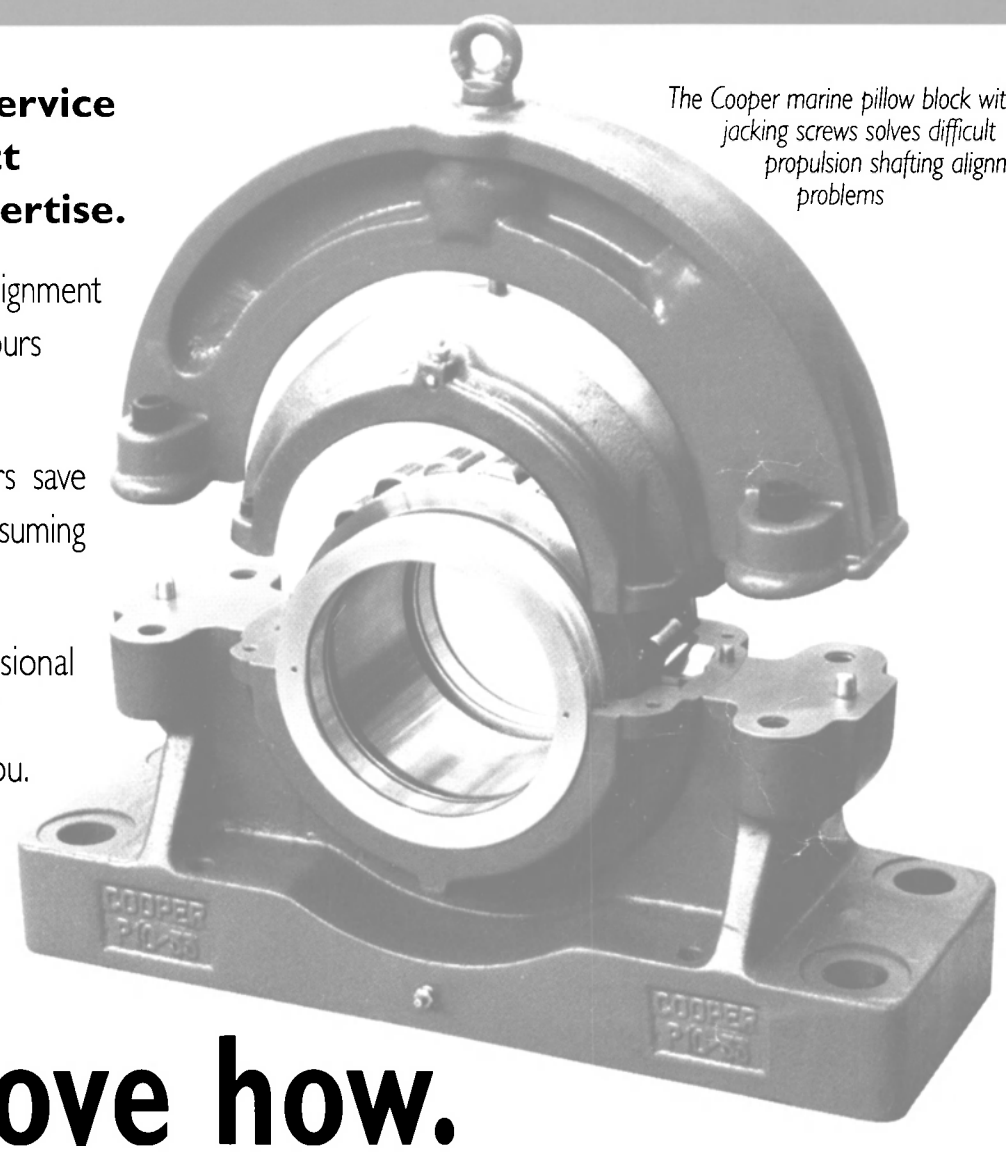
The Cooper split to the shaft roller bearing solves difficult alignment problems, minimises downtime and reduces maintenance hours giving you and your customers a competitive edge.

In addition, when replacement is necessary, Cooper users save valuable time that would otherwise be lost by the time consuming replacement of non-split bearings.

As a global company, we place great emphasis on professional local representation and have an established network of authorized partners and local sales managers to assist you.

A call to our local sales office will be your first step to having the advantage.

Call Cooper now...



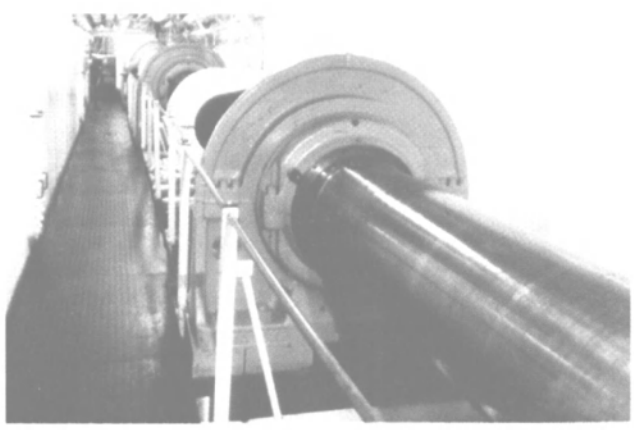
The Cooper marine pillow block with jacking screws solves difficult propulsion shafting alignment problems

...and we'll prove how.

Typical shipboard applications:

- **Propulsion shafting**
- **Bow thrusters**
- **Deck machinery**
- **Rudder stocks**
- **Shipboard conveyors**
- **Fans for inert gas**

Easy access for maintenance and inspection on propulsion shafting gives more uptime and lower maintenance, inspection and replacement costs



Cooper Bearings Group
Wisbech Road, King's Lynn,
Norfolk, PE30 5JX, England.

Telephone +44 (0) 1553 763 447.
Fax +44 (0) 1553 761 113

Web site: cooperbearings.com

Offices and representation worldwide

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Mr. Olof Wadehn
(631) 692-4548

Visit our website at http://www.karlsenner.com
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