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- (E) Pushboats
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January 2002

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Naval Market Signals of Change

SENESCO: The Boatyard Next Door
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Marine Electronics Integration Continues

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Features

18 Entry of Titans Delayed

The push to build ultra large containerships has helped advance a number of marine technologies, but the sour world economy has muted some of the glitter. — by David Tinsley, technical editor

26 U.S. Navy Supplement

Decisions are being made today for the look and consistency of the Navy for the next generation.

34 Your Friendly Boatbuilding Neighbor

Born, in essence, from the collapse of the Cold War, SENESCO continues to carve an ever-widening niche in the barge building business. — by Regina P. Ciardiello, senior editor

36 Integrated Bridge

The push for consolidation has been led by marine electronics manufacturers' integration of components and systems.

41 Bridge of the Future

Transas' Andrey Vorobiev shares his vision for the bridge of tomorrow.

47 RoPax Re-Think

Wartsila offers innovative thinking in the development of machinery for the latest breed of combined RoRo / Passenger vessels.

48 RK280: New MAN B&W Powerhouse

The RK280 enters the market with the lofty claim of "the most powerful and fuel efficient 1,000 rpm diesel engine in the world."



On the Cover

A crew member signals with semaphore flags aboard the USNS Pawcatuck. *Photo Credit: U.S. Navy.* (See U.S. Navy Supplement beginning on page 26).

News

4 Carnival & P&O?

Carnival tries to thwart Royal Caribbean with hostile takeover bid for P&O.

12 New & Notable

Peralta, Costa Atlantica and Superfast XI debut.

23 A New Seastreak

Seastreak America welcomed Seastreak New Jersey to its burgeoning fleet.

24 E-Commerce

OTAL puts \$5M into IT.

42 Australia Report

Ship's Store

Ferliship's New Contracts

54 Buyer's Directory

56 Advertisers Index

57 Classified Ads

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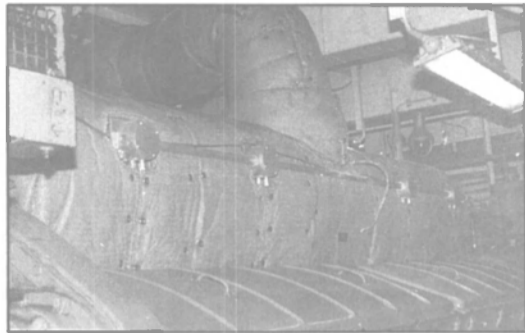
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Competition for Princess Cruises Heats Up With Arison Entry



Power Play: The battle is on for Princess Cruises, as Carnival's CEO, **Micky Arison** (at left), and Royal Caribbean's chairman and CEO, **Richard Fain**, (center), try to woo Princess' CEO **Peter Ratcliffe** and shareholders before they vote on February 14 at Princess' annual shareholders meeting.

Despite the less-than-stellar performance by the cruise industry during the last part of 2001, the industry more than had its fair share of newsmaking events — aside from the September 11 terrorist attacks — which ultimately exposed the frailty of this leisure sector. Beginning with the demise of Renaissance Cruises almost immediately after the attacks, the industry suffered an additional blow in October when American Classic Voyages' (AMCV's) subsidiary U.S. Lines filed Chapter 11 — causing the dream of American cruiseship building to cease before it could even begin.

These events, which were almost reminiscent of the faltering cruise industry of the 1970's, took a backseat this fall when P&O Princess and Royal Caribbean International announced on November 20 their intentions to merge their respective cruise lines into a \$6 billion company. RCCL's Chairman and CEO, **Richard Fain**, and P&O Princess' chief executive **Peter Ratcliffe** shook hands in London proclaiming that they would work to head what will be the world's largest

cruise line — tentatively titled RCP Lines. The new company, which with 41 vessels and 75,000 berths is expected to surpass even **Micky Arison's** powerhouse Carnival Corp., is expected to be up and running by 2003. That is of course if Arison and his executive team are not successful in their hostile takeover bid of P&O Princess.

Exactly one month to the day that P&O Princess and RCCL announced that they would merge, Carnival approached P&O with a \$4.59 billion hostile takeover bid. P&O Princess, which initially rejected Carnival's offer, has now reconsidered and is currently weighing all its options of a possible merger with the "world's largest cruise line."

Despite these new developments, Royal Caribbean still stands firmly on its initial agreement with P&O Princess, according to **Richard Fain**, RCCL's chairman and CEO. Fain, who doesn't seem to be losing sleep over Princess' decision to postpone its key shareholder meeting, released a statement following Carnival's proposal last month confirming his staunch

beliefs of RCP Lines: "I am convinced that the merger we have with P&O Princess will provide both sets of shareholders the greatest long term value going forward, and the P&O Princess shareholders will recognize that the transaction with Royal Caribbean is superior in all respects to the takeover proposal from Carnival."

Originally, a possible merger between Princess and Carnival was considered out of the question by the line's CEO, **Peter Ratcliffe**, because of anti-trust issues that could arise. Ratcliffe also added that he can't even discuss a possible merger with Carnival due to the terms outlined in the merger with RCCL — (Princess cannot hold discussions with another cruise line unless it was deemed that a better offer was made). In addition, Princess also runs the risk of a \$62.5 million break up fee, should the merger with RCCL not go through. However, it was reported that if P&O decided to discuss a possible merger with Carnival that they would not run the risk of the \$62.5 million fee.

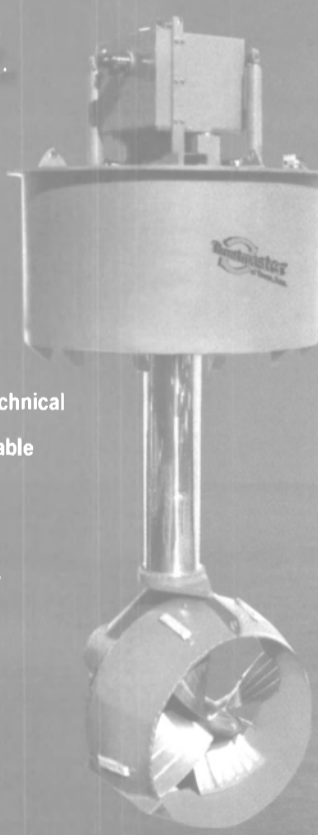
Meanwhile, P&O Princess has set a deadline of January 18 for Carnival to deliver an offer that would surpass that of RCCL's before P&O's shareholders meeting scheduled for February 14.

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Kitchen To Retire From Northrop Grumman



Northrop Grumman Corporation's Ship Systems announced that **Thomas M. Kitchen** will retire later this month as president of the sector's Avondale Operations. Kitchen started his career with Avondale in 1977 as assistant controller and was named president in late 1999.

Dr. **Philip A. Dur**, president of Northrop Grumman's Ship Systems sector, noted Mr. Kitchen's numerous contributions to the company and his many years of service to Avondale. "Tom's contributions to the transition of the Ship Systems organization have been important in our future success," Dr. Dur said.

Dr. Dur said a successor to Kitchen will be named soon. Northrop Grumman Ship Systems, headquartered in Pascagoula, Miss., includes the Ingalls Operations and the Ship Systems Full Service Center, both located in Pascagoula, as well as the Avondale Operations, located in New Orleans and Tallulah, La., and Gulfport, Miss.

Royal Navy Ships To Feature Kelvin Hughes Radars

Kelvin Hughes will supply radar equipment to Marine Electronic Supplies (MES) for three new Royal Navy offshore patrol vessels.

Each of the three River Class patrol vessels, which are being built by Vosper Thornycroft Shipbuilders, will feature two Kelvin Hughes Nucleus3 5000 ARPA X and S band radars as part of navigation and communication package supplied by MES.

The river Class future offshore patrol vessels will measure approximately 262 ft. (79.8 m), and have a speed of 20 knots.

Under an innovative arrangement, the ships will be leased to the Royal Navy for five year, with Vosper Thornycroft taking responsibility for maintenance and support.

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P&O's Oriana Completes Refit At A&P's Southampton Yard

P&O Cruises' Oriana has completed its second refit in A&P Group's Southampton yard. Oriana was in dry-dock from December 1-12, followed by sea trials and returned into service on schedule on December 13 when the ship

departed on her Christmas cruise, with a full compliment of passengers.

The refit works comprised routine ship repair work including the application of International's Intersleek 700 biocide-free fouling-control system to the outer hull.

A&P was the first ship repairer ever to apply this product to a cruise ship when

Star Cruises' Norway visited the yard during 1996.

The Oriana refit represents the fifth consecutive refit of a P&O Cruise vessel by A&P, following earlier successful refits of the Arcadia, Oriana and Victoria (twice).

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Despite the renewed vigor for military activities due to the prolonged commitment to fighting terrorism at home and abroad, it seems that lawmakers are still reticent — via the proposal of a Navy Budget for Fiscal Years '02 and '03 — to spend adequate levels of money to maintain a strong fleet. According to the American Shipbuilding Association (ASA), The Defense Authorization Bill for FY02, that passed both the House and Senate (S.1438) on December 13, authorizes a paltry 5 and 1/7 new naval ships, despite the ASA's contention that 12 ships per year are needed to sustain the 305-ship navy mandated in the 1997 Quadrennial Defense Review. Meanwhile, a draft of the Navy's FY03 budget proposes to buy only five new ships.



While these preliminary numbers are, indeed, not positive news, the prospects of building military and patrol vessels of all shapes and sizes, for all military branches, should brighten considerably in the years to come.

As we go to press with the first issue of 2002, the book on coastal and waterway security in and around the United States is literally being re-written. Cold War notwithstanding, never in our history has the prospect of real damage on U.S. soil been such a reality. New legislation and procedures that will affect all branches of waterway patrols, from local municipalities up through the U.S. Navy, and, undoubtedly, new equipment, from vessels to shoreside technologies, will be procured. As reported in the December 14, 2001 edition of sister-publication **MarineNews**, the Navy and the U.S. Coast Guard, for the first time, teamed together for the patrol of the U.S. coast. Specifically, four Cyclone-Class Navy Patrol Coastal (PC) ships — built by Bollinger Shipyards — were incorporated into the nation's homeland security Operation Noble Eagle, and an additional two PCs were assigned to the Pacific Coast. On one hand this could be a unique reaction for extraordinary times. But if the operation is deemed a success, it could very well provide a blueprint for enhanced waterborne assets deployed for the protection of U.S. ports and shores.

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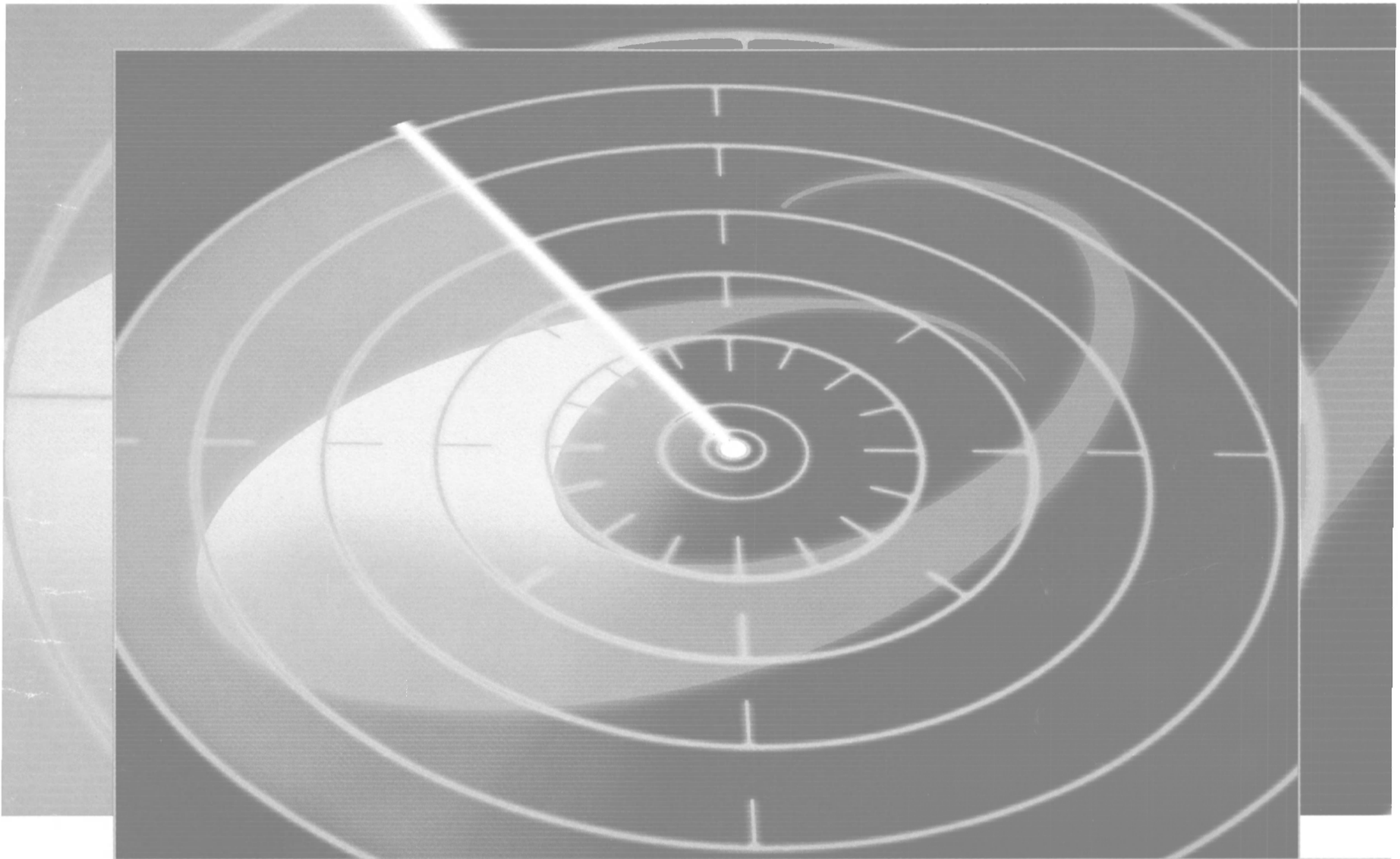
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Chief Executive Officer

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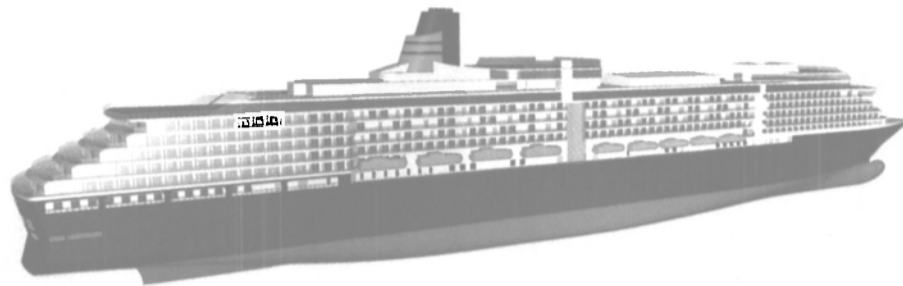
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News

Fincantieri to Build Liner For British Market



Cunard Line's parent company, Carnival Corporation, has signed a letter of intent with Italian shipyard Fincantieri for the construction of a new 1,968-passenger liner to serve the British market. The ship, which will cost approximately \$400 million, will be delivered to Cunard in January 2005, just one year after the launch of the line's much anticipated Queen Mary 2. The order solidifies Cunard's strategic initiative, announced earlier this year, to play a more significant role in the growing British cruise market.

The yet-unnamed vessel will be based in Southampton, and will be built to Panamax standards so it can be deployed on a variety of worldwide itineraries.

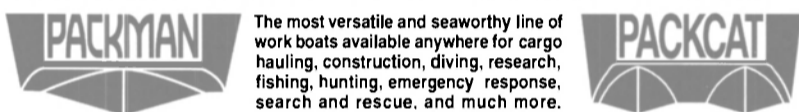
"We are thoroughly committed to expanding our presence in the U.K.," said Pamela Conover, Cunard's president and

COO.

In the tradition of its Cunard forbearers, the new ship will boast a covered promenade deck encircling its entire exterior, a forward-facing observation lounge and a large Lido pool with a retractable magradome for inclement weather. Innovative exterior elevators with glass walls will uniquely tower 10 decks high on both sides of the vessel. A wide range of accommodations will be available, with 67 percent of outside staterooms and suites offering private balconies.

The ship's powerplant will feature low-emission, diesel-electric motors, and the ship also will employ the Azipod propulsion, which enhances operating efficiencies and environmental benefits.

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Captain William G. Schubert Named Maritime Administrator



Captain William G. Schubert was appointed to the position of Maritime Administrator through the U.S. Department of Transportation, unanimously. A former maritime industry consultant and Maritime Administration official, Captain Schubert brings 27 years of professional maritime experience to his new post.

After graduating from the U.S. Merchant Marine Academy in Kings Point, N.Y. in 1974, Captain Schubert sailed as a licensed deck officer with Reynolds Metals Company for 10 years. Between 1984-1986, he worked as Master and installation manager at three offshore

drilling platforms.

He began his 10-year career at the Maritime Administration in 1986 as a Special Assistant to former Maritime Administrator John Gaughan, and from 1990-1995, he served as the agency's Regional Representative for the Southwestern United States.

Prior to his confirmation, Captain Schubert was president of the Houston, Texas-based International Trade and Transportation, Inc., a maritime consulting firm.

Sperry Marine Name Revived

Corporate consolidations have, in the last 10 years, effectively consumed a number of "household" brand names as efforts were made to streamline the acquirer's letterhead. In a reverse, of sorts, Northrop Grumman Corporation said that its marine systems business unit has been renamed Sperry Marine, effective immediately. Formerly Litton Marine, this commercial and defense-related marine electronics business was acquired by Northrop Grumman in its purchase of Litton Industries Inc., last year.

Sperry Marine remains a business unit of the Baltimore, Md.-based Electronic Systems sector of Northrop Grumman.

Chuan HUP Subsidiary Sells Entire Stake In Dredging International

Marine transportation services provider, Chuan Hup Holdings Limited's subsidiary, ACIS Holdings Ltd. has disposed of its entire 10 percent stake in Dredging International Asia Pacific Pte Ltd for \$8.2 million. Chuan Hup estimates the net profit before tax attributable to this sale to be \$3 million. The cash sale of 6.3 million ordinary DIAP shares, representing 10 percent of the total issued share capital of DIAP, was made to Tideway B.V. of the Netherlands. The remaining 90 percent of DIAP is owned by Pacific Dredging Corporation B.V. Both Pacific Dredging and Tideway are wholly-owned subsidiaries of Dredging, Environmental and Marine Engineering N.V., a Belgian hydraulic engineering, dredging and offshore contractor.

Chuan Hup's finance director, **Lim Kwee Siah**, said, "This sale is in keeping with our Group's continuing efforts to focus on our core competencies as a marine transportation service provider. As such, we are divesting our non-core businesses whenever favorable opportunities arise to enhance shareholder value."

Excluding the Group's chairman, Dr. **Tan Cheng Bock** and managing director, **Peh Kwee Chim**, who are non-executive directors of DIAP, no director or substantial shareholder of Chuan Hup has any interest in the transaction.

FGH Announces \$10M in New Contracts

FGH Engineered Products Group, the equipment segment of Friede Goldman Halter, Inc., announced that its AmClyde unit has signed new contracts totaling more than \$10 million with several customers in the international offshore oil and gas sector.

AmClyde will provide engineering and services to Saipem (ENI Group) of Italy as it relocates a 2,400-ton AmClyde crane to a new vessel. AmClyde also has a contract from Horizon Offshore Contractors to upgrade the lifting capacity on their existing AmClyde Model 52 marine crane by more than 50 percent.

In other developments, AmClyde was awarded a contract from CNOOC (China National Offshore Oil Corporation) to provide aftermarket support services for their new 3,800-ton AmClyde marine crane.

The company will seek court approval to perform on the CNOOC aftermarket services contract. AmClyde-Norson Engineering, the company's pipelay and cable lay equipment specialist of Glasgow, Scotland, received a contract from AIOC (Azerbaijan International Operating Company) to provide a template lev-

eling system.

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Aker Finnyards Close To Delivering \$15M Cruise Ferry

Aker Finnyards is building for the Estonian Hansatee Group, trading as Tallink, a cruise ferry for the Gulf of Finland traffic. On December 14, 2001, the vessel's valves were opened enabling it to float in the yard's graving dock. Before being launched, the cruise ferry was christened as **Romanika** by **Nele Helen Pant**, who is the daughter of **Eve Pant**, Hansatee Supervisory Board Member. The vessel, which is to be delivered in May 2002 will be Estonia's biggest cruise ferry, and is expected to open a new era in the Baltic Sea passenger traffic. With seating capacity for 3,160 in the restaurants and lobbies, along with the 727 cabins including 2,178 beds, the interiors will be of cruise liner standard. The vessel has a length of 652 ft. (198.7 m), a beam of 95 ft. (28.9 m) and gross tonnage of 40,000. Propulsion by four diesel engines totaling 26,240 kW will provide a service speed of 22 knots.

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NASSCO Awarded \$5.1M Contract

National Steel and Shipbuilding Company (NASSCO), has received a contract valued at \$5.1 million, with options up to \$20.2 million, for the six-month extended dry-docking and maintenance availability of USS Antietam (CG-54), a Ticonderoga-class Aegis guided missile cruiser homeported in San Diego.

The initial award provides funds to begin advance planning for the Antietam maintenance, repair and alteration work package.

Actual work on the ship will begin in March 2002 and is to be completed by September 2002. Major work items include the drydocking, plus alterations to convert the ship to all-electric auxiliaries and to install the Navy's Smart Ship electronic control and automation systems. This is the second complex refurbishment of an Aegis guided missile cruiser performed by NASSCO and the third installation of the Smart Ship systems equipment. The company completed a \$30-million extended maintenance, repair and alteration availability on USS Mobile Bay (CG-53) in June 2001 and has previously installed Smart Ship on USS Valley Forge (CG-50).

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IN THE UNITED STATES BANKRUPTCY COURT
FOR THE SOUTHERN DISTRICT OF MISSISSIPPI
(Southern Division)

| | |
|---|---|
| IN RE: | Jointly Administered Under CASE NO. 01-52173 (SEG) |
| FRIEDE GOLDMAN HALTER, INC. | 01-52064 (SEG) |
| FRIEDE GOLDMAN DELAWARE, INC. | 01-52175 (SEG) |
| FRIEDE & GOLDMAN, LTD. | 01-52176 (SEG) |
| BRISSENEAU & LOTZ MARINE USA, INC. | 01-52177 (SEG) |
| FRIEDE GOLDMAN OFFSHORE, INC. | 01-52178 (SEG) |
| WORLD RIG LEASING COMPANY | 01-52179 (SEG) |
| HALTER MARINE, INC. | 01-52180 (SEG) |
| GULF COAST FABRICATION, INC. | 01-52181 (SEG) |
| HALTER MARINE GULFPORT, INC. | 01-52182 (SEG) |
| HALTER MARINE SERVICES, INC. | 01-52183 (SEG) |
| HALTER MARINE, INC. | 01-52184 (SEG) |
| HALTER MARINE PASCAGOULA, INC. | 01-52185 (SEG) |
| FRIEDE GOLDMAN HALTER ENGINEERED PRODUCTS GROUP, INC. | 01-52186 (SEG) |
| UTILITY STEEL FABRICATION, INC. | 01-52187 (SEG) |
| FRITZ CULVER, INC. | 01-52188 (SEG) |
| AMCLYDE ENGINEERED PRODUCTS COMPANY, INC. | 01-52189 (SEG) |
| AMCANE COMPANY | 01-52190 (SEG) |
| MARITIME HOLDINGS, INC. | 01-52191 (SEG) |
| TDI-ORANGE, L.L.C. | 01-52192 (SEG) |
| TDI-HALTER, L.L.C. | 01-52193 (SEG) |
| FRIEDE GOLDMAN OFFSHORE TEXAS LIMITED PARTNERSHIP | 01-52194 (SEG) |
| TDI-ORANGE LIMITED PARTNERSHIP | 01-52195 (SEG) |
| BLUDWORTH BOND HOLDING, INC. | 01-52196 (SEG) |
| BLUDWORTH BOND LIMITED PARTNERSHIP | 01-52197 (SEG) |
| BLUDWORTH BOND L.L.C. | 01-52198 (SEG) |
| GREYNA MACHINE & IRON WORKS L.L.C. | 01-52199 (SEG) |
| HALTER GULF REPAIR, INC. | 01-52200 (SEG) |
| EQUITABLE SHIPYARDS, L.L.C. | 01-52201 (SEG) |
| HALTER MARINE PANAMA CITY, INC. | 01-52202 (SEG) |
| HALTER YACHTS, INC. | 01-52203 (SEG) |
| MARINE CLEANING, L.L.C. | 01-53003 (SEG) |
| AMCANE INTERNATIONAL, INC. | 01-53004 (SEG) |
| SABRE PERSONNEL ASSOCIATES, INC. | 01-53005 (SEG) |
| HALTER-CALCASIEU, L.L.C. | 01-53005 (SEG) |

NOTICE OF DEADLINE FOR FILING PROOFS OF CLAIM AGAINST FRIEDE GOLDMAN HALTER, INC. AND THE ABOVE LISTED JOINTLY ADMINISTERED DEBTORS

TO ALL CREDITORS AND EQUITY INTEREST HOLDERS OF FRIEDE GOLDMAN HALTER, INC. AND THE ABOVE-LISTED JOINTLY ADMINISTERED DEBTORS:

PLEASE TAKE NOTICE that the Court has set a deadline for filing proofs of claim of February 28, 2002 at 4:00 p.m., Central Standard time (the "Bar Date") in the Debtors' cases. IF YOU ARE REQUIRED TO FILE A PROOF OF CLAIM BUT DO NOT DO SO IN THE MANNER AND BEFORE THE TIME PRESCRIBED, THE BANKRUPTCY COURT MAY, UPON MOTION OF THE DEBTORS, DISALLOW YOUR CLAIM(S) AS AGAINST THE DEBTOR(S) ESTATE(S). IF THE BANKRUPTCY COURT DISALLOWS YOUR CLAIM(S) AGAINST THE DEBTOR(S) ESTATE(S), YOU WILL NOT BE ENTITLED TO RECEIVE DISTRIBUTION FROM THE DEBTOR(S) BANKRUPTCY ESTATE(S) ON ACCOUNT THEREOF.

1. Who Must File:

You must file a proof of claim by the Bar Date if you have: A CLAIM AS DEFINED IN SECTION 101(4) OF THE BANKRUPTCY CODE AGAINST ONE OR MORE OF THE DEBTORS ARISING BEFORE April 20, 2001, or (a) in the case of Friede Goldman Halter, Inc., April 19, 2001; (b) in the case of Friede Goldman Delaware, Inc., April 16, 2001; and (c) in the cases of Amcane International, Inc., Sabre Personnel Associates, Inc. and Halter-Calcasieu, L.L.C., June 1, 2001, the respective dates of the Debtors' chapter 11 filings. If your claim was not listed on the Debtors' schedules of liabilities filed in the chapter 11 cases or was listed therein as an unliquidated, contingent or disputed liability, you must file a proof of claim. HOWEVER, IF you have a claim of the type described in Sections 502(g), (h), or (i) of the Bankruptcy Code, the deadline for filing your proof of such claim is the later of (a) the Bar Date; or (b) 30 days after occurrence of the event giving rise to such claim (i.e., entry of the order authorizing rejection of an executory contract or of a judgment granting to the Debtor's estate the recovery of money or property or avoiding the transfer of an interest, or the accrual of a tax claim of the type described in Section 502(i) of the Bankruptcy Code). A creditor who desires to rely on the Debtors' schedules of creditors has the responsibility for determining that the claim is scheduled accurately.

2. Who Need Not File:

You need not file a proof of claim or a proof of equity interest if you have only: AN EQUITY INTEREST IN FRIEDE GOLDMAN HALTER, INC. ("FGH"). The Court will separately set a record date for establishing the holders of equity interests in FGH for purposes of voting, if necessary, on the Debtors' plan of reorganization. As used herein, "equity interest" means any share of common stock or other instrument evidencing an ownership interest in FGH, whether or not transferable, and any option, warrant or right, contractual or otherwise, to acquire any such interest.

3. When and Where to File:

The deadline established for filing a proof of claim is 4:00 p.m. Central Standard time on February 28, 2002. A proof of claim should be filed at the following address:

| | |
|---|--|
| IF BY MAIL TO: | IF BY HAND OR OVERNIGHT DELIVERY TO: |
| FRIEDE GOLDMAN HALTER CLAIMS PROCESSING c/o Poorman-Douglas Corporation P.O. BOX 4390 Portland, Oregon 97208-4390 | FRIEDE GOLDMAN HALTER CLAIMS PROCESSING c/o Poorman-Douglas Corporation 10300 SW Allen Boulevard Beaverton, Oregon 97005 |

4. What to File:

PLEASE USE THE FORM ATTACHED TO THIS NOTICE OR A PROOF OF CLAIM FORM CONFORMING SUBSTANTIALLY TO OFFICIAL BANKRUPTCY FORM NO. 10. YOU SHOULD ATTACH TO THE CLAIM FORM COPIES OF SUPPORTING DOCUMENTS.

5. Duplicate Notices:

You may inadvertently receive multiple copies of this notice together with the form Proof of Claim. Only one Proof of Claim should be filed for each claim asserted. Multiple proofs should not be filed documenting the same claim. If you have already filed a proof of claim in these cases, you do not need to file another one.

Dated this 14th day of December, 2001.

FRIEDE GOLDMAN HALTER, INC., et al.

By Their Attorneys
ANDREWS & KURTH, MAYOR, DAY, CALDWELL & KEETON, L.L.P.

By Douglas G. Walter
Douglas G. Walter

OF COUNSEL:

| | |
|---|---|
| HUGH RAY (Texas Bar #16611000) | JOHN G. CORLEW (MSB #6526) |
| JOHN J. SPARACINO (Texas Bar #18873700) | J. FRED SPENCER, JR. (MSB #7736) |
| DOUGLAS G. WALTER (New York Bar #DW5817) | WATKINS & EAGER PLLC Suite 300, 400 East Capitol Street (39201) Post Office Box 650 (39205) Jackson, Mississippi Telephone: (601) 948-6470 |
| ANDREWS & KURTH, MAYOR, DAY, CALDWELL & KEETON, L.L.P. 600 Travis, Suite 4200 Houston, Texas 77002 Telephone: (713) 220-4200 Telecopy: (713) 220-4285 | Attorneys for the Debtors |
| Attorneys for the Debtors | |

ACBL and MBLX Create BargeLink

American Commercial Barge Line Company (ACBL) and MBLX, Inc. have formed BargeLink, a joint venture company providing river barge logistics, barge brokering, electronic rate requests and tracking services for full barge load cargoes. Based in the New Orleans, La. offices of MBLX, BargeLink supplies a broad range of barge-related services, including ocean transportation, customs clearance, discharge of vessels, unloading of barges, warehousing, distribution, and truck/rail deliveries.

The joint venture offers domestic and international shippers the combination of MBLX's logistics expertise and advanced web-based tracking systems with the unmatched coverage offered by ACBL's extensive inventory of boats, barges and fleeting services. With these combined strengths, BargeLink can design and implement the best conventional or customized transportation packages to maximize a customer's shipping opportunities.

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Leica To Supply DGPS For Hellenic Navy Gunboats

Leica Marine GPS has won orders to supply high-precision marine DGPS receivers for four new Hellenic Navy gunboats, with options for two additional gunboats. Constructed at the Hellenic

Shipyard Co., in Skaramanga, the first vessel is scheduled for delivery in mid-2002. Each of the gunboats, which will be fitted with a Leica MX 420/8 DGPS receiver, will be used as the primary navigation aid. The MX 420/8 will be interfaced with other bridge equipment, including the BridgeMaster E naviga-

tion radars, DSC radio, central clock system and gyrocompass.

The equipment will be installed and commissioned by Radio Marine Electronics, the Greek sales and service agent for Leica Marine GPS.

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Saab TransponderTech Wins Order For the First AIS

Following an order by STN-Atlas for a VTS system in Kvitsøy, Norway, earlier this year, Saab TransponderTech has now also won an order for several R30 AIS Base Stations for the VTS system in Huangha and Majisuan in China. With these orders, Saab TransponderTech establishes itself as the leading Automatic Identification System (AIS) supplier in the Far East.

In Majisuan, the Vessel Traffic Service (VTS) system is already under construction and will allow the important ability to identify, track and serve all commercial vessels in the area carrying AIS-equipment. Marine Safety Agency (MSA) is herewith shouldering an important responsibility for the implementation of the new AIS-rules, taking effect on July 1, 2002.

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Stolt Offshore Announces \$110 Million Contract Award

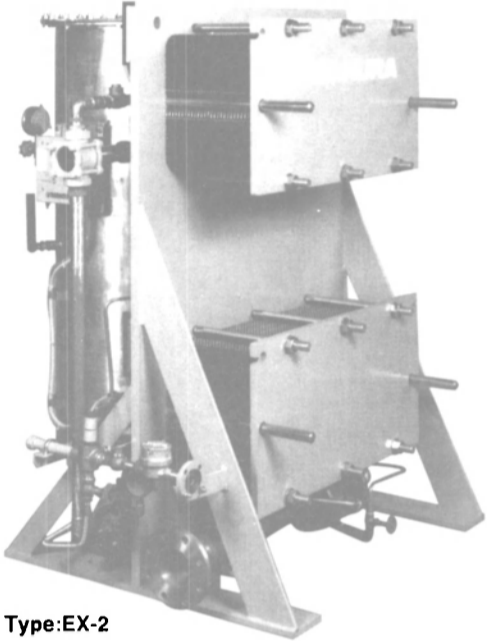
Stolt Offshore S.A. has secured a contract from Shell Petroleum Development Company (SPDC) in Nigeria for the Forcados/Yokri offshore development in the Niger Delta. The \$245 million contract has been awarded to a consortium of Stolt Offshore and the Nigerian company Suffolk which is part of the Adamac group. The Stolt Offshore share of the contract is \$110 million.

The Forcados Yokri project includes the expansion and refurbishment of existing shallow water oil and gas production and process facilities and the fabrication and the installation of a new production platform with a 250 ton jacket and 1,300 ton topsides. Stolt Offshore is responsible for all of the engineering, procurement and fabrication work while our partner will be doing most of the installation of some 220 km of flowlines and umbilicals in a maximum water depth of 15 m.

A new pipeline from the Forcados Yokri development will take gas, that is currently being flared, into the Offshore Gas Gathering System that we are installing next year under a separate contract, also in partnership with Adamac. Paragon Litwin, Stolt Offshore's engineering company in Paris, will carry out 150,000 hours of engineering work for the project, the largest item being the detailed design of the production platform and topsides.

The production platform and a number of jacket-mounted clusters, bridges and decks will be fabricated at the Stolt Offshore Globestar yard at Warri requiring some 600,000 man hours of work.

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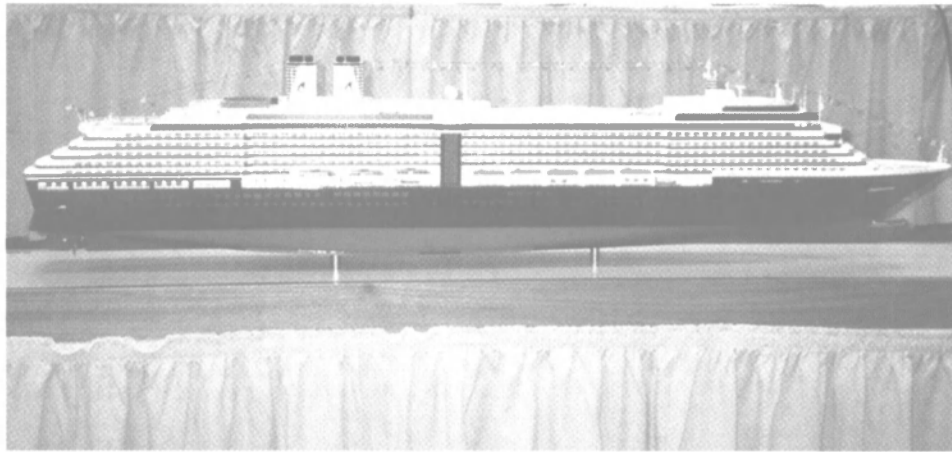
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Holland America's two ship contract was announced at last year's Sea Trade Convention in Miami Beach, Fla. during March 2001.

HAL Details Delivery of New Ships

Holland America Line (HAL) announced a revised delivery schedule of ships from Fincantieri-Cantieri Navali Italiani S.p.A.

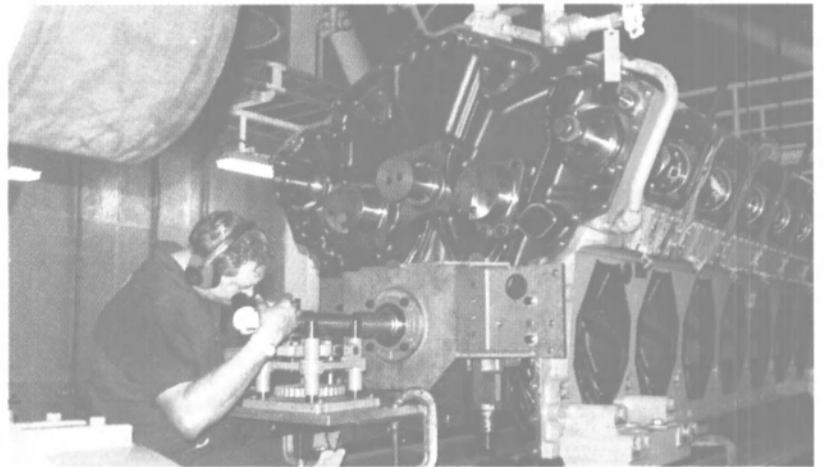
As previously announced, the first of the vessels, Holland America Line's 951-ft. (289,8-m) 1,848 passenger ms Zuiderdam will be delivered Nov. 15, 2002 and sail on its maiden voyage Dec. 14, 2002, on a seven-day Caribbean cruise from Ft. Lauderdale.

Holland America Line's new ms Oosterdam, is scheduled for delivery in June 2003; two other vessels, currently unnamed, are scheduled for delivery to Holland America Line in April 2004 and October 2005 — a fifth ship, a newbuild option, if exercised, will be delivered in May 2006. A vessel delivery time previously planned for HAL in January 2005 will be assigned to a sister company, Cunard Line. At 85,000 tons, HAL's "Project Vista" series of premium ships are the largest ever built for the company, and feature innovative exterior elevators. Located on both sides of the vessel and vertically transversing 10 decks, the elevators provide passengers with panoramic sea views. In addition to its Azipod propulsion system, the vessels' propulsion includes a full-scale diesel-electric power plant, backed up by a gas turbine as an additional power source, giving the vessel the capability to operate on either diesel or gas turbine power. The ships also will use the Azipod propulsion system.

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Nichols Brothers Delivers Catamaran



The 315-passenger ferry M/V Peralta was delivered by Nichols Bros. Boat Builders of Whidbey Island, Wash.

Nichols Brothers Boat Builders, Inc., of Whidbey Island, Wash., delivered a Cummins-powered, 112-ft. (34.2 m) vessel for service between Alameda, Oakland, and San Francisco this past November. The 315-passenger catamaran, M/V Peralta, will be operated by the Alameda/Oakland Ferry Service, with the Blue and Gold Fleet providing maintenance and engineering services. The vessel was designed by International Catamaran Designs of Sydney, Australia. The new catamaran is powered by Cummins KTA 50 M2 1,600-hp engines, which drive propellers through ZF Marine BW460-1 gears; equipment was provided by Cummins Northwest. Propellers are five-bladed, 46-in. diameter, stainless steel equipment from Rolls-Royce. Matthews Marine supplied the steering system and

Reynolds Aluminum Supply Company was the aluminum vendor.

Electronic equipment includes a Ritchie Model FD-500-B compass; Furuno FR 8111 D6 radar, FR 1525 Mk III D6 radar, and GP80D Differential GPS; and Raytheon Ray 430 loudhailer.

Current Nichols Brothers projects include the recently awarded contract to build a Robert Allen -designed fire-boat for the Port of Los Angeles. The vessel, dedicated in ceremonies at the Port of Oakland in November, is named for Luis Peralta who retired in 1820 after 40 years in the Spanish Army. He received a land grant of 44,000 acres in the East Bay. This grant now includes the communities of Albany, Berkeley, Oakland, Alameda, Piedmont, and part of San Leandro. The hacienda he established in the Fruitvale section of Oakland was the first non-Indian settlement in the East Bay.

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Launching, Double Christening At Flender Werft

On December 7, 2001, two ferries were christened and one was launched by German Shipyard Flender Werft. **Katerina Panagopulos**, who is the National Ambassador of Greece to the Council of Europe for Sports, Tolerance and Fairplay, and is also the wife of **Pericles Panagopulos**, Chairman of Attica Enterprises S.A. christened the RoRo Pax Ferry Superfast XI. Subsequently, **Julie McLeish**, wife of the former First Minister of Scotland Rt. Hon **Henry McLeish** MSP, named the sister vessel "Superfast XII" prior to its launching. Having the new-building number 682 and 683, the ships are being built for the Greek-based company Attica Enterprises S.A.

The fast twin-screw vessels, which were launched on August 3, developed by the yard are built as per the Rules and Regulations and under supervision of the classification society American Bureau of Shipping (ABS). The ships can carry 1,550 passengers, and offer 2,000 lane meters for RoRo cargo as well as space for about 100 other vehicles. Loading and unloading of the ship is done via three stern ramps, and traveling stairs and elevators facilitate access of the passengers to the passenger decks. The ships are propelled by four Wartsila main engines having an output of totally 48,000 kW via double gear onto two CP propeller systems. In order to reduce exhaust gas emissions, the main engines are equipped with a water injection device. Service speed of the ships will be nearly 30 knots, while full speed will be more than 31 knots. Two semi-balanced rudders as well as two bowthrusters and one stern thruster ensure optimum maneuverability. The ships' optimized seakeeping characteristics are enhanced by a heeling stabilizer system and additional fin stabilizers.



Kvaerner Delivers Carnival Pride

Carnival Pride, the third cruise ship in a series of new Panama-Max size cruise ships under construction for Carnival Corp was delivered to the cruise line last month at the Kvaerner Masa-Yards' Helsinki shipyard. The vessel will be operated by Carnival Cruise Lines and Costa Crociere.



The first ship in the series, Costa Atlantica was delivered in June 2000 and the second ship, MS Carnival Spirit, in April this year.

Production, which took less than two years, began in winter 2000, and the assembly of the hull began in the covered newbuilding dock the following summer. Carnival Pride was launched in late March this year, after which the cruise ship was transferred to the outfitting quay in front of the yard's outfitting terminal; successful sea trials followed this past October. Carnival Pride has a diesel-electric machinery, consisting of six Wartsila 9L46D diesel engines, with a total power of 62,370 kW. The propulsion consists of two electric Azipod propulsion units, with a power of 17.6 MW each, with a service speed of 22 knots.

Measuring 960 ft. (292.5 m), with a breadth of 127 ft. (38.8 m) and a draft at dwl of 25 ft. (7.8 m), the vessel carries a total of 2,680 passengers in 1,062 staterooms as well as 961 crew.

The Panamanian-flagged Carnival Pride is classified under Italy's RINA specifications — fulfilling the society's new green star environmental standard. Consisting of two voluntary RINA class notations, Clean Sea and Clean Air, these notations set strict requirements on the ship's design and operation in order to protect the environment. From a safety standpoint, the vessel complies with standards that are more advanced than those applicable to the date of the actual keel laying. The vessel has been built and classified in compliance with not only the existing SOLAS requirements, but also the amendments already approved by the IMO Maritime Safety Committee and known at the moment the contract is signed.

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Main Particulars — Carnival Pride

| | |
|--------------------------|---|
| Flag | Panama |
| Classification | RINA |
| Length, (o.a.) | 960 ft. (292.5 m) |
| Length, (cwl.) | 865 ft. (263.6 m) |
| Breadth, (max.) | 127 ft. (38.8 m) |
| Draft | 25 ft. (7.8 m) |
| Passenger capacity, max. | 2,680 |
| Crew capacity | 961 |
| Speed, service | 22 knots |
| Speed, maximum | 24 knots |
| Machinery | Diesel-electric power station Azipod propulsion |
| Main engines | 6 x Wartsila 9L46D, 10,395 kW |
| Propulsion | 2 x 17.6 MW Azipod |

Klyne Tugs Orders AHTS From Yantai Raffles



The contract was signed on November 23, 2001 in Yantai by **Carl Beare**, managing director of Klyne Tugs; and **Brian Chang**, chairman/CEO of Yantai Raffles Shipyard.

Yantai Raffles Shipyard announced that Klyne Tugs (Lowestoft) Limited, U.K. has placed an order with the shipyard to build a repeat UT719-T 220 ft. (67m) Anchor Handling Towing Supply Vessel.

The contract was signed on November 23, 2001 in Yantai by **Carl Beare**, managing director of Klyne Tugs and **Brian Chang**, Chairman/CEO of Yantai Raffles Shipyard. Yantai Raffles Shipyard is currently building 20 vessels for various international owners. The vessels include some of the largest DP2 Anchor Handling Towing Supply Vessels for Tidewater Marine; UT 719-T Anchor Handling Towing Supply Vessels for Klyne Tugs (Lowestoft) Ltd.; Maintenance Support Vessel for SMIT Salvor BV; a FSO (Floating Storage Offloading Vessel) for Total-Thailand/MODEC Japan Inc.; and an External Turret for FMC/SOFEC Inc. The yard, which will have a 10,000 work force within three years including subcontractors, has a 1,410 x 394 ft. (430-m x 120-m) dry dock, a 1,214 ft. (370-m)-gantry crane.

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S G Brown Launches Lightweight Marine VDR



A lightweight Voyage Data Recorder (VDR) has been launched by the S G Brown Division of TSS (U.K.) Ltd. which is part of the Vosper Thornycroft group.

The new VDR is reportedly the lightest and most compact VDR on the market. Its design has set a new standard for the industry and is expected to prove particularly attractive to fast ferry operators and owners of smaller ships subject to the new IMO regulations.

Despite its compact size, the Ocean 2000 VDR offers the same range of benefits and performance specifications as the standard (larger) Ocean 3000 VDR

launched by S G Brown earlier this year. It is fully compliant with IMO resolution A861(20) and the revised SOLAS regulations that came into force on July 1. It features a central data hub with optional flat screen display which will enable the VDR to be accommodated more easily on vessels where space may be limited.

The new VDR interfaces with the full

spectrum of bridge, navigation and engine room equipment aboard the ship and contains two 20Gb removable hard drives that provide a huge storage capacity capable of recording data continuously for up to four months. The Ocean 2000 is supplied with a Hardened Voyage Recorder (HVR) capsule. This contains a 1.5 GB solid state memory that automatically retains the last 12 hours of

voyage data in a protective capsule within the HVR. It is fitted with an underwater locator beacon that remains active for 30 days at depths down to 6,000 m so that the capsule can be recovered by divers or by remotely operated vehicle in the event of a sinking. Operators can install a float-free capsule if they prefer.

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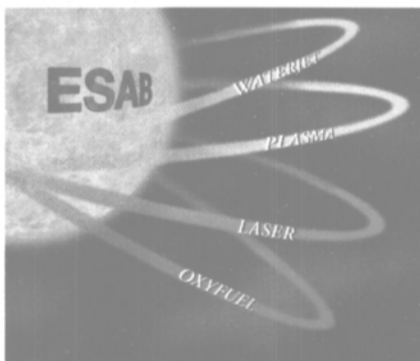


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New Supplyship Contract For Aker Brattvaag Group

Brattvaag Skipsverft AS, a member of the Aker Brattvaag Group, has signed a \$14.6 million contract with Waveney Shipping Ltd. for the construction of a Type UT 755L platform supply vessel.

With design and equipment worth approximately \$4.4 million to be supplied by Rolls-Royce, the hull will be built in Romania and the completed vessel is scheduled for delivery in April 2003.

The vessel will be an enlarged version of the well-known UT 755 design for satisfying the general demands of the offshore industry, such as transport of pipes, cement, different types of fluid and equipment and cargo.

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Keppel FELS Signs \$77M in Contracts With Diamond

Keppel FELS Ltd. has secured contracts worth a total of \$77 million from Diamond Offshore Drilling Inc. for the upgrades of a semi-submersible, Ocean Rover and a jack-up rig, Ocean Tower. This is subsequent to a \$34 million contract from Diamond Offshore for the upgrading of four jack-up rigs in July this year.

These contracts were secured as a result of KFELS' high quality services and the outstanding work it is performing on Ocean Baroness, presently in the final stages of an extremely challenging deepwater upgrade in KFELS' Pioneer Yard in Singapore.

KFELS has been able to provide innovative solutions on Ocean Baroness, a Victory-class semi-submersible which is being enhanced with fifth generation capabilities, allowing it to work in challenging deepwater of up to 6,500 ft and the capability to handle 5,500 tons operating variable deck load.

In the newly awarded contract, Ocean Rover will undergo an upgrade with specifications similar to the enhanced Ocean Baroness.

The project is expected to encompass approximately 18 months.

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Iridium Predicts Constellation To Live Through Mid-2010

Iridium Satellite LLC predicts its constellation of satellites will retain mission functionality into the next decade, based on internal analyses of satellite and operational data, as well as an external study by an independent company.

Iridium contracted with The Aerospace Corporation of El Segundo, Calif., to conduct the study, based on several years of actual on-orbit reliability data

January, 2002

provided by Iridium.

The analysis indicated that the Iridium constellation would likely remain viable into the next decade.

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New Board at Kvaerner Masa-Yards

A new board has been elected at Kvaerner Masa-Yards, Inc. with Hans Petter Finne, executive vice president appointed as the chairman of the board. The members of the board include:

Jorma Eloranta, president and CEO of Kvaerner Masa-Yards; Finn Berg-Jacobsen, CFO of Kvaerner ASA; and Richard Petrie, executive vice president of Kvaerner Investments. Arne Ukkola and Jorma Malinen continue as representatives of the personnel.

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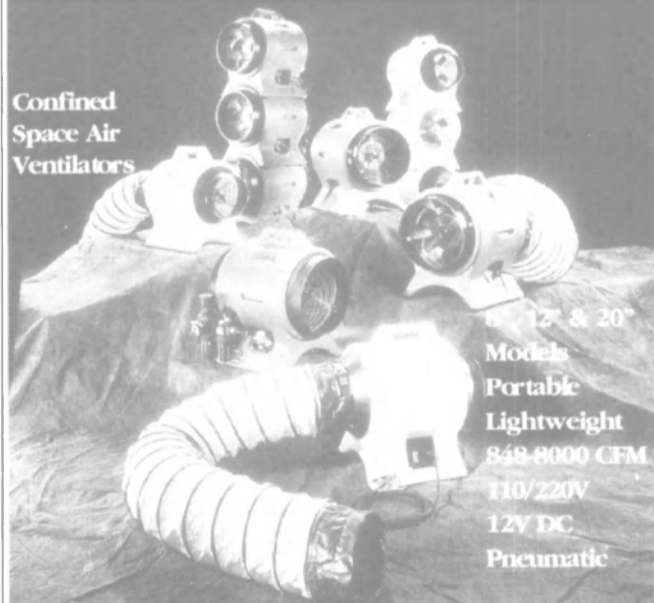
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MariTEL Offers Total Telecommunications Solution

MariTEL, "The Marine Telephone Company," is now a one-stop shop for all marine telecommunications needs. An official dealer of Inmarsat, Iridium, MarineSat/LandSat, Globalstar satellite services, MariTEL offers commercial

operators a full suite of telecommunications services including satellite and the new Marine Wireless VHF Radiotelephone Network. In 2002, the company will offer commercial operators total land and sea telecommunication solutions that integrate MariTEL's wireless services with traditional land-based "wired" services. This includes domes-

tic long distance calling, toll free calling, calling cards, prepaid calling cards, and customized telephone networks. For example, vessel operation centers will be able to dial an office extension to reach a vessel, much like dialing an extension down the hall.

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Leica Marine Will Supply AIS For BP Tankers

Leica Marine GPS has received orders from high-seas dealer Seacoast Electronics, Jacksonville, Fla., to supply automatic identification systems (AIS) for three new tankers under construction for British Petroleum at the National Steel and Shipbuilding Company (NASSCO) in San Diego, Calif.

Each of the vessels will be fitted with an integrated DGPS/AIS system meeting the International Maritime Organization (IMO) carriage requirements for shipboard AIS. The AIS equipment will permit the ships to exchange vital identification and navigation data automatically with other AIS-equipped ships and coastal stations via VHF radio channels.

The three 185,000 dwt tankers, which will measure 942 ft., are being built for BP at NASSCO to transport oil from Valdez, Ala., to refineries on the U.S. West Coast. Scheduled for deliveries beginning in 2003, they are being fitted with the latest navigation technology to ensure safe operation in environmentally sensitive waters, and each has a design draft of 62 ft. (18.8 m) and operates at a speed of 15.3 knots with cargo capacity of 1.3 million barrels of oil.

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Bollinger Promotes Fanguy, McDonough

Bollinger Shipyards, Inc., has promoted two senior department heads at its headquarters in Lockport, La. **Dennis Fanguy** has been appointed vice president, Engineering; and **Robert McDonough** has been named vice president and general manager of Bollinger's New Construction Division at Lockport.

During his tenure at Bollinger, Fanguy has been responsible for the design of 49 Island Class patrol boats for the U.S. Coast Guard, design modifications in the last 12 of the series, the design of supply boats, lift boats a deck barge and 117-ft. (35.6-m) ocean-going tugs. He was also responsible for the entire design of the 13 U.S. Navy fast patrol boats. In McDonough's new role, he is not only managing new construction at Lockport where all of the Coast Guard's boats are built, he also oversees material control, maintenance and program management.

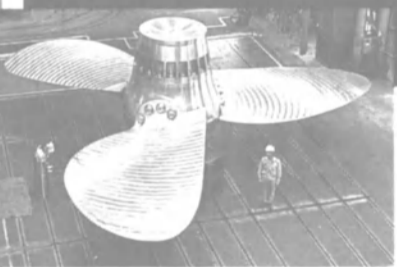
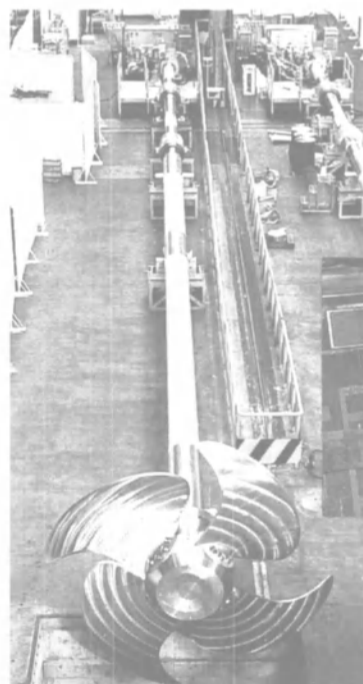
El Paso, Cal Dive Will Construct Anadarko's Unit

El Paso Energy Partners, L.P. and Cal Dive International, Inc. have signed a letter of intent to form a 50/50 venture to construct, install, and own a deepwater production hub platform and associated facilities primarily for Anadarko Petroleum Corporation's Marco Polo field



IN PURSUIT OF MANOEUVRABILITY

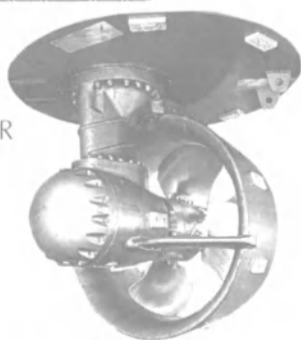
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discovery at Green Canyon 608 in the Gulf of Mexico. The companies anticipate that the facilities will be completed and online in 2004.

The production hub platform will be installed in 4,300 ft. of water and has been designed to process 100,000 barrels of oil per day and 250 million cu. ft. of natural gas per day. Anadarko will have rights to capacity of 50,000 barrels of oil per day and 150 million cubic ft. of gas per day. The remaining capacity will be marketed for additional Anadarko and other area discoveries.

Water Weights Provides Unique Crane Approach



For the past 25 years Water Weights, as part of the IMES Group has been supplying products and services to the crane industry worldwide. Building on this experience,

the company is able to design and build user-friendly Crane Load Systems of top quality. The unique approach allows cost effective systems to not only be reliable, but also easy to install, calibrate and maintain.

Water Weights has made breakthroughs in state of the art digital electronics, as it is no longer necessary to load and unload a crane many times in order to set all of the system parameters. All the user needs to do is set zero, with no load on the crane, and then load to capacity and you have completed the entire calibration procedure. All other system parameters are then digitally entered on the internal or external display, including multiple load limits and units of measure.

Radio telemetry interface between the trolley/winch mounted electronics and the crane operator, not only allows for greater application options, but also in many cases, actually cuts installation costs to the point that it is the lower cost option versus hard-wired systems.

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Rodriguez Cantieri Navali Fast Ferry Completes First Season

As has previously been reported, the 377-ft. (115-m), 40 knot, all aluminum TMV 115 monohull fast ferry Federico Garcia Lorca built at Rodriguez Cantieri Navali's Pietra Ligure shipyard in Italy was delivered to its owners Balearia Eurolineas Maritimas on June 22, 2001. The vessel immediately entered service on June 25 and operates between Dania on the Spanish mainland to the Balearic

Islands of Majorca and Ibiza.

Federico Garcia Lorca, which entered service on June 25, up until November 6, did not miss a single trip due to either mechanical problems or adverse weather conditions despite experiencing Beaufort force 7 conditions that required other high-speed craft to remain in port.

During the peak season, i.e. between July and September, the vessel transported approximately 136,000 passengers and 39,000 cars.

The vesse, which is currently in Genoa, Italy is undergoing scheduled end of season service and maintenance under the direction of Rodriguez. It was expected to be back in service in December 2001.

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Pasha Announces New Corporate Entity

George W. Pasha, III, chairman and CEO of The Pasha Group, recently announced that the company successfully concluded negotiations with Companhia Vale do Rio Doce (CVRD) for the purchase of CVRD's partnership shares in the Los Angeles joint venture known as Rio Doce Pasha Terminal, L.P. (RDP)

The new company, called Pasha Stevedoring & Terminals L.P. (PST), is now a wholly owned subsidiary of The Pasha Group. PST operates the only omni breakbulk and container terminal in the Port of Los Angeles, Wilmington Berths 143-146 and 174-181, as well as Wilm-

ington Berths 154-155, San Pedro Berths 87-89, and Outer Harbor Berths 49-53.

In addition to stevedore and terminal services for a variety of breakbulk, rail and container customers, PST provides

ancillary services such as reefer and chassis M&R, sensitive cargo warehousing, trucking and logistics management.

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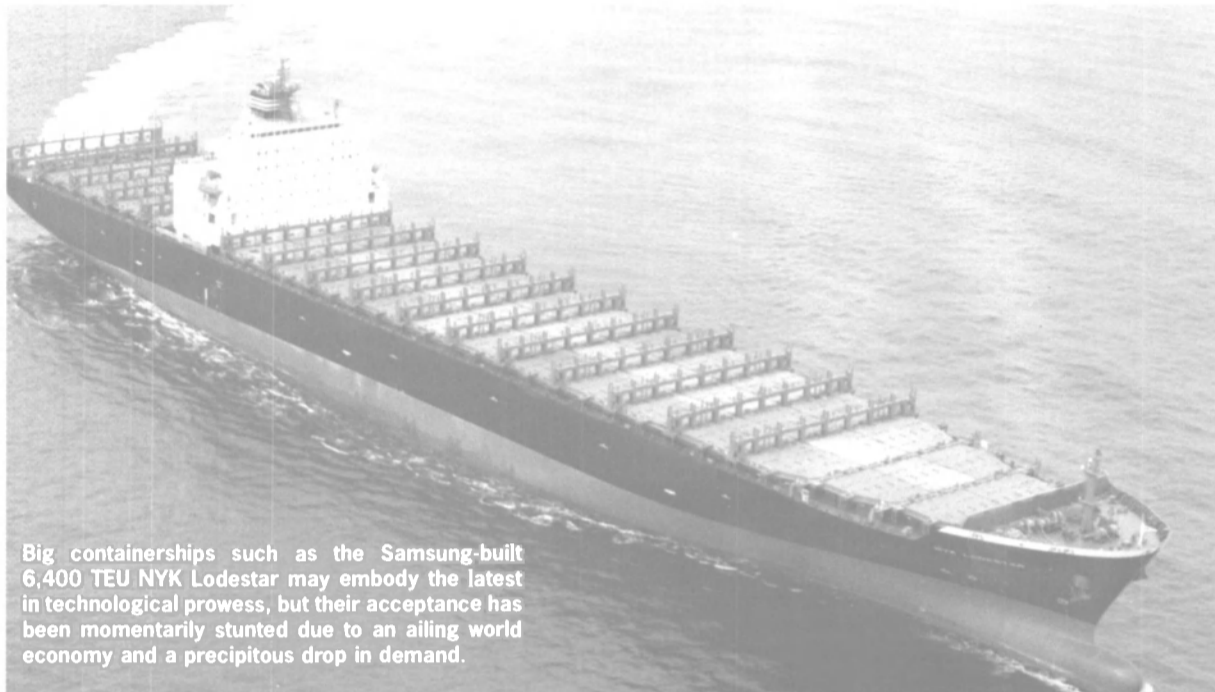
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Entry of the Titans Delayed

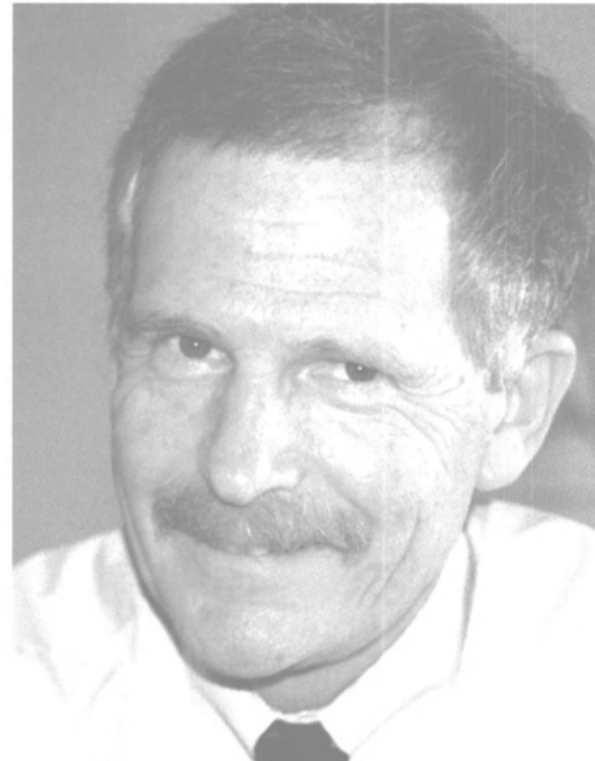


Big containerships such as the Samsung-built 6,400 TEU NYK Lodestar may embody the latest in technological prowess, but their acceptance has been momentarily stunted due to an ailing world economy and a precipitous drop in demand.

After consistent annual growth of between seven and nine percent, the global containership market is experiencing severe conditions, with the collapse in charter rates and continuing, extensive capacity additions to the fleet at a time of stagnation in the world economy. The international trade downturn, exacerbated by the broader economic impact of the terrorist outrages in the U.S., has resulted in the deferment of contracts for the much-vaunted, proposed new generation of line-haul vessels over 8,000-TEU capacity. The events in

the liner sector underscore shipping's propensity for extreme market conditions, over-and-above the cyclical patterns that have traditionally been experienced in the bulker and tanker fields. That very fact points to recovery in due course, albeit after the current period has exacted a heavy toll on operators and the related industries.

Dr. Hans G. Payer, one of the industry's most circumspect as well as erudite representatives, has expressed confidence in the long-term growth



Dr. Hans G. Payer

prospects for the liner business, and in the ultimate scope for newbuildings offering more than 8,000-TEU slots. In his capacity as executive board member of Germanischer Lloyd, he told a recent London gathering that "There will again be a doubling of container volume to be shipped by the year 2010," and pointed to the tempting economies of scale embodied in a future breed of cellular ships outstripping currently operated tonnage.

"The continuing investment in hub ports to handle vessels of this size and beyond testifies to the preparedness of ports in most parts of the world to accommodate them," noted Dr. Payer, adding "They are an inevitable component in the further development of the container transportation industry....."

Although the 'stretched' Maersk S-type ships and Hapag-Lloyd's recently commissioned, 7,500-TEU Hamburg Express have already taken the industry close to the 8,000-TEU category, there had been earlier expectations that ships of 9,000-TEU and larger would be ordered in 2001.

Dr. Payer criticized certain of the mega-container ship design studies undertaken by various organizations on the strength of earlier market interest as being "superficial and technically inadequate". He felt they did not compare in depth and thoroughness with the six-year German maritime industry research study, project-managed by GL, into the feasibility of an 8,000-TEU containership, including detailed design consid-

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erations. He also contended that some of the proposals publicized by other organizations did not match "the technical comprehensiveness of our subsequent design study for a 9,200-TEU vessel." The society's research endeavors pertinent to boxship technology and safety include participation in a number of European Union- and German government-sponsored projects. One area of study, dubbed Roll-S, is the phenomenon of parametric roll as affects large containerships in particular.

GL has also addressed issues relating to the adoption of ever-more powerful main engines in increasingly large boxships, as regards engine deflections and interactions between the machinery and the ship's hull. It has developed a new method of engine alignment aimed at minimizing loads on crankshafts and obviating the engine-hull interaction problems experienced by some containerships. Furthermore, the society has been involved in strengthening containership hulls at anchor contact points, hawse pipes and tug pressure points. It is also developing instrumentation to indicate hull stresses and reduce storm damage, and is investigating improvements in lashing systems.

GL's stake in boxship classification amounts to 31-percent of gt and 35-percent of ships in service, as at October 2001. However, this is set to grow by virtue of a 51-percent penetration of tonnage under construction and on order, corresponding to 56-percent by vessel number.

Comfort in Class

Italian ferry operators' widespread endorsement of vessel speed as a tool of competition and improved productivity has provided a platform for the advance of maritime technology across a broader front in Italy. Through its project for a new breed of full-displacement, RoRo passenger ferry able to attain a top speed of 31-knots, Neapolitan coastal and shortsea specialist Tirrenia di Navigazione signaled its determination to ensure long-term competitiveness in a core business, namely the traffic between the Italian mainland and Sardinia. Bithia, the first of two sisters, which bring the concept to realization, is a testament to Fincantieri's design skills in achieving a remarkable combination of speed, power and carrying capacity. In addition, the award of the Comfort Class notation by Registro Italiano Navale (RINA) denotes the designers' ability to overcome the particular technical challenge associated with ensuring minimal noise and vibration in a comparatively fine-lined hull encapsulating a multi-engine plant and power train intended to ensure a cruising speed of 29 knots.

The 36,500-gt Bithia is the first RoPax ferry of conventional type to receive

RINA's Comfort Class certification, hitherto conferred on cruise ships and high-speed craft since its introduction in 1999.

The award was made by the society following a comprehensive series of tests carried out in the course of the vessel's regular operating pattern linking Genoa with Porto Torres. The vessel was

found to comply with the strict noise and vibration criteria laid down by RINA to ensure an especially high standard of passenger comfort. Similar investigations were also undertaken on a unit of Tirrenia's high-speed ferry fleet, the 1,800-passenger Scorpio, leading to the parallel assignment of the Comfort Class status to the 43-knot vessel, which runs

between Civitavecchia and Olbia. Bithia is due to be joined in February by sistership Janas. Both were constructed in the Naples Bay area, at Fincantieri's Castellammare di Stabia yard. The Tirrenia vessels are arranged for 2,700-passengers, complemented by a RoRo intake of 900-cars, or 70-trailers plus 500-cars.

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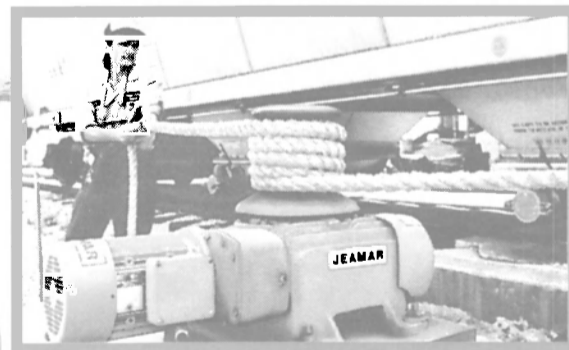
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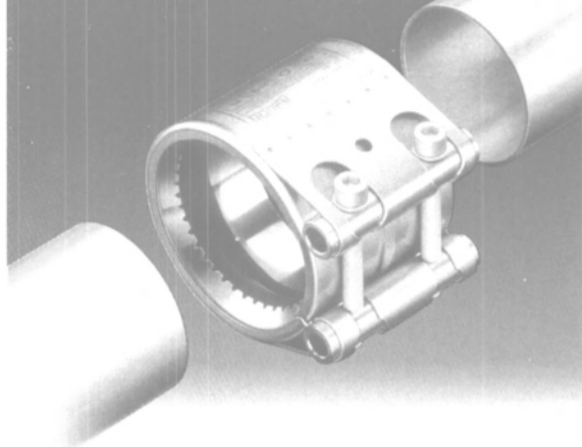
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EU Ministers Fail To Agree On Shipbuilding Aid

This year's European Council meeting of European industry ministers, which occurred on December 5 focused on shipbuilding and the Commission that was presented to the Industry Council in May 2001 on the situation of world shipbuilding.

Once again, the conclusions pointed to anti-competitive practices by South Korean shipyards such as: debt forgiveness, debt moratoria, advantageous refund credits, fresh credits and guarantees, allowing them to offer ships at below-cost prices.

Efforts to address these unfair practices through bi-lateral talks with South Korean authorities failed, and the Commission adopted a two-pronged strategy to improve the situation: a request for dispute settlement at the World Trade Organization and a Temporary Defensive Mechanism for the EU shipbuilding industry.

The Commission has insisted that both elements of the proposed strategy would have to be implemented in combination.

In the Council, however, there has been unanimous support for the first element but not for the second. Indeed, on the issue of EU ship-

building aids, the Member States have been divided into two blocks: the Scandinavian countries, the U.K. and the Netherlands, who continued to be firmly against the granting of any aid, and the Southern countries (Greece, Spain and Italy) and Germany, who were in favor, with France, being rather indecisive, in the middle.

The Temporary Defensive Mechanism would allow aid to those market segments in which the Commission investigation found that EU industry has been considerably harmed by unfair Korean trade practices, namely container ships and product and chemical tankers.

The Commission has emphasized, however, that the new mechanism must not result in distortion of competition within the European Union.

The main problem remains, however, that the Council as a whole feels it is now up to the Commission to launch a complaint against South Korea at the WTO without waiting for new aid regimes to be implemented in Europe. So far, the Commission has declined to separate the two.

M/V Industrial Challenger Welcomed To U.S.-Flag Fleet

U.S. Secretary of Transportation **Norman Y. Mineta** and Maritime Administrator **Bill Schuber** announced that Industrial Maritime Carriers will transfer a Challenger Class heavy-lift vessel from the Bahamian flag to the U.S. flag. The 8,000 dwt vessel has two 200 mt electro-hydraulic cranes, a service speed of 16 knots and is ideally suited for project and heavy lift cargo.

M/V Industrial Challenger is the latest ship to benefit from an agreement between the U.S. Coast Guard and the Maritime Administration (MarAd) that significantly reduces the time required to reflag certain vessels into the U.S. registry.

M/V Industrial Challenger will maintain the same name under the U.S. flag and will enroll in the Voluntary Intermodal Sealift Agreement (VISA) program sponsored by the MarAd and approved by the Department of Defense as its principal sealift readiness program.

CP Ships Secures Financing

CP Ships is in the process of closing a secured five-year revolving credit facility, \$250 million of which is being underwritten by Citibank N.A. Expected to be \$350 million in total, closing of the underwritten portion of the facility is expected by the end of the year.

The facility, which has been placed with banks

with extensive experience of lending to the shipping industry, will be used primarily to finance CP Ships' previously announced \$800 million ship investment program.

The investment program, which continues as planned with deliveries of 10 new ships expected from mid-2002 to mid-2003, will replace chartered ships with more economic ships specifically designed to match the requirements of CP Ships' regional trades.

CP Ships also has in place a secured \$175 million revolving credit facility, which became effective on August 2, 2001.

The new facility replaces a planned \$255 million private placement announced on September 21 by CP Ships' former parent, Canadian Pacific Limited.

RCRA Violation Settled For \$11.2 Million

Joint Press Releases were issued by the U.S. Attorney for the Eastern District of New York and the Environmental Protection Agency stating that hazardous waste charges under the Resource Conservation and Recovery Act (RCRA) have been settled with ExxonMobil Corporation. ExxonMobil has agreed to pay \$11.2 million, to perform cleanup at the facility, and to comply with applicable hazardous waste laws and regulations. The defendant operated a barge cleaning and vacuum-

ing facility at Port Mobil on Staten Island, N.Y. Benzene-contaminated wastes were generated at the facility and some of that waste was discharged into Arthur Kill, part of the waters of the United States.

Transocean Sedco Forex COO Retires

Transocean Sedco Forex Inc., announced that **W. Dennis Heagney**, executive vice president and COO, will retire from the company in June 2002, after 33 years of service. Heagney began his career in 1969 with The Offshore Company, a predecessor of Transocean Sedco Forex and has worked in a variety of operating and marketing roles in both the United States and International locations.

The board of directors has appointed **Robert L. Long** as president of Transocean Sedco Forex Inc., effective immediately. Long, who will also assume the role of COO upon the retirement of Heagney in June 2002, joined the company in 1975 and has held numerous operational and financial roles over his 26-year career including division engineer, division manager of the North Sea and Egypt and his most recent role as executive vice president and chief financial officer. In addition, the company's board has appointed **Gregory L. Cauthen** as vice president and CFO, effective immediately. Cauthen, who presently serves as vice president of finance, joined the company in March 2001 following management positions with Arthur Young, First Interstate Bank and Service Corporation International, where he was senior vice president and president of SCI Financial Services, Inc.

Maritrans Announces New Financing Arrangement

Maritrans Inc. has entered into a new five-year financing agreement with a syndicate of financial institutions.

Mellon Bank, which led the transaction, was joined by Fleet Bank, Hibernia Bank and SunTrust Bank. The new facility consists of a \$45 million term loan and a \$40 million revolving credit facility, and the new debt will have floating interest rates and should cost significantly less than the previous 9.25 percent fixed-rate indenture that was paid off in October.

ICS Welcomes New Director

Alan Phillips has replaced **Barbara Fletcher** as director of the Institute of Chartered Shipbrokers (ICS), effective December 1. Phillips, who has a Navy background, gained experience as a captain of a variety of vessels, including HMS Phoebe and HMS

January, 2002

Endurance. He has also been involved in a number of maritime incidents including the search and rescue operation following the Piper Alpha disaster. Prior to taking voluntary retirement from the Navy in 2001, he held policy-making positions with NATO and the Royal Marines. After 13 years of service, Fletcher retired at the end of December. Although she hopes to maintain her links with the Institute, Fletcher plans to pursue a consultancy role in the shipping industry.

Cal Dive Agrees to Acquire Canyon Offshore

Cal Dive International, Inc. has agreed to acquire 85 percent of Canyon Offshore, Inc., a supplier of remotely operated vehicles (ROVs) and robotics to the offshore construction and telecommunications industries. Cal Dive would purchase the remaining 15 percent at a price to be determined by Canyon's performance during the years 2002 through 2004. The purchase price from \$66 million to \$74 million is four to five times expected Canyon EBITDA. The acquisition, which is subject to the customary Hart Scott Rodino filing, is expected to close before year-end.

Canyon Offshore Appoints Execs

Canyon Offshore has appointed **Doug Stroud** as vice president sales and marketing. In this newly-created position, Stroud will be responsible for overseeing Canyon's international marketing program, developing new markets and identifying new business opportunities for the company. He will also develop and implement marketing strategies designed to increase awareness of Canyon's deepwater capabilities, expand Canyon's current market share of the remotely operated vehicle market. Canyon Offshore has also appointed **Scott Sparks** as general manager, cable protection Services. Sparks will be based out of Canyon Offshore's Aberdeen, Scotland facility and will be responsible for overseeing the company's rapidly expanding submarine cable trenching operations on an international basis.

New Chairman For Bilbroughs

Graham Edmiston will retire as chairman and chief executive of A Bilbrough & Co, managers of the London P&I Club, on February 20, 2002. Edmiston has been with Bilbroughs for 30 years — 27 of them as director. The directors, however, announce that Edmiston will continue to be associated with Bilbroughs as a consultant. He will be succeeded as chairman and chief executive by **Paul Hinton**, who joined Bilbroughs in 1976, and was appointed a director in 1987.

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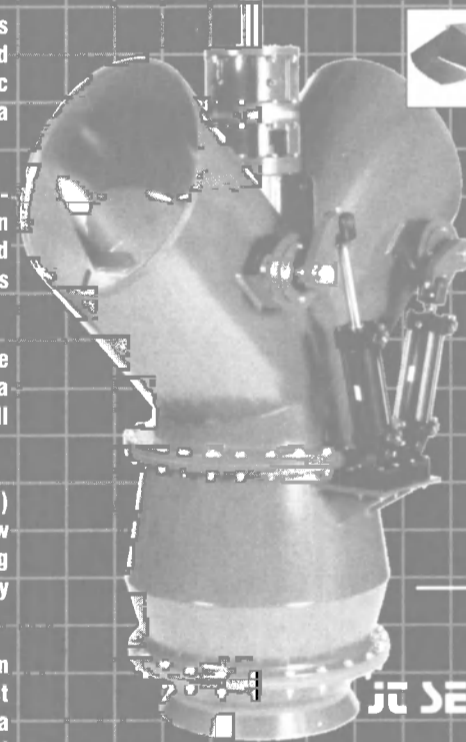
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**Renaissance Cruise Ships
Reflagged To Marshall Islands**

Six of the former Renaissance cruise ships now owned by Cruiseinvest LLC, a Marshall Islands-incorporated company, have been re-flagged to the Marshall Islands, Cruiseinvest, and International Registries Inc. the managers of the Mar-

shall Islands maritime and corporate registers, said in a joint announcement on December 5, 2001.

Dominique Prunier, chief executive of Cruiseinvest Management S.A., said that Cruiseinvest had appointed American Marine Advisors, the New York-based merchant bank, as the ships' commercial manager, and the Monte-Carlo

based Martinoli SAM as the fleet's technical manager.

**Philadelphia Gear Appoints
New President and CEO**

Philadelphia Gear Corporation, an international manufacturer of gears and related power transmission equipment,

has named **Carl D. Rapp**, as president and CEO. Rapp, who will work from Philadelphia Gear's corporate headquarters in Norristown, Pa., will lead the company's efforts to align with its end users and develop new product offerings.

Rapp succeeds **Gerry Rooney**, who held the position of president and CEO from May 1998 through September 2001.

**Fire on Stolt-Nielsen Barge
At Uerdingen**

Stolt-Nielsen Transportation Group Ltd., a wholly-owned subsidiary of Stolt-Nielsen S.A. reports that during the early morning of November 21, the crew of the SNTG Motor Tank Barge, Stolt Rotterdam discharging nitric acid at Bayer Uerdingen near Cologne on the River Rhine noticed fumes coming from the double bottom of the barge. The local authorities and fire department were alerted immediately.

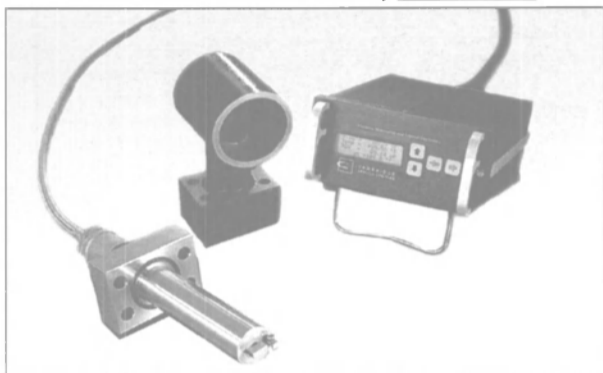
Subsequently, the captain and crew coordinated their emergency response with shore personnel and the emergency authorities — there were no reports of injuries to any personnel or persons in the vicinity.

The crew was evacuated as a result of an engine room fire caused by nitric acid leaking from one of the ship's tanks containing 270 cu. m. of product. As a safety measure, the barge was lowered to the river bottom.

The ship was loaded with 1,352 cu. m. of nitric acid.

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Seastreak Launches M/V Seastreak New Jersey



Seastreak America Inc. has added another catamaran ferry to its service within the New York City commuter market with the December 10, 2001 launch of M/V Seastreak New Jersey.

The 141-ft. (42.9-m), 400 passenger high speed catamaran will provide daily commuter ferry service from Atlantic Highlands and Highlands, N.J. to Pier 11 near Wall Street and East 34th Street in Manhattan.

SeaStreak New Jersey is the sister ship of SeaStreak New York and joins the fleet of the 300-passenger SeaStreak Manhattan and SeaStreak Liberty, which also provides commuter services between central New Jersey and Manhattan; the 149-passenger Seastreak Brooklyn accommodates commuters between Brooklyn and Manhattan.

The catamaran, built by Gladding-Hearn Shipbuilding in Somerset, Mass., features three decks: including two interior and one exterior with Lexan wind deflectors; automatic doors, heated decks and ramps, a full bar and three restrooms.

Reported to be the fastest commuter ferry in the New York Harbor, Seastreak New Jersey travels at a service speed of 38 knots and a maximum speed of 42 knots, and is expected to complete the passage from New Jersey and Manhattan in 35 minutes.

It is propelled by four Cummins KTA50M2 engines rated at 7,500 bhp

M/V Seastreak - New Jersey

| | |
|------------------|--|
| Entering service | December 11, 2001 |
| Builder | Gladding-Hearn Shipbuilding |
| Type | Catamaran |
| Length | 141 ft. (42.9 m) |
| Breadth | 34 ft. (10 m) |
| Draft | 6 ft. (1.8 m) |
| Capacity | 405 passengers and crew |
| Decks | Three: two interior, one exterior with Lexan wind deflectors |
| Service speed | 38 knots |
| Max. speed | 42 knots |
| Main engines | 4 Cummins KTA50M2 |
| Propulsion power | 7,500 bhp |
| Propulsion units | 4 Kamewa A50 model Waterjets |

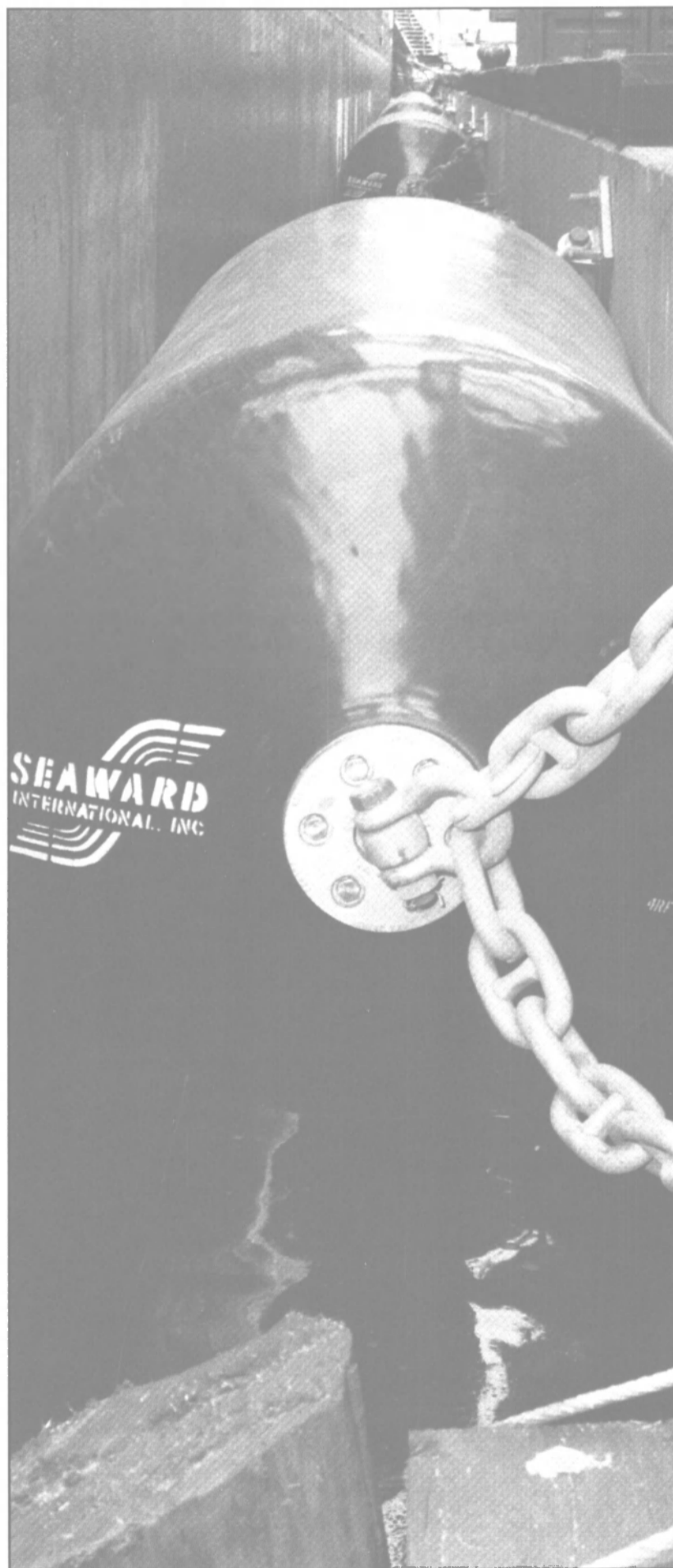
and four Kamewa A50 model waterjets. According to Gladding-Hearn, it possesses a balance of seakeeping, efficiency, low wash and mechanical redundancy.

Launch ceremonies for the SeaStreak

New Jersey were held at the Atlantic Highlands Municipal Marina, Pier 6 in Atlantic Highlands, N.J. with the boat's godmother, Miss New Jersey **Julie Barber**, christening the vessel. Local and state dignitaries, representatives of the

U.S. Coast Guard and Rev. **Peter Larom** of the Seamen's Church Institute in Manhattan also participated in the vessel's official unveiling.

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OTAL To Invest \$5 million in New IT System



The Bollore Maritime Division (BMD) is investing \$5 million in a new software management system called iQ-Ship. As a group company OT Africa Line (OTAL) will benefit from this system, which is designed to enhance the quality of service provided to its customers worldwide.

Qiva Inc, a leading producer of supply chain logistics and global transportation management systems, has developed the system.

iQ-Ship will enable OTAL to simplify and automate several internal processes, which will in turn, reduce the time and costs required to execute OTAL's com-

mercial, logistics and financial functions and allow staff more time meeting customers' needs.

During 2002, OTAL plans to deploy the application in several phases beginning with line activities. This is scheduled to be complete by spring/early summer and will then be extended to cover the

European agency network, the target completion date being the end of 2002. iQ-ship will then be implemented throughout OTAL's Asian and African networks during 2003.

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ACBL To Use Originals Online

American Commercial Barge Line (ACBL) will use Originals Online to enhance the exchange of barge freight commercial documents with its customers. The system uses eOriginal technology, providing a secure, web-driven process for initiating, signing, endorsing, verifying and storing electronic barge freight transaction documents. According to ACBL's senior v.p. **James F. Farley**, Original Online is designed to protect the security of electronically exchanged certified and signed original trade documents.

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McDATA Enterprise Storage Area Network To Support Major Business

McDATA Corporation announced that Naptheon Inc., a wholly owned subsidiary of Newport News Shipbuilding (NNS), has selected McDATA to deliver a centralized easy to manage and highly available storage area network (SAN) solution to address the explosion of data growth the company has experienced. The McDATA solution lowers Naptheon's overall IT costs and ensures business continuance by delivering reliability and simplified management of Naptheon's sensitive data.

The solution McDATA designed for Naptheon/NNS

was based on the company's Galaxy-class 6000 Series Director at the core and McDATA's 3000 Series 16 and 32 port Fabric Switches at the edge.

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SMI, Tribon Create Team

The Society of Maritime Industries, the umbrella organization of equipment and services in all areas of the maritime industry in United Kingdom and Tribon Solutions announced a co-operation agreement. The co-operation will provide the members of the Society of Maritime Solutions with a framework of activities to further strengthen their communication with and presence at shipyards worldwide by participating in Tribon.com.



From left, **John Murray**, Chief Executive of the Society of Maritime Industries, and **Ola Hansson**, sales director Tribon Solutions.

Tribon.com is an Internet based service for the shipbuilding industry linking together shipyards, maritime equipment suppliers and ship owners in a comprehensive global network. The site contains 3-D models; design information, pictures, technical specifications and commercial information enabling design integration supplemented by full e-commerce functionality.

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United Arab Shipping Company Joins INTTRA

INTTRA, the leading provider of B2B ocean freight services, announced that United Arab Shipping Company (UASC) has selected INTTRA as its portal for the management of ocean-going container shipping. The national line of the Arabian Gulf states, UASC (www.uasc.com.kw) is the twelfth carrier to join INTTRA's non-exclusive network, extending INTTRA's reach beyond 40 percent of world container capacity. UASC provides direct liner services between the Arabian Gulf and main ports in Europe, U.S. East Coast, Indian sub-continent, and a full range of ports in Asia. The addition of UASC to INTTRA connects two of the portal's traditionally strongest areas - Asia and Europe — and provides customers with the capability to view both regional and global shipments from one portal.


Digitrace Certified In The Netherlands

Netherlands Shipping Inspectorate has given its accreditation to Digitrace, a service of Notice to Mariners via e-mail. This accreditation acknowledges Digitrace as the equivalent of the official paper NTM (from e.g. British Admiralty), thus satisfying the carriage requirement for Notices to Mariners under Regulation 20 of Chapter V of SOLAS. Several other flag states have already given similar accreditations.

The shipping inspectorate has further accredited The Digital Lists of Lights, which is another service developed by Marine Press of Canada, which is an innovative chart agent with its own software development including Digitrace, Digital List of Lights and the Chart Catalog.


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Grand Bahama Shipyard's Drydock Arrives After 160-Day Tow

Grand Bahama Shipyard's Dock No. 2, which is the former Cascade General Dock No. 4, arrived safely at its new spot at the Freeport, Bahamas shipyard on December 11. The floating drydock, which measures 984 x 2,296 ft. (300 x 700 m) and is capable of lifting 85,000 tons, will be the largest floating dock on the Eastern seaboard of the U.S., accommodating cruise vessels up to 150,000 grt or VLCC tankers of up to 250,000 tdwt.

The 20,000 n.m. tow from Portland, Ore. to the Freeport, Bahamas shipyard took 160 days. The dock traveled across the Pacific Ocean passing close to Hawaii, through the Philippines and the East Indies, across the Indian Ocean and up the Red Sea, through the Suez Canal and then across the Mediterranean and the Atlantic.

Preparations are currently underway at the shipyard for the dock, which is expected to be fully operational by the end of March 2002.

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Balder Leaves Rotterdam Following Facelift

After a facelift of \$200 million at the Verolme Botlek shipyard at Rotterdam, Balder headed for the Norwegian offshore port Stavanger on December 17, 2001.

The facelift changed the former crane vessel into a pipelayer, and the large pipelaying tower of 120 m, allows the Balder to lay pipes on a depth of more than 2,000 m.

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ISR Purchases Drydock From Norshipco

International Ship Repair & Marine Services, Tampa, Fla. acquired its fifth drydock, the 669 x 100-ft. (203.9 x 30.4 m) inside clear width, 20,000-ton Virginian from Norshipco in Norfolk, Va. — expected to be in place at the yard by February 2002.

A full service repair and conversion facility, International was established in 1973, and has undertaken a variety of projects, most recently a life cycle extension process for Maritrans' 5,400-hp Tug Navigator and installation of a 1,000-hp retractable bow thruster for Great Lakes Towing's 5,000-hp Tug Z-2.

Recently the company has completed several conversion projects on ships in the seismic field and well as scheduled repairs on bulk carrying ships and barges for Teco Transport.

International Ship has further expanded with an equity stake in propeller manufacturer Padgett & Swann Machinery, also located in Tampa, as well as a strategic alliance with a new marine and industrial piping company, Tampa Pipe and Welding.

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Nonshipco's Virginian Drydock was recently purchased by International Ship Repair.

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Visions of the *New* Navy

As the nation grapples with the effects of the September 11 terrorist strikes, defense spending suddenly gains stature after years of neglect. The question at hand: how much money will the U.S. Navy get, and how much will be spent on new boats and ships?

While the "new" navy will demand more, faster, cheaper vessels, there is still no replacement for the nuclear aircraft carrier, which is lovingly referred to as "90,000 tons of diplomacy" by its builder Newport News Shipbuilding. Pictured is the night launching of aircraft.

(Photo credit: U.S. Navy)

Money Talks

The American Shipbuilding Association has long bemoaned the level of U.S. Navy funding, arguing that the amount of spending on new ships would, in the future, leave the force woefully under-equipped to handle its duties of defense. Though the ASA is but the lobbying voice of the country's "Big Six" shipbuilders — by consolidation now reduced to, in effect, the Big Two — would be the primary beneficiaries of a spending splurge, it now seems the arguments presented were visionary, as the U.S. enters a gray area in international relations with the recent terrorist attacks in New York and Washington and the resultant war in Afghanistan.

The ASA fight for dollars was taken up in an August 2001 report from the General Accounting Office, a report entitled *"Military Transformation: Navy Efforts Should be More Integrated and Focused."* (GAO-01-853). On the topic of Fiscal and Force Structure, the report reads: "The Navy has not been building enough ships to maintain the roughly 300 ship force mandated by the 1997 Quadrennial Defense Review. The high costs of supporting the current force, the time needed to acquire new ships, and the prospect of a continued mismatch between fiscal resources and force structure requirements increase the urgency of planning for and carrying out transformation ... the Congressional Budget Office has estimated that the Navy would require roughly \$17 billion more each year for fiscal years 2001 through 2005 than it is currently expected to receive to sustain this force level. If current construction rates and funding levels remain the same, the Navy's force could decrease to approximately 260 ships or lower after 2020."

By the Numbers

In 1987, the U.S. had a naval fleet of 594 ships. While a fleet of that stature is likely unnecessary and uneconomical based on the current world political situation that is devoid of a second legiti-

mate superpower, the fleet today is vastly different from that of less than 15 years ago. Current estimates show the U.S. Navy fleet hovering around the 300-ship level, but most troubling is the procurement level. Simply put, the U.S. has not been ordering enough ships on an annual basis to sustain a 300-ship fleet, the adopted psychological barrier to providing the nation with adequate defense resources. In fact, as ASA reports, annual numbers of naval ships procured is at the lowest level since 1932; the size of the Navy's fleet is the smallest since the year before we entered WWI; and while the fleet has been cut almost in half, the number of overseas deployments has increased 300 percent.

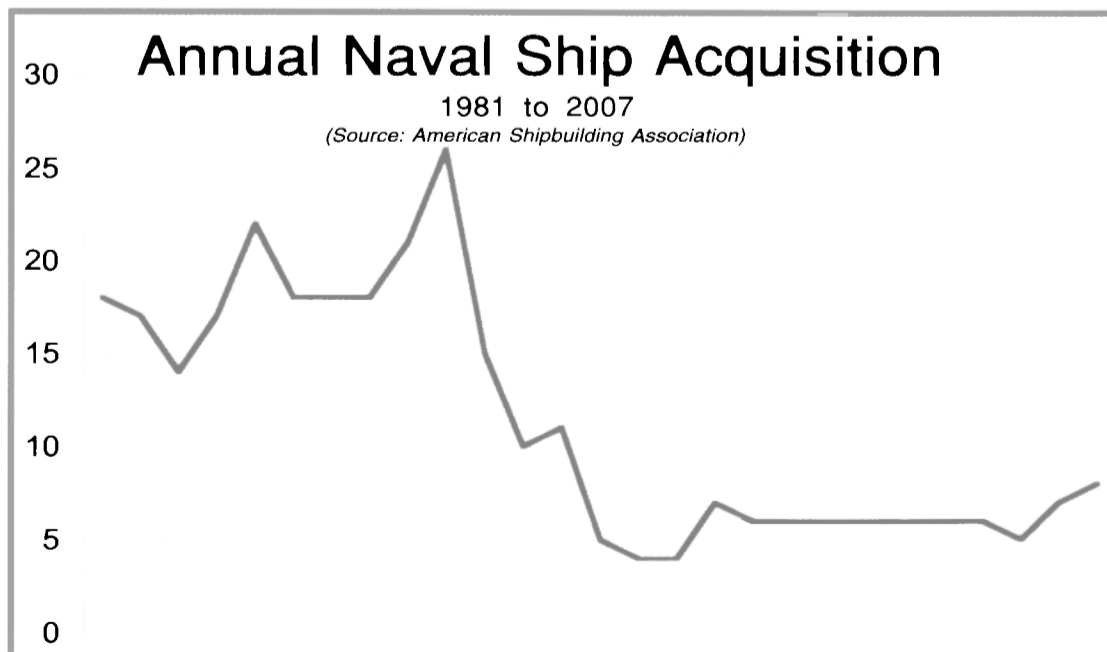
But the "business-as-usual" model is effectively out the window in terms of naval ship construction, as nearly a decade of consolidation of defense resources has effectively left the U.S. with two large companies — Northrop Grumman and General Dynamics — operating the shipyards that build most navy vessels. The latest acquisition has been the high profile pursuit of nuclear aircraft carrier and nuclear submarine builder Newport News Shipbuilding, which was recently concluded with its acquisition by Northrop Grumman.

While the oceangoing, deep draft fleet will undoubtedly remain the central focus of U.S. sea power, the winds of change have blown in hurri-

Did you know?

- **During the 1980's, the Navy procured an average of 19 ships per year in an effort to build the naval fleet to 600-ships.**
- **During the 1990's, the average annual procurement of naval ships dropped to six.**

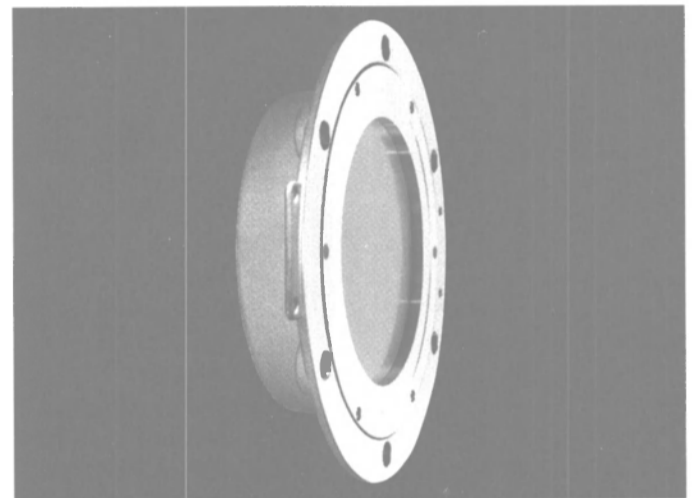
Source: American Shipbuilding Association (ASA)



January, 2002

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U.S. Navy Shipbuilding Prospects



Austal's Westpac Express received a rigorous trial from the U.S. Marines last year, as the focus of all forces who use the waterways turns to fast and flexible vessels.

cane style, as the powers in charge rapidly assess the current make-up and future needs of the U.S. Navy.

President **George W. Bush**, speaking at the Citadel in Charleston, S.C., said, "We have to think differently. The enemy who appeared on Sept. 11 seeks to avoid our strengths and constantly searches for our weaknesses. So America is required once again to change the way our military thinks and fights."

Part of this change is already underway, with the current trial of high-speed, high capacity cargo and troop carriers from the Austal and Incat design stable, which have been well publicized in the pages of *MR/EN* and sister publication *MarineNews*.

Another significant move towards a smaller, more agile navy was in early November, when the Navy effectively threw out the DD-21 program and issued a Request for Proposal for the Future Surface Combatant Program, renamed DD(X). The DD-21 class vessel was put in peril long before September 11, as the awarding of the contract to ultimately design and build the new ships was delayed from the original Spring 2001 date as the new Bush Administration carefully reviewed all military assets, plans and future spending. The new program seeks to receive a plan for a family of advanced surface combatants rather than a single ship class — effectively calling for more, faster and cheaper ships.

"Through DD(X), the Navy has charted a course to transformation that will provide capability across the full spectrum of naval warfare," said Deputy Secretary of Defense **Paul Wolfowitz** at the time of the RFP's announcement. "With the approval of this strategy, the Navy has defined its surface combatant roadmap for the future in a manner which ensures all maritime missions can be accomplished," said Navy Secretary **Gordon England**. "Through DD(X), we are taking a significant step toward providing improved combat capability for our Sailors and Marines."

The DD(X) is in essence the new baseline of technology and defense for the U.S. naval forces, and is intended to provide a baseline for the development of a future cruiser, or CG(X), with the emphasis on common hullform and technology development.

Understandably, progress on the DD(X) program is expected to progress rapidly, with Spring 2002 scheduled as the timing for the selection of a new contractor. Construction is likely to begin around 2005, with vessels set to enter the fleet several years later.

Despite the loosening of purse strings and an expected flood of money to purchase defense assets of every size, shape, and variety, the ASA continues to warn that spending is inadequate to meet the defense needs of the country. While the focus has shifted slowly but surely

to smaller, more economical assets, the value of the large ship navy — or as Newport News Shipbuilding likes to refer to the nuclear aircraft carrier "90,000 tons of diplomacy" — cannot be overstated, particularly giving the size, scope and nature of the current war in Afghanistan. While American diplomats were quickly negotiating with surrounding countries for use of land bases for personnel, equipment and aircraft, multiple carrier battle groups were quickly assembling in the area, giving the U.S. sufficient force to act regardless of diplomatic endeavors.

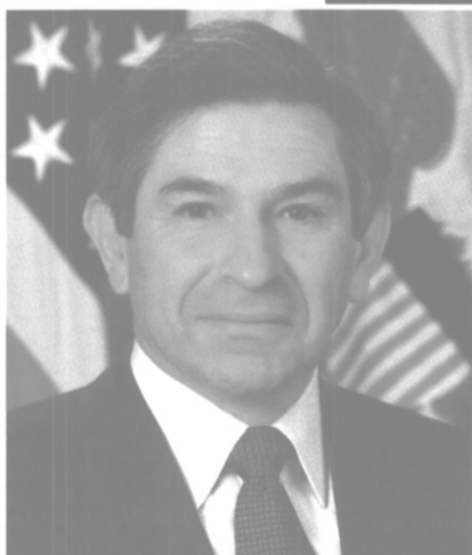
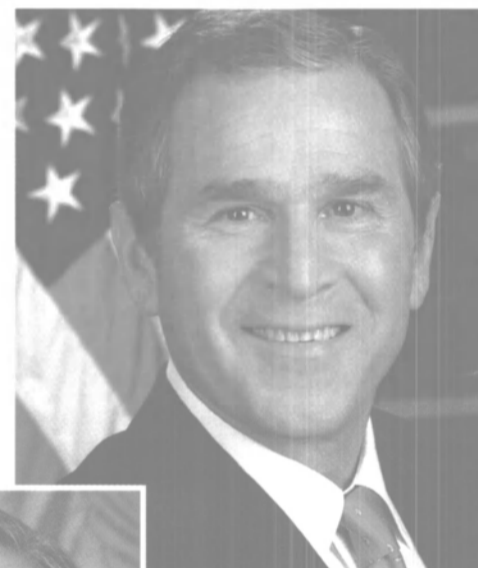
Speed & Capacity: A Lethal Combination

The use of wave-piercing catamarans (WPC's) for military purposes has fast gained momentum, and quickly resulted in a strategic marriage between INCAT and Bollinger Shipbuilding, Inc., of Lockport, La. The joint venture Bollinger/INCAT, Inc. in October 2001, delivered a WPC, the 315 x 85-ft. (96 x 25.9 m) Joint Venture, to the U.S. armed services for testing.

The U.S. military has been looking for fast ships for rapid worldwide deployment of military assets, and according to **Richard Lowrie**, Incat's program manager for military applications, the U.S. military is now more focused on "off-the-shelf" acquisition of commercial vessels meeting its requirements. "They were in the process of re-inventing the wheel," Lowrie said, in an article on the matter published in the

December 14, 2001 edition of *MarineNews*, sister-publication to *Maritime Reporter & Engineering News*. "High speed vessels have come a longway in the last 10

(Continued on page 30)



Power Players

From the Commander in Chief — **George W. Bush**, pictured top — down through the ranks, the future of the "new" U.S. navy will be decided in the coming months. While big oceangoing vessels will remain the backbone of the force for the foreseeable future, plans are on the drawing board for a smaller, faster, more economical and cost efficient naval force. Also pictured are (middle) Secretary of Defense **Donald H. Rumsfeld**, and (bottom) Deputy Secretary of Defense **Paul Wolfowitz**.

Happy Birthday Navy

The U.S. Navy recently celebrated a birthday. The following message, posted to the official U.S. Navy Website, are remarks from the Secretary of the Navy, The Honorable Gordon R. England.

As we celebrate the United States Navy's 226th year of defending this great republic, it is fitting that we take a few moments to reflect upon our proud heritage. Throughout history, our Navy and our Nation have defeated every adversary and every challenger we have faced.

In the earliest days of our republic, USS Constitution and her sister ships defeated the most powerful navies in the world. In World War II, the attack on Pearl Harbor spurred us on to sweep the Imperial Fleet from the Pacific. Today we face a new foe in a new kind of war, but at the end of the day, the result will be the same — victory.

The terrorist attacks of September 11, 2001, will echo through history. My charge to you is to never forget. Never forget this attack on the American way of life. Never forget the lives of our shipmates and countrymen lost. Never forget the selfless acts of bravery and generosity that emerged following the attacks. With renewed purpose, we will come to remember September 11th as the day that marked the beginning of the end for these enemies of free-

dom. When I took office last May, I outlined four strategic priorities for our Navy. Today, these priorities — combat capability, people, technology and improved business practices — demand an even greater sense of urgency as we wage the first war of the 21st century. Over the years, our Navy has adapted to changes in technology, tactics and command structures to counter new threats to our way of life. This is the strength of our Navy.

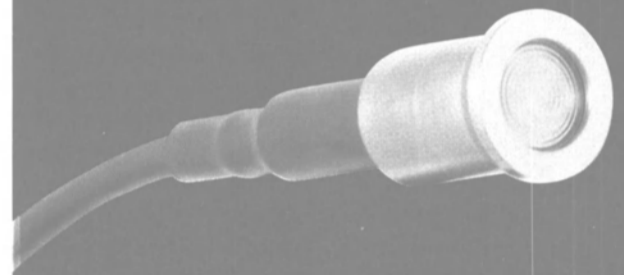
I know that in ships, submarines and squadrons around the world, you stand ready to answer our nation's call. During the course of this challenging year, our Nation will continue to count on your honor, courage and commitment. As our Navy sails into its 226th year, I encourage each of you to take a few moments to reflect on the blessings we enjoy that were earned by earlier generations. Your children, grandchildren and future generations will likewise honor your defense of freedom.

Happy Birthday Shipmates! God Bless each of you, your families and the United States of America.



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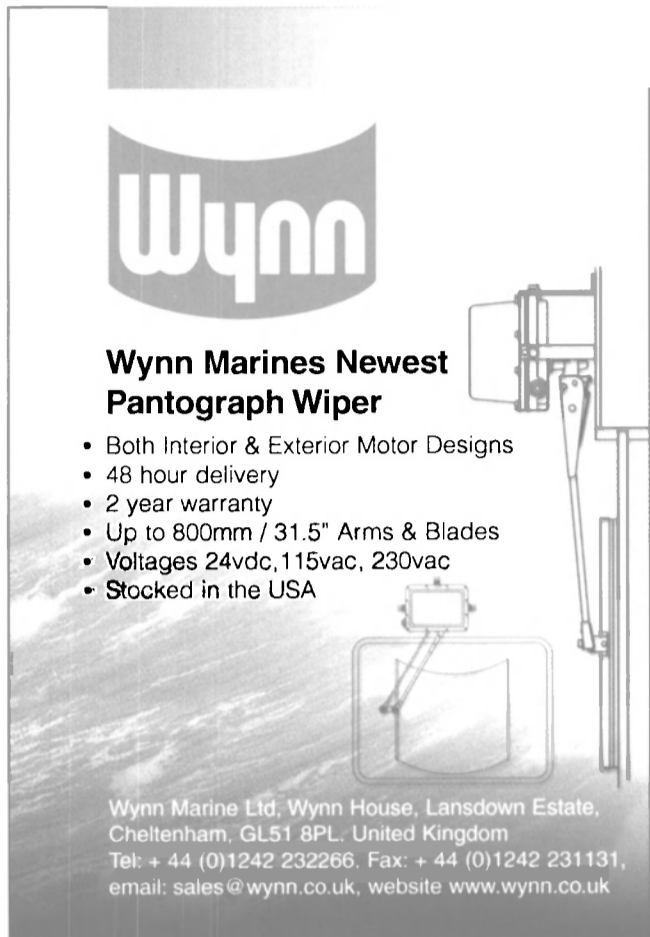
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U.S. Navy Shipbuilding Prospects

(Continued from page 28)



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years, and I don't think they were watching the industry closely. It took the Jervis Bay's stellar performance in the East Timor crisis to get their attention."

"These vessels offer tremendous deck space and deadweight," Lowrie said. "Any kind of equipment can be loaded onto them, including housing modules, helicopter or warplane hangars, tanks, armored personnel carriers, and shipping containers." According to Lowrie, the U.S. military's current objective is to be able to transport a battalion of troops and its equipment anywhere in the world within 96 hours, a division within five days, and five divisions within 30 days. "Our Cats hold the world record for the Atlantic," Lowrie said, "making the crossing in 70 hours, just short of three days. The speed and capacity of the Joint Venture can meet this objective with current technology."

The design's astounding speed comes from four diesel engines developing 9,648 hp at 1,050 rpm, driving four Lips 150D waterjets via four Reintjes VLJ6831 gearboxes.

Ship's service power comes from four 230 kW generators, two in each hull. The Joint Venture's hull is constructed of 5383 - H116 aluminum alloy, providing strength and resiliency at light weight. The aluminum superstructure is supported on vibration damping mounts.

The vessel is fitted with a Maritime Dynamics Inc. ride control system, consisting of computer-controlled, active trim tabs mounted at the transoms and active T-shaped hydrofoils mounted forward, to provide trim and motion dampening.

Chris Bollinger, CEO of Bollinger Shipyards, is confident that military orders will soon follow the Joint Venture's testing. "The Marines are testing (her) right now off the coast of Virginia. The word we're getting is that they're very impressed with the vessel. We know we can build them at a reasonable price — the design work is already done — so we expect military orders shortly."

He sees the craft's versatility as a major draw-

ing point for the military. "Any of the services, including the Army, Navy, Marines, or Coast Guard, can configure the deck modules to suit its specific purposes. The basic vessel remains the same. That way the vessel can be shifted from service to service as requirements change."

The Joint Venture is actually the second WPC that the U.S. Marine Corps has tried. Last summer, the U.S. Marine Corps took the 331-ft. (100.8-m) Westpac Express, built by Australia's Austral Corporation, on a two-month charter for transportation between U.S. bases in the Far East. The Westpac Express was fitted with an 85-ft. (25.9 m) articulated stern ramp capable of loading and discharging trucks, armored personnel carriers, and light tanks. At 41 knots top speed, the Westpac Express is slightly slower than Joint Venture, but the Marines were impressed enough to follow it up by chartering the Joint Venture.

Prior to the charter, U.S. military personnel went to Australia to watch the INCAT 050 — Joint Venture's previous name — in action. Captain Pat Denny, Director of the Maritime Battle Center at the U.S. Navy Warfare Development Command, later said. "(She's) an awesome ship ... I have never seen a ship like this. I'm impressed with the sleekness of the vessel, the shallow draft and cargo carrying capacity ... combined with the very high speed ..."

In preparation for the charter, Bollinger/INCAT gave the vessel a major refit in September 2001, fitting it with military enhancements such as a helicopter deck capable of handling the large Seahawk and Sea Knight helicopters, stern quarter ramp, RIB deployment gantry, and troop facilities. The craft emerged from Incat's Wilson, Australia, drydock capable of carrying 363 troops and 300 tons of military vehicles and equipment over 1,110 nautical miles at 45 knots, in an average condition of Sea State 3.

"There's no question that wave-piercing catamarans are the answer to high-speed, open-water transportation," Lowrie concluded.



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Teams Prep For DD(X) Challenge

When the Navy announced in November its plans to scrap the DD-21 program and introduce the DD(X), the scramble was on by the two primary teams bidding the project — Blue and Gold — to shift gears on the fly and re-think the entire concept. The team of General Dynamics and Lockheed Martin - Blue — is one of the teams hoping to be chosen by the navy for its vision of future naval forces. The Blue Team has developed technologies relevant to the DD(X) requirement and is preparing its response to the Navy's request for proposal (RFP).

DD(X) will be a technology engine that will drive a family of combatants to transform the Navy. The Navy will use the advanced technology and networking capabilities from DD(X) in the development of both the future cruiser, CG(X), and the Littoral Combat Ship (LCS).

"With 20 years of teaming experience, General Dynamics and Lockheed Martin are committed to the success of this family of ships, and we believe we will provide the U.S. Navy with the best technologically advanced combatant," said

Tom Bowler, Bath Iron Works vice president of Strategic Planning and Business Development. "We are convinced we can provide the transformation the Navy needs as it moves into the 21st century."

Under the restructured program, the investment stream for force transformation will be funneled through DD(X). Therefore, technology maturation for missile defense cruisers, precision fires and the Navy's desire to develop a Littoral Combat Ship will all start with the technologies developed in DD(X).

Dr. Mike Hughes, Lockheed Martin DD(X) vice president, said the Blue Team has the technological expertise and management capability to be the Navy's best choice to develop the DD(X).

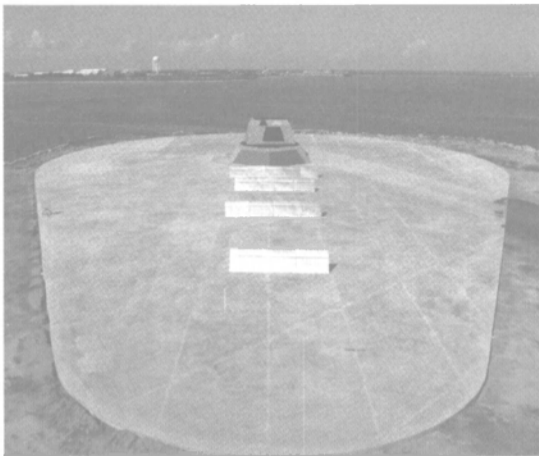
"Our approach emphasizes a balance between system performance, affordability and program executability. As partners, we have a rich and lengthy history of being teammates in the design and construction of the Navy's surface combatant force," said Hughes.

Surface Combatants Benefit from Northrop Grumman Research

Northrop Grumman Corporation's Ship Systems sector reports that it has successfully tested the Low Observable Multifunction Stack (LMS) designed to demonstrate two different advanced exhaust suppresser systems for surface combatants. The exhaust systems, enclosed in a low signature composite structure, also integrate embedded multifunction communication arrays.

"This integrated approach will help provide increased connectivity necessary for modern warfare while avoiding the mass of communications antennas that typically cover the topside of surface combatants," said Richard Schenk, president of Ship Systems' Full Service Center.

Construction of the LMS was completed at the Northrop Grumman Ship Systems Avondale Operations composite facility in Gulfport, Miss., in July 2001. After completing construction, the LMS structure was barged to Ship Systems' Ingalls Operations' East Bank facility in Pascagoula, Miss., for final fit-out, and land-based testing of its Radar Cross Section (RCS). The RCS testing was performed at the Ship Systems Near Field Radar Reflectivity Range (NFR3) facility. "The NFR3 facility was instrumental in demonstrating the performance of the LMS and greatly reduced the potential cost of testing at other East or West Coast facilities," said **Ross Buck**, engineering project manager and Ship Systems Radar Range Test director.



After RCS testing, the LMS structure was installed on an Ex-Asheville class patrol gunboat for additional testing at-sea near Panama City, Fla. The additional tests included at-sea signature measurements of the LMS and tests of the communication capabilities of the antenna systems embedded within the LMS structure.

The project was sponsored by the Office of Naval Research through its Advanced Technology Demonstration (ATD) program. Execution management of the project is provided jointly by the Naval Sea Systems Command and the Space and Naval Warfare Command (SPAWAR).

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GE LM2500s Slated For Norwegian Frigates

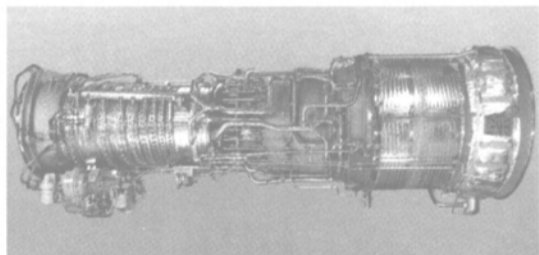
GE Marine Engines said its LM2500 aeroderivative gas turbine will power five new Royal Norwegian Navy F310-class frigates, ships to be built in Spain at the IZAR Construcciones Navales, S.A., naval shipyard in Ferrol. This is the first naval Combined Diesel And Gas Turbine (CODAG) configuration to be installed by IZAR, and the Royal Norwegian Navy is only the second international navy to adopt this arrangement.

The German Navy uses an LM2500-based CODAG configuration on its new F124-class frigates. "This is a significant project for GE for several reasons," said **Karl Matson**, general manager of GE Marine Engines. "This is GE's first project with the Royal Norwegian Navy, bringing the total to 28 international navies to use GE's LM gas turbines aboard naval vessels."

"What the Royal Norwegian Navy will gain by using the LM2500 is an experienced engine with a historical fleet availability and reliability of 98.66 percent and 99.4 percent, respectively," Matson added.

The CODAG configuration on each F310-class frigate will consist of one GE LM2500 gas turbine, rated at 21.5 MW/28,832 shp, combined with the two diesel engines for a total propulsion system rating of 30.5 MW.

The GE gas turbines for the F310-class frigates will be manufactured at GE's Evendale, Ohio

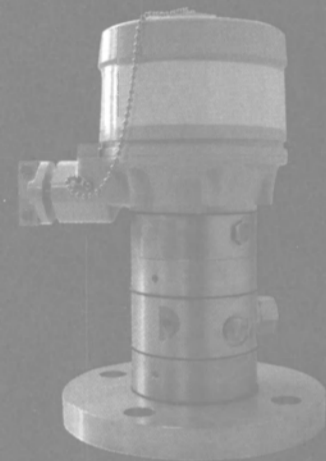


facility. The contract provides that GE will deliver the first LM2500 to IZAR starting in December 2002 and another gas turbine will be shipped annually in December through 2006. The F310 frigates are scheduled for commissioning beginning in September 2005, with the remaining vessels to be launched annually in September through 2009.

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| Royal Norwegian Navy F310-Class Main Dimensions | |
|--|-----------------------------------|
| Length, o.a. | 433 ft. (132 m) |
| Length, waterline | 398 ft. (121.4 m) |
| Maximum height above water line | 98 ft. (30 m) |
| Design draft baseline | 16 ft. (4.9 m) |
| Maximum beam | 55 ft. (16.8 m) |
| Beam on the waterline | 52 ft. (15.9 m) |
| Full load displacement (including margins) | 5,121 tons |
| Complement | 120 (accommodation capacity: 146) |
| Propulsion plant CODAG (2 x LM2500; 2 x bravo 12/Caterpillar diesel engines) | |

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U.S. Navy Shipbuilding Prospects

U.S. Navy Commissions USS Bulkeley in NY



USS Bulkeley, the newest in a series of advanced Aegis guided missile destroyers built for the U.S. Navy by Northrop Grumman Corporation, was commissioned on December 8, 2001, in New York City at the Intrepid Sea, Air and Space Museum. This ship is named in honor of Vice Adm. **John D. Bulkeley**, USN, (1911-1996), a Congressional Medal of Honor recipient who spearheaded the evacuation of Gen. **Douglas MacArthur** from the island of Corregidor in World War II and later served as president, Board of Inspection and Survey for the U.S. Navy. Following commissioning, the ship will be homeported in Norfolk, Va., as an element of the U.S. Atlantic Fleet. Cmdr. **Carlos Del Toro**, USN, of New York, is now in command of the 509.5-ft. (155.1-m) 9,300-ton destroyer.

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Mustin Christened

The U.S. Navy's newest guided missile destroyer, Mustin (DDG 89), "will carry American sovereignty to the far corners of the Earth," Adm. **Vernon E. Clark**, USN, chief of naval operations, said during christening ceremonies in Pascagoula, Miss. on Dec. 15 for the ship built by Northrop Grumman Corporation's Ingalls Operations. Adm. Clark was the principal speaker at ceremonies for the new Aegis guided missile destroyer, which is named for a family of Naval war heroes span-

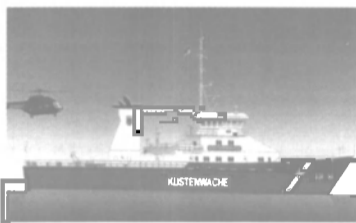
ning a century of service to Navy and country. The Mustin is the 18th Aegis destroyer to be built by the company's Ingalls Operations. The vessel was christened by three Mustin family members serving as Ship's Sponsors: **Lucy Holcomb Mustin**, wife of ship's namesake Vice Adm. **Henry C. Mustin**, USN, retired, of Arlington, Va.; **Jean Phillips Mustin**, wife of ship's namesake **Thomas Mustin**, former lieutenant commander, USN, of Coronado, Calif.; and **Douglas Mustin St. Denis**, also of Coronado.

A&R To Build Offshore Patrol Vessels

Germany's Abeking & Rasmussen recently was chosen to build three Offshore Patrol Vessels (OPV) for the German Coast Guard. The new OPVs are

intended for EEZ patrol and law enforcement in the North Sea and the Baltic. Measuring 215.5 ft. (66 m) with a displacement of 800 tons, the vessel is powered by a father-son plant driving a single shaft with an MTU 16V 1163 TB 73L rated 5,200 kW at 1,250 rpm for high speed, and an electric motor developing 800 kW for low speed. The electric motor will be driven by the auxiliary generator set, and the propulsion concept is touted by the builder as helping to drastically reduce maintenance and fuel costs during patrol operations. Siemens Marine Solutions Div. was commissioned to fit three new patrol boats with electronic, navigation and safety equipment. The OPVs are to be built under the survey of Germanischer Lloyd, receiving class notation +100 A5 ME "Patrol Boat" for the ship and GL+MCE Aut RPI for the engine. The first vessel is now being outfitted and will be delivered in the summer of 2002.

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Navy Honors Engineering Pioneer

A ceremony was held on November 19, 2001, to rename the Naval Ship Systems Engineering Station's (NAVSSSES) Surface Ship Systems Engineering Complex, the **Richard C. Cunningham** Engineering Complex. The building (77H) was renamed to honor Cunningham's pioneering work and engineering innovations in machinery controls and other accomplishments in naval machinery engineering.

During the ceremony, Rear Admiral **William Cobb, Jr.**, the Program Executive Officer for Theater Surface Combatants at the Naval Sea Systems Command, presented a special AEGIS Program Lifetime achievement Award to Mrs. **Debra Cunningham** on behalf of Richard. The award was presented in memoriam "in recognition of his unprecedented contributions to the AEGIS Shipbuilding Program." According to the citation, "... his exceptional Machinery Control System engineering expertise, exemplary record of achievement, personal sacrifice, and loyal devotion to duty ... played an unparalleled role in the design and delivery of the Arleigh Burke (DDG 51) Class guided missile destroyer."

The building, located at the Philadelphia Naval Business Center in South Philadelphia, is a major test and evaluation building in which Cunningham worked; and is the only one of the 40 buildings owned by NAVSSSES

to have been dedicated to an employee/individual. Cunningham passed away suddenly in January 2001 from complications following surgery. He is survived by his wife Debra, two children — Carolyn and Patrick, his parents, three sisters and three brothers.

Cunningham began his career at the Naval Ship Systems Engineering Station in 1975 as a co-op student while attending Drexel University. He was hired as an electronics engineer following his June 1978 graduation from Drexel. By November of 1997, he had been promoted to a top-level position and became the leading Machinery Control Systems In-Service Engineer for NAVSSSES. Cunningham was widely recognized as one of the foremost authorities on machinery control systems for the Navy. He received many special act and performance awards for his accomplishments, recently winning the Rear Admiral **Benjamin F. Isherwood** Award for Exceptional Fleet Support. In February 2001, the Naval Sea Systems Command's AEGIS Excellence Award was presented posthumously for his support of new construction Arleigh Burke-Class ships.

The preceding was written by Warren Christensen, Public Affairs Officer, Naval Ship Systems Engineering Station, Carderock Division, Naval Surface Warfare Center

Navy Notes

New Sonar System Uses Light

Northrop Grumman Corporation received an \$8.9 million contract from the U.S. Navy Space and Naval Warfare Systems Command (SPAWAR) to develop an all-optical fixed undersea surveillance system that uses light rather than electrical current. The 24-month development program will culminate in an at-sea demonstration and validation of Northrop Grumman's deep water, all-optical, acoustic system.

"This competitive award solidifies Northrop Grumman's position as the industry leader in the emerging all-optical acoustic sensor technology field," said **William J. Allison**, vice president and general manager of the company's Navigation Systems Division. "Successful completion of this development program will place Northrop Grumman in an excellent competitive position for subsequent production programs."

The Navy and Northrop Grumman began developing this technology in the early 1980's as a potential replacement for the decades-old electro-mechanical/copper wire-based technology systems.

GE Wins Canadian Navy Contract

GE Canada signed a commercial maintenance and logistics support contract with Canada's Public Works Government Services. Under this multi-year contract, GE will provide maintenance and logistical support services for the Canadian Navy's fleet of LM2500 aeroderivative gas turbines used to power Halifax-class patrol frigates.

"The contract should provide the Canadian Navy with more predictable maintenance costs, and a lower total cost of ownership for their fleet of 24 installed LM2500 gas turbines and six spare engines," added **Karl Matson**, general manager of GE Marine Engines, Evendale, Ohio.

Ship Shafting Contract Set

Park Corporation's purchase of Erie Forge & Steel is seen as ensuring the company's capability to meet the growing needs of the U.S. Navy for ship propulsion shafting well into the future. "The purchase will guarantee a domestic source, and bring long-term stability to the supply of forgings critical to the production of ships for the U.S. Navy," said **Robing Ingols**, director of marketing for Erie Forge. The purchase will allow Erie Forge to become part of Lehigh Heavy Forge Corp, a WHEMCO company. Erie Forge, which filed for bankruptcy protection last year which led to the takeover, has melt, forge, heat treat and machine capabilities. It houses a 3,500-ton and a 2,500-ton hydraulic forging press.

Primar Signs on Royal Danish Navy

The Royal Danish Navy signed an agreement with the Stavanger-based official Primar ENC service covering the delivery of official electronic navigational charts (ENCs). This agreement involves a "navy supplier" model, designed to allow the Royal Danish Navy to download all charts and updates — including the very latest

versions — directly from Primar. Primar delivers ENC's from 13 national hydrographic offices, with standing invitations for others to join. Currently comprising more than 950 charts, the ENC database is sold via Primar's global distributor network.

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GD gets \$42M for Sub Work

The U.S. Navy has awarded Electric Boat a \$42.3 million contract modification for nuclear submarine work. Electric Boat is a wholly owned subsidiary of General Dynamics. The award is a continuation of a contract awarded in May 1999 to provide design, engineering, material and logistics support for the Trident program, the Trident U.K. program, the two operational Seawolf-class submarines, NR-1, and efforts supporting Los Angeles-class ships. It also supports work at Puget Sound Naval Shipyard in Bangor, Wash., to backfit older Tridents to accommodate D-5 missiles, and D-5 pre-ERP (Extended Refit Periods) work at Kings Bay, Ga.

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NASSCO Awarded Contract

National Steel and Shipbuilding Company (NASSCO) received a \$5.1 million contract, with options up to \$20.2 million, for the six-month extended dry-docking and maintenance availability of USS Antietam (CG-54), a Ticonderoga-class Aegis guided missile cruiser homeported in San Diego. This is the second complex refurbishment of an Aegis guided missile cruiser performed by NASSCO and the third installation of the "Smart Ship" systems equipment. Said **Richard Vortmann**, President of NASSCO. "We and our fellow companies have invested heavily in developing a comprehensive ship repair infrastructure and can now repair and upgrade all classes of Navy ships, including carriers and submarines, homeported in San Diego."

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Kilo Moana Christened

The U.S. Navy christened the newest oceanographic research vessel Kilo Moana (AGOR 26) in a ceremony at Atlantic Marine, Inc., Jacksonville, Fla., in mid-November. Kilo Moana is designed to perform a broad spectrum of oceanographic research in coastal and deep ocean areas. Research ranges from physical, biological and chemical oceanography to environmental investigations, ocean surveys, engineering, marine acoustics, marine geology and geophysics. The ship, built by Atlantic Marine, Inc., has an innovative Small-Waterplane-Area Twin Hull (SWATH). Kilo Moana is 185 ft. (56.3 m) long, has a breadth of 88 ft. (26.8 ft.), and a displacement of 2,542 light tons. The ship will be delivered to the Navy in 2002.

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Maritime Multi Displays

Jakob Hatteland Display offers the 20.1-in. TFT display, type JH 20T03 MIL. The display is tested for naval applications and are suitable both for multi-function applications such as integrated bridge and combat systems. The flagship of the product range is the new 23.1 in. screen. Utilizing the latest technology, this display offers a viewing area suitable for the IMO ARPA 340 mm radar. The MMD product line is tested according to IEC945.



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Rolls-Royce Wins Sub Contract

Rolls-Royce won a second service contract from the Ministry of Defense to ensure the safety and power performance of Royal Navy nuclear submarines, in a deal worth more than \$500 million. The company will continue to operate and maintain the Vulcan Naval Reactor Test Establishment site at Dounreay, Scotland.

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KMSS Wins Navy Contract

Kongsberg Maritime Ship Systems (KMSS) won the contract to deliver a radar simulator to the Royal Norwegian Naval Academy, worth an estimated \$800,000. The contract calls for the supply of a radar simulator that is identical to the actual navigation equipment that will be delivered to the new Norwegian frigates.

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Regulateurs Europa gets Deal

Regulateurs Europa won a contract from Devonport Management Ltd. to supply a new control and monitoring system for the 436 ft. (133 m) patrol vessel Cascadura, which is owned by the Trinidad and Tobago Coast Guard. The scope of supply includes a new Machinery Control Room Desk, Viking 22 Propulsion Control Panel, Wheelhouse Drop-in-Plate and Open Bridge Plate.

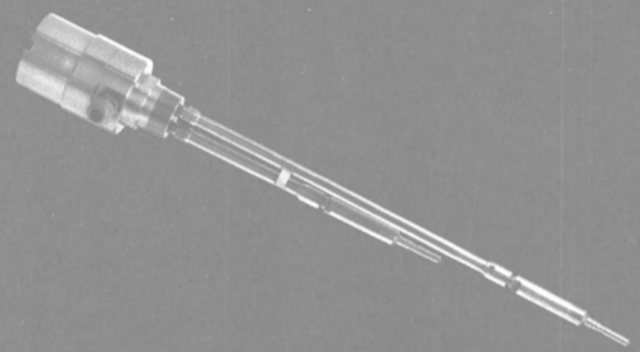
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MedAire Helps Navy Physicians

In a pilot program commencing November 1, 2001, select ship-based U.S. Navy physicians will use MedAire Inc. to gain access to medical specialist at Good Samaritan Regional Medical Center in Phoenix. Calls will come directly from a naval ship to MedAire's MedLink Emergency Telemedicine Center inside Good Samaritan, where they will be managed in conjunction with the specialists. While ship communications will primarily be two-way voice, the pilot project may also involve visual transmissions as well.

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The Sea Switch Two was designed and patented for all tank applications. The Sea Switch Two offers a reliable solution for liquid level detection and control for cargo, ballast, and storage tanks, without any moving parts.

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SENESCO — The People's Shipyard

In the fall of 1990, the Berlin Wall came down, thus unifying Germany into one nation — and marking the end of the Cold War. One year following the fall of the Iron Curtain, U.S. President George Bush and Soviet president Mikhail Gorbachev signed the START treaty, which stated that both nations would agree to dismantle all nuclear weapons. How do these events half way around the world effect U.S. builders of boats and barges? Significantly, as it turns out. It appears that the fall in nuclear submarine production has given rise to one of the country's fast growing barge building companies.

— By Regina P. Ciardiello, senior editor

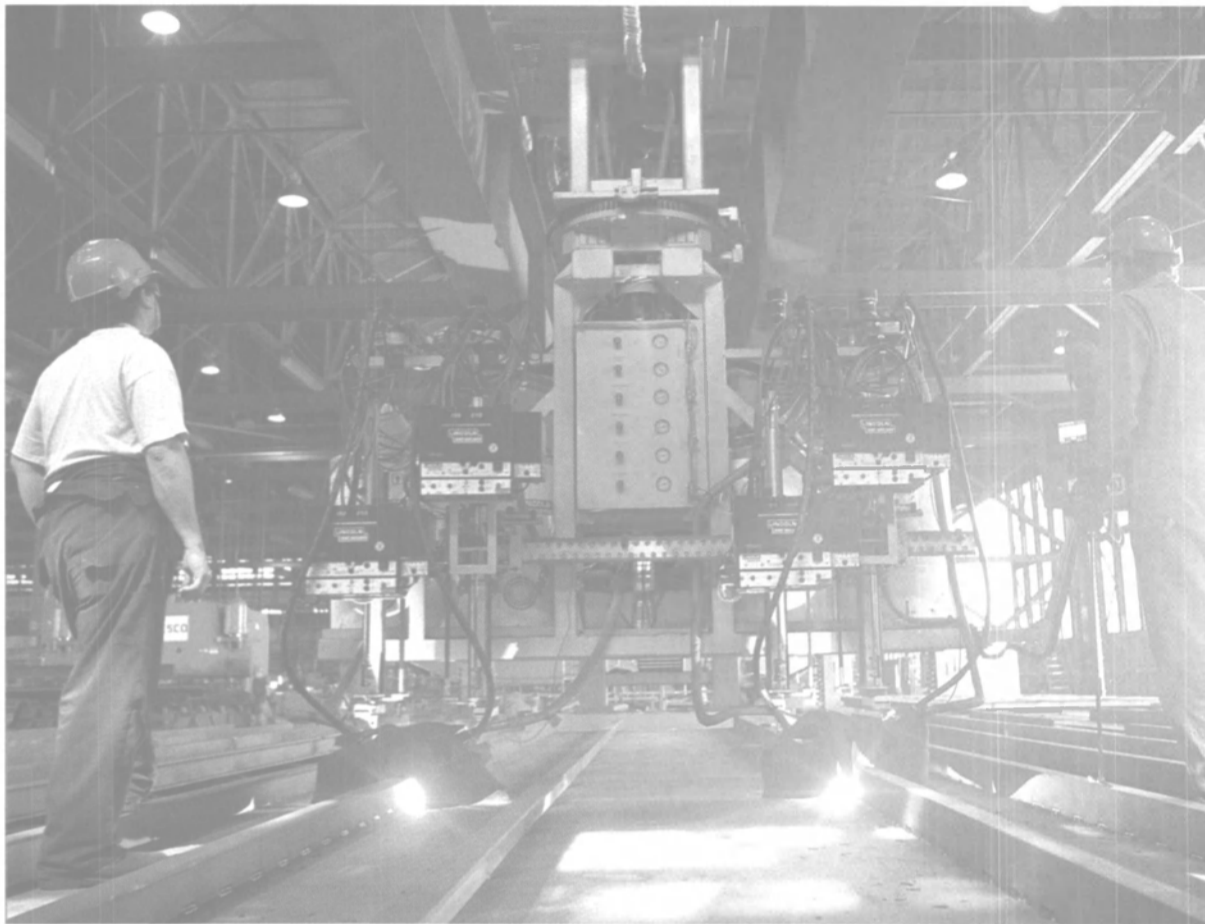
The middle to late 1980s was a watershed of sorts for the U.S. shipbuilding industry. With the end of the Cold War came the end of the 600-ship navy dream, and a significant and prolonged reduction of naval shipbuilding in the U.S. While many of the major U.S. shipbuilding facilities have been absorbed via a massive corporate consolidation, the mothballing of facilities and loss of jobs was unavoidable.

Many yards, namely General Dynamics-Electric Boat and Northrop Grumman's Newport News Shipbuilding facility — two major builders of nuclear submarines (and major competitors as well) were forced to lay off long-time employees. General Dynamics-Electric Boat, had only recently spent for the installation of new lighting, and panel line assembly equipment, upgrading its production capacity, but with nothing to construct. With the closure of the first building in 1992, Electric Boat wrapped up operations on the second building in 1998 — exactly one year before the birth of SENESCO.

1994 — A Turning Point

Before thoughts of SENESCO even popped into the heads of anyone in the Southeastern New England area, a meeting was held at the end of 1993, to decide what would be done with the 25 acres of land that Electric Boat had abandoned — and to effectively determine the future for thousands of displaced workers in not only Rhode Island, but for the entire Southeastern New England area as well. What once was a bevy of production activity on Narragansett Bay had become two empty buildings situated on 25 acres of land on the former Quonset Point Naval Air Base. The buildings, which were used as seaplane hangars during WWII were simply taking up space and rusting away. Therefore a subcommittee called "Navigating Beyond 1994" was established. According to **Dick Carpenter**, SENESCO's senior vice president, the purpose of the meeting was to involve as many residents from the Southeastern New England area on this decision.

Carpenter, who is an attorney specializing in Admiralty Law, heard about this subcommittee through a client who was involved. By this point, the committee had decided that a solution would be to establish another shipyard at Quonset Point, but alas they needed legal assistance. Enter Carpenter, who at the urging of his client, and through his own interest, offered his services as general counsel and eventually evolved into the position of the yard's president in 1996 — a position that would later be assumed by **Bob Homan** once



SENESCO's Ogden Panneline allows for automated assembly and welding of flat panels.

the yard was fully established in 1999.

As president of SENESCO, Carpenter spent the next couple of years not only trying to raise capital for the yard, but to also find a name that would signify something that would identify it as "the people's shipyard," hence the name Southeastern New England Shipyard, which is representative of those who worked together to enhance the family atmosphere that the yard prides itself on. According to Carpenter, the majority of the yard's employees (some of whom were with Electric Boat) hail from the Southeastern New England area — specifically south of Boston — in Rhode Island, Connecticut and Maine. "The idea was to include the area's affinity within the yard, so we stuck with it (the

name)," Carpenter said.

The next step was to secure capital for SENESCO, which appeared through financial offerings from a Providence businessman, **Malcolm Chase**, and through a \$4.75 million, 15-year loan guarantee from the U.S. Department of Agriculture (USDA) through its Rural Business Enterprise Grant Program.

With funding in place, all that was left to square away was the site in which the new shipyard would lie, which came in the form of a lease from the Rhode Island Economic Development Corporation. It was decided that SENESCO would establish its roots on the former Naval Air Base at Quonset Point, taking over the two buildings that Electric Boat had abandoned years before. While not much had to be accomplished in the form of adding basic components to the buildings, SENESCO wanted to optimize advanced in automation with the implementation of a large Ogden Panneline, which provides automated assembly and welding of flat panels — cutting manpower by approximately 40 percent. The company also boasts a 600-ton bending brake and totally automatic electric arc welding systems. According to Carpenter, this equipment is undoubtedly the company's stronghold in the industry. "It (the new equipment) enables us to build custom products on a wide scale, eliminate human error and provides a lot of platform when erecting modules," Carpenter said. "We build things accurately and fast with very little corrective work."

Building the Business

This past summer, after two years of literally establishing itself from the ground up, SENESCO won a contract for a 320-ft. (97.5-m), double hull, 80,000 bar-



Dick Carpenter, SENESCO's senior vice president.



Dubbed "the people's shipyard," SENESCO has grown to a company boasting more than 150 employees at both its North Kingstown, R.I. and New Orleans, La. locations.

rel barge from Barges Unlimited of Fall River, Mass. The contract marks the construction of the largest double hull barge ever to be built in the Northeast, and is expected to be ready this coming summer. At the time of *MR/EN's* visit to the shipyard, workers were in the midst of production for the barge — taking full advantage of SENESCO's investment in state-of-the-art equipment.

The yard signed two separate contracts this past October for the construction of three barges and pier floats worth approximately \$3 million. The first barge, which will be built for N.J.-based Hughes Marine, will measure 160-ft. (48.7-m) and at press time, was almost ready for delivery. The two additional barges, both of which will be built for Cashman Equipment of Boston, Mass., will measure 180-ft. (54.8-m) each with heavy deck loading capabilities. The vessels, which are scheduled for delivery in February and March, will be used as a construction barge holding 4,000 lbs./sq. ft. The contract for the construction of the pier floats for the MacMillan Pier Reconstruction in Provincetown, Mass. was signed with Mashpee, Mass. based AGM, and is expected to be ready by Spring 2002.

The company is also expanding its presence with the U.S. with the establishment of a sales office in New Orleans, La. in order to promote its presence along the Gulf and West Coasts, as well as inland waterways and international clients. The company appointed **Chris Cole**, a 25-year veteran of the marine sales industry specializing in offshore, Inland River and foreign waterways to serve as vice president of sales.

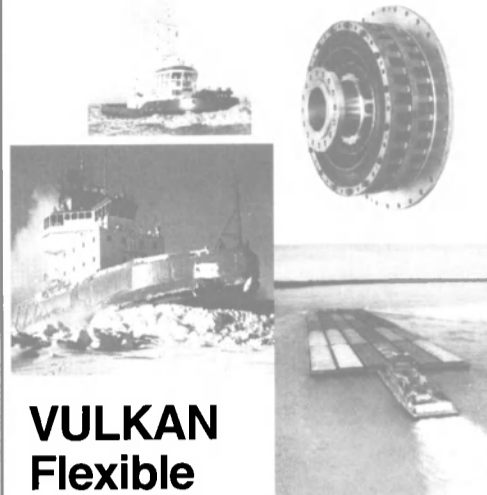
Management changes occurred in the Rhode Island office as well with the retirement of the company's founding president, **Bob Homan**, this past November. Homan, who was well regarded in the industry and had been with Crowley Maritime prior to his tenure at SENESCO, was replaced by **Bob Jarvis**, who had previously held the position of general and production manager at the yard. A native of Scotland, Jarvis, who recently became a U.S. Citizen, worked at various well-known shipyards as Irving Shipbuilding, McDermott and Derektor. Standing firmly on its goal of trying to increase production and reduce hours, SENESCO hopes to expand its production endeavors beyond barge construction. While the yard is steadily moving to the forefront as New England's premier builder in this field, the company, according to Carpenter, would like to build a wider range of vessels - beyond the realm of double hull fuel barges, which because of OPA 90, will keep the yard busy through 2015. "Obviously we would like to build a wider range of vessels - a solid base of double-hulled barges go out of here," Carpenter said. "As we expand we'll look into more sophisticated production, namely OSV's, tugs and RoRo ferries." He also feels that the yard will not be directly affected by the current economic state - in fact he believes that the yard will do better despite the tough times that have been predicted. "Indeed we'll do better because there has to be some measure taken to cure congestion on I-95," Carpenter said. "Water is the only way to go in the future."



SENESCO - NORTH KINGSTOWN RHODE ISLAND SENESCO

Southeastern New England Ship Company (SENESCO), based in North Kingstown, R.I. has completed approximately two dozen jobs - ranging from small floats to a 165-ft. (50.2-m) dredge since opening its doors in the fall of 1999.

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Integrated Bridge Allows Cutting Edge Design

The integrated bridge system concept has steadily gained speed over the last decade, as much the result as a market driven phenomena with owners and regulators demanding safe, efficient and labor-saving bridge design, as the result of the tremendous level of consolidation among marine electronics and software providers. Because of its diversity of vessel builders and owners spread around the world, it is foolhardy to believe that the marine business will, in this generation, approach the standardization inherent in the airline industry, for example. However, a number of high-profile accidents and navigation mishaps, combined with owners that increasingly demand more efficiency from less crew, has helped to advance the IBS concept very rapidly.

STN Atlas Marine Electronics recently received orders worth \$10 million from South Korean yards for 23 NACOS integrated navigation command systems incorporating Atlas Radarpilot 1000 radars, ECDIS and other proprietary sensors. Worldwide sales of systems for installation aboard commercial vessels and new-generation cruise liners as well as retrofits now exceed 700 configurations. The new commissionings include 35-4 systems for a series of LNG carriers and oil tankers being built by Daewoo on behalf of Exmar, Golar LNG and Chandris for delivery in 2002-3; the systems will form part of Atlas Ship Control Centers (SCCs) also featuring integrated bridge automation and communication functions. Similar 35-4 assemblies have also been commissioned for installation aboard 13 container and crude oil tanker newbuildings under construction by Hyundai Heavy Industries for delivery to Costamare Shipping, MSC Mediterranean Shipping and the National Iranian Tanker Co. Meanwhile, four new 50,800 gt container vessels ordered by NSB from Hanjin's Busan yard for completion in 2003 are to be equipped with NACOS 55-4 systems which additionally feature Atlas Multipilot multi-functional navigation workstations combining ARPA, ECDIS, conning and steering control functions.

Kongsberg Maritime Ship Systems (KMSS) reported recent success in selling its Bridgeline. Integrated Navigation System in Korea, as the system is to be fitted to seven of the new LNG tankers, with options for further deliveries in the future. The orders have been placed by the three major Korean shipyards; Hyundai, Samsung and Daewoo for tanker operators; Shell Tankers (U.K.); BP Amoco (U.K.); ALSOC



An STN Atlas NACOS 65 integrated navigation command system aboard the 77,000-gt Norwegian Sun, NCL's latest \$353 million cruise liner built by Meyer-Werft.

(Australia); Bergesen (Norway); Osprey x 2 (Singapore); and SK Shipping (Korea).

KMSS will provide Radar/ARPA, ECDIS- electronic chart display system, MBB- voyage data recorder, UAIS- universal automatic identification system with full integration of the navigation instruments.

The Bridgeline assembly will be carried out in Korea. In addition to these key LNG tanker orders, KMSS also received contracts for BridgeLine to two other large LPG tankers from Hyundai, to be operated by CMM (Greece) in addition to two shuttle tankers from Samsung for InterOcean Uglund Management.

Ever the innovator, Kelvin Hughes Ltd. introduced its new bridge design concept at the recent Europort 2001 exhibition in Amsterdam. "The new bridge system represents a radical departure for Kelvin Hughes and for the shipping industry," said Ron Nailer, managing director. A radical departure from traditional bridge design, the new Kelvin Hughes offering employs only flat panel displays and a new, completely independent control unit. Patent is pending.

The new unit effectively ditches the preconceived "T" bridge design, as operators can now move freely between displays and controls. A pair of high chairs at either side of the control unit enable operators to have a maximum head-height vision while using ergopods to control displays. Five 23-in. flat screen panel KHOR (Kelvin Hughes Optimum Resources) 2300 displays are aesthetically placed on a base console.

The new layout is designed to make maneuvering

around the bridge easier for operators and to significantly improve access to displays and controls.

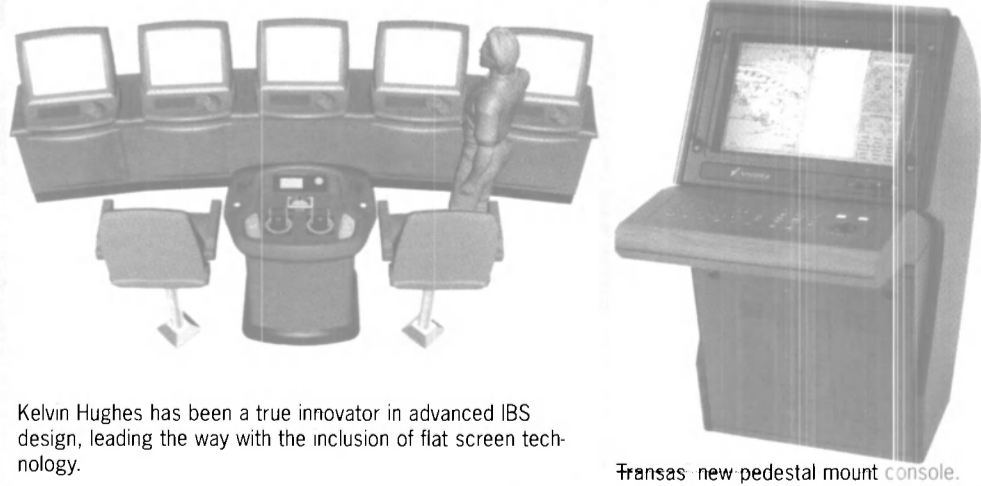
Kelvin Hughes recently was the recipient of a major contract to have its fully integrated bridge system installed onboard the new flagship Queen Mary 2, a record-setting ship that was a hotly contested reference. Measuring more than 1,131 ft. (345 m) the ship will be the largest passenger liner ever built, and is due to be launched in 2003 from the Alstom-owned Chantiers de l'Atlantique in France.

Transas launched two new products of its own in Amsterdam, the Navi-Radar and Navi-Conning products. The company, which is a confirmed leader in the production and delivery of advanced, integrated bridge concepts, shares its vision of the future of the integrated bridge in an article by **Andrey Vorobiev**, manager of the Navigation Product Unit, starting on page 41 of this edition. Transas' Navi-Radar is an advanced system combining a variety of functions, including video signal processing, displaying radar and auxiliary information, ARPA tasks, displaying SENC data, the control of radar operations, interfacing with external systems and documenting information.

Navi-Conning presents information from a variety of external sensors on a single display. The standard panel layout of Navi-Conning permits indicators for such vital systems and parameters as wind, depth, anchor, navigational lights; course, speed and rudder state; route, time, position, rpm and engines.

Furuno's integrated bridge system is dubbed voyager,

The Haustrum, an H-class product tanker to be fitted with a Kelvin Hughes Nucleus 3 radar ship set.



Kelvin Hughes has been a true innovator in advanced IBS design, leading the way with the inclusion of flat screen technology.

Transas' new pedestal mount console.

and combines ECDIS, Route Planning and Route Monitoring, ARPA and Radar, and ANTS — with centralized conning display.

The Voyager incorporates an adaptive steering control in the automatic track control system, which automatically steers the ship from point to point along a planned route in narrow waters, or across the ocean in the most economical way. The ANTS, or Automatic Navigation and Track-keeping System, has built-in adaptive steering control and a centralized conning display.

nView Corp. introduced the Virtual Bridge, providing a panoramic view of the ship's integrated monitoring systems on multiple side-by-side displays. The Virtual Bridge is now offered by nView as an optional capability with SiMON, the Ships Information Monitoring system.

The Virtual Bridge is comprised of up to four large flat-panel LCD displays, mounted end-to-end, running from one central computer. It creates the appearance of having one very wide display, capable of providing information from all the ship's critical operating systems simultaneously.

The user can easily drag and drop operating information, such as the radar display, electronic charting and SiMON from one screen to the next in any direction with simple point and click functions.

The information on the displays can be dynamically reconfigured as the captain chooses, using a single computer keyboard and mouse. SiMON is an integrated system designed to monitor any system, subsystem or sensors on the vessel. It collects real-time data from any number of analog or digital sources, and formats the data for display on the ship's computers.

Polar Marine is sending its Able Bodied (AB) seamen to MarineSafety International (MSI) San Diego to become proficient as Radar Observers and ARPA operators.

This approach was developed by Polar Marine to enable their AB's to better participate as watchstanders on its new Millennium tankers. The Polar Endeavor Class vessels are equipped with state-of-the-art Integrated Bridge Systems

(IBS). When underway, the ABs stand a lookout watch day and night on the ship's Bridge.

Due to severe weather conditions in many operational areas, the bridges are fully enclosed from wing to wing. Although they do not relieve the Watch Officer of responsibility, a better-trained Lookout will be better able to assist the Watch Officer in identifying contacts

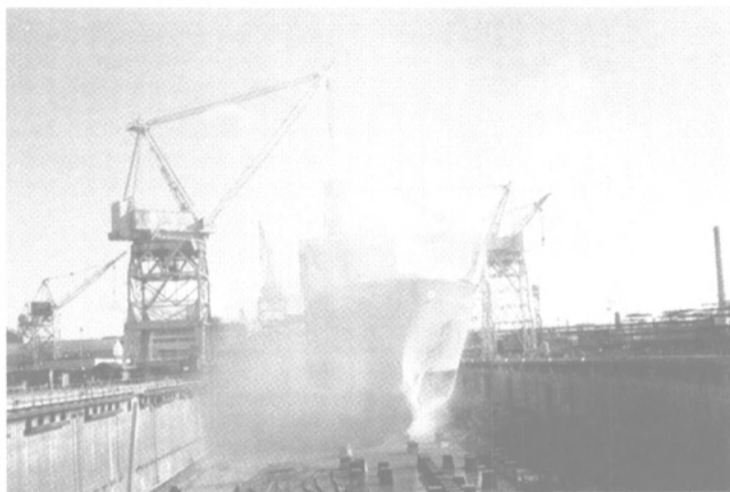
and assessing threats.

MarineSafety International will conduct the nine-day combined Radar Observer and ARPA course at its San Diego Simulator Center.

MSI instructors, certified by the USCG under STCW guidelines, will train students in the theory of radar operation, Rules of the Road, rapid radar plotting and relative motion as part of

the Radar Observer Course. An examination will be given at the end of the course. ARPA training will include theory and systems practical exercises and a USCG approved comprehensive final examination. Graduation from the nine-day course will culminate with the awarding of Radar Observer and ARPA certificates recognized by the USCG.

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* Typical

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| | |
|------------------------------------|----|
| Furuno | 54 |
| Kelvin Hughes | 55 |
| Kongsberg Maritime | 56 |
| Marine Safety Intl. | 57 |
| nView Corp. | 58 |
| STN Atlas Marine Electronics | 59 |
| Transas | 60 |



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Safer Sea Passages

A new system, developed to reduce risk for cargo and hull damage, has proven to secure safer and more efficient sea passages for ships and cargo.

Seaware Onboard is designed as a user friendly sea keeping guidance system with the intention to give ample warning when risk occurs for cargo and hull damage. The system is designed for on-line use during sea passages, and can also be used during pre-voyage route planning.

Seaware Onboard was developed by Sweden's Seaware AB, formed by a group of postgraduate researchers from the Institution of Naval Architecture at the Royal Institute of Technology in Stockholm. A joint project regarding further development of the system for reefer vessels was started together with Cool Carriers, nowadays LauritzenCool, in 1998.

After extensive demo testing, a decision was taken to proceed with full-scale test during three voyages on

board the reefer vessel M/V Ivory Dawn. The test was carried out in the first months of 2001. The outcome of the test can be regarded as positive.

The Seaware Onboard system can assist to secure the safe and efficient passage for ship and cargo. The Master and Navigation Officers involved in operation of the system during the test runs were given questionnaires upon ending the trial period.

Seaware Onboard is a computer based decision support system for rationally based risk assessment and route planning, providing support on sea keeping:

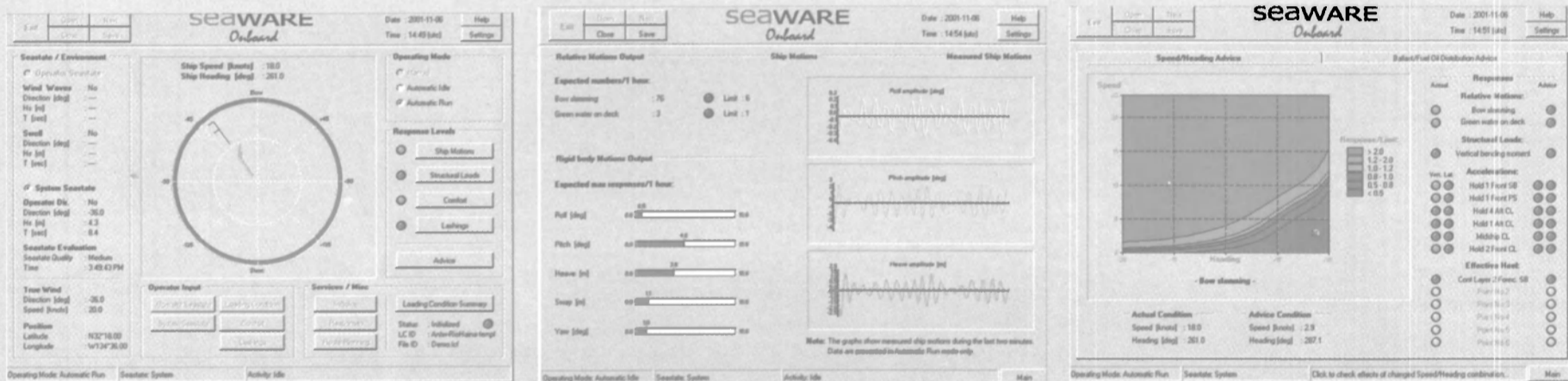
- Automatic, continuous information on sea state and various wave-induced effects
- Warning functionality based on forecasts;
- Advice on heavy weather maneuvering;
- Route planning facility;
- Continuous recording of ships dynamic behavior and

performance.

A built in weather routing tool gives a unique possibility to greatly reduce the operating cost and improve time efficiency for the vessel based on weather prognosis from a weather bureau. The ship's command has the possibility to investigate the implications on ship performance and dynamics resulting from alternative routes and/or engine settings.

During sea passages, the system continuously evaluates the present sea condition based on measurements of the motions of the vessel. This is followed by predictions of the resulting dynamic effects for the near future. The system will detect undesired or dangerous situations well in advance. The Master/Navigation Officer can also investigate the implications of altering course and/or speed.

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Thrane & Thrane A/S Launches eTrack

Thrane & Thrane received type approval from Inmarsat for the world's first Mini-C product, eTrack. A full integrated Inmarsat Mini-C product, offering high reliability, quality and service, as well as benefits of lower cost and high performance, eTrack integrates transceiver, antenna, power supply, and a 12 channel GPS receiver in one single unit, thus providing a significant cost reduction as well as simplified installation.

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Kelvin Hughes: Safety Job 1

Kelvin Hughes has developed a software package that assists in the risk assessment process required to operate ECDIS in the Raster Chart Display System (RCDS) mode. The U.K. Maritime Coastguard Agency (MCA) requires a risk assessment to be undertaken before authorizing a vessel's use of ECDIS in the RCDS mode of navigation.

The easy-to-follow, step-by-step pro-

gram from Kelvin Hughes is designed to make it easier to determine the optimum level of paper charts required to complement the ECDIS.

Thus, the risk assessment software is designed to significantly help ship's operators to develop instructions and procedures for shipboard personnel on the safe and efficient use of any electronic chart system.

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Towards the "Paperless" Bridge

Maptech was chosen as the official raster chart of the U.S. Coast Guard. The contract calls for Maptech to supply Digital ChartKit Professional to the USCG on a fleet-wide basis. Along with the official digital NOAA charts, the USCG uses Maptech's exclusive Notice to Mariners weekly Internet E-Mail automatic update service.

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Consilium Navigation Acquires BSH Approval

Consilium Navigation AB has recently acquired BSH (Bundesamt für Seeschif-

fahrt und Hydrographie) type approval for its voyage data recorder system, VDR M2.

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Navy Orders OSI System

Offshore Systems International Ltd. (OSI), said that the Canadian Navy placed a new order for ECPINS Systems worth more than \$300,000 to Offshore to support urgent operational requirements on board Navy ships deploying as part of Canada's contribution to the international war on terrorism.

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Kittiwake Offers New Oil Test Kits

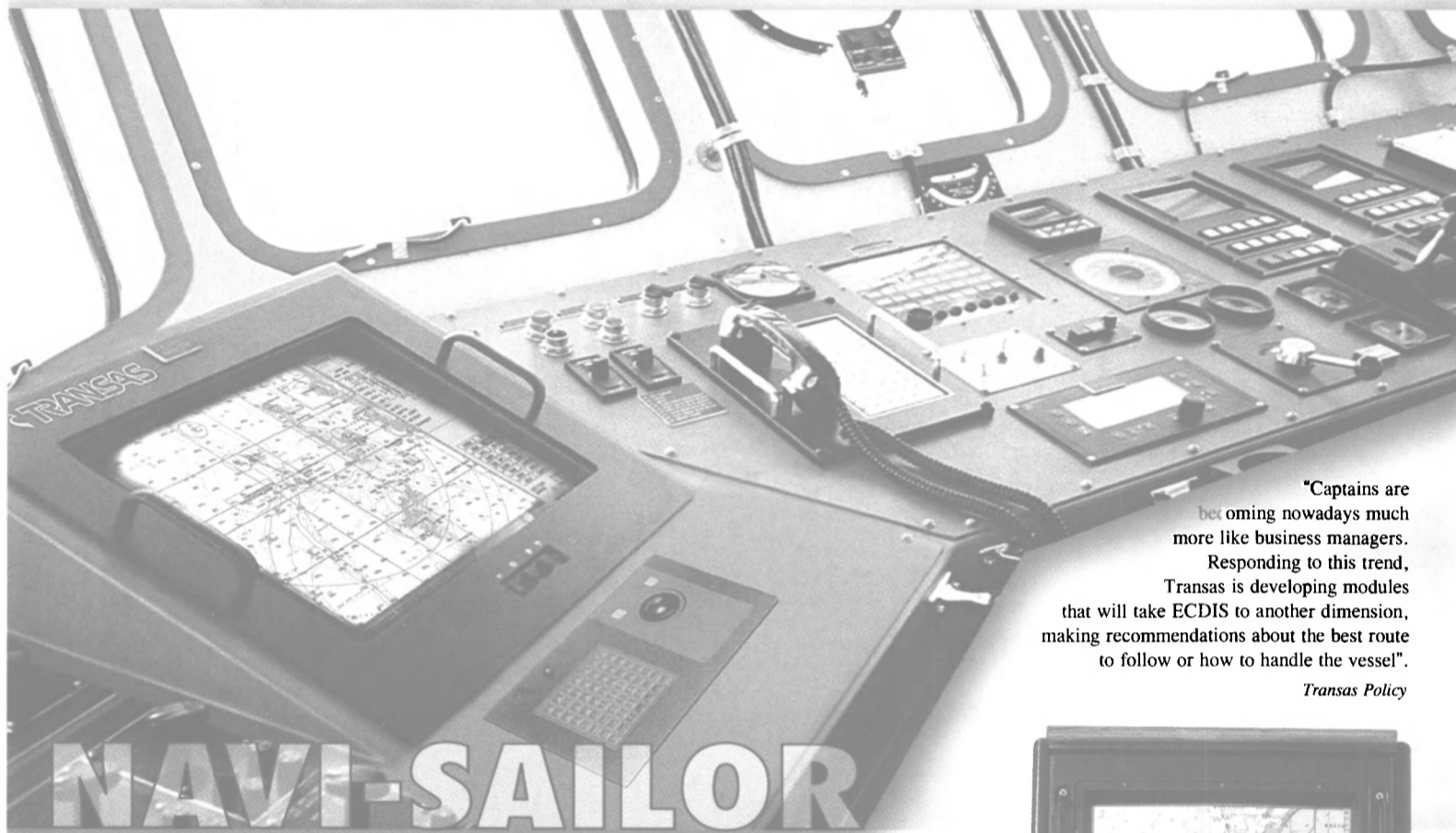
Undetected ingress of water or degradation of the Total Base Number (TBN) of engine oil could easily end as the most expensive bill of the year. Regular sampling is the only foolproof way of monitoring the con-



dition of your machine oils. Kittiwake Developments Ltd., a specialist in oil test kits, is aiming its new product launch at both ends of this crucial market sector, with its new DIGITest Kits for the multiple parameter users of machinery and the ECONTest cells for single parameter, entry level user. Kittiwake's latest offering incorporates both 'water in oil' and the TBN test in one cell. The DIGITest cell, made from rugged machined aluminum with pre-programmed proprietary software. The new dual purpose test cell can be switched from water to TBN testing with a swift wipe of a paper towel and a press of a button. It is designed with non-slip twist grips at either end, and a clear scratch resistant LED display. For ease of use, the display also features step by step instructions. Clearly a key advantage is the reduction in cost, which is passed on to the enduser. Being virtually indestructible, even in the often harsh 24/7 conditions of an offshore oil-rig, a ships engine room, or a remotely located power station, the DIGITest cell casing and display comes with a lifetime guarantee.

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PROFESSIONALS SAY **YES** TO QUALITY



"Captains are becoming nowadays much more like business managers. Responding to this trend, Transas is developing modules that will take ECDIS to another dimension, making recommendations about the best route to follow or how to handle the vessel".

Transas Policy

NAVI-SAILOR

More than 4,500 Transas professional ECS and ECDIS systems of the Navi-Sailor range have been installed so far. All in all, 30 Navies and Coast Guard organizations, together with hundreds of merchant shipping companies such as **Maersk Line, P&O Nedlloyd, P&O, Color Line, Stena Line, Stena Bulk, Tor Line, Standard Marine Services, V-Ships** and **Holland America Line**, amongst many others, now use Transas systems.

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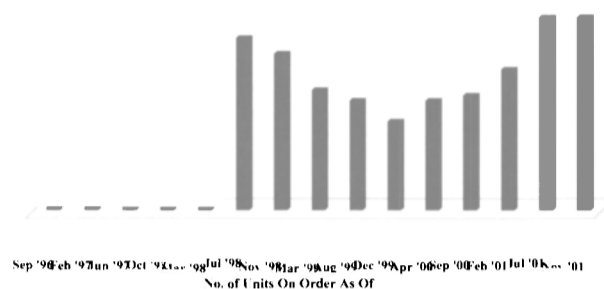
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Floating Production Systems

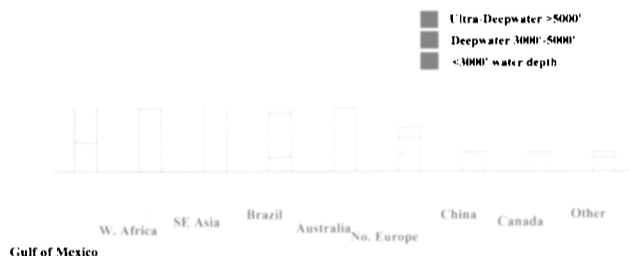
a series of business reports on floating production systems to be published in November 2001, March 2002 and July 2002
\$1,400 for the report series

Order backlog - Despite the recent downturn in the offshore sector, there has been no decline in activity involving new floating production systems. Between July and November 2001, 9 additional floating production systems were ordered - and the backlog of orders as of November remained at a four-year high of 37 units. The November report provides details on who's building what.

Order Backlog for Floating Production Systems Remains at 37 Units

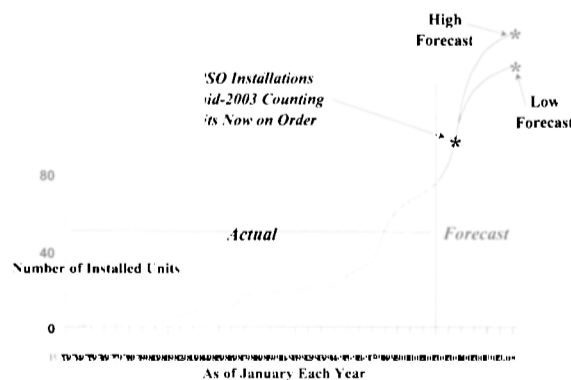


175 Projects Involving Floating Production Systems are Planned or Under Study



New projects - We have identified 175 projects in the design or planning stage that potentially require a floating production system. A listing of these projects is provided in the November report, along with their location, water depth and likely production solution. In the report, we also provide details for more than 50 projects in the planning or design stage and discuss developments involving 30 more systems on order or producing.

FPSO Vessel Requirements Will Grow Strongly Over the Next Five Year



Five-year forecast - The November report provides a totally updated five-year forecast of orders for floating production systems. We identify the likely number of additional FPSOs, production semis, TLPs and spars to be required - along with the capex associated with the orders. We believe this forecast of equipment requirements will be helpful to anyone involved in this business sector.

To order the report series - Just fax your order to 1-202-333-8504 or e-mail your request to maassoc@msn.com. We will provide the reports via e-mail or hard copy, depending on your preference. If you would like more details on the reports, please visit our website at www.imastudies.com.

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Bridge of the Future



Seen by **Andrey Vorobiev**, Manager of the Navigation Product Unit, Transas

In the light of the overall tendency in the industry towards the integration of information into single interactive solutions, Transas feels that integration technologies will also be dominant on the ship's bridge.

Today, captains are becoming much more like business managers who have to simultaneously deal with many different types of information. Responding to this trend, Transas is developing modules that will take ECDIS to another



dimension allowing it to make recommendations about the best route to follow or how to handle the vessel.

We at Transas see that in a few years, the ship's bridge will be a fully integrated environment incorporating Radar/ARPA, ECDIS, AIS, and other types of equipment with, as a rule, two flat-panel displays located at a central workstation. Note, this is basically, the implementation of the DNV (Det Norske Veritas) "Watch One" configuration.

Either display on the bridge will be capable of showing any combination of information. However, one will primarily be used for chart-related navigation (grounding avoidance), and the other for collision avoidance. Now, Transas offers high tech solutions that fully conform to our vision of the ship's future. The Navi-Bridge from Transas, which was introduced to the worldwide maritime community as recently as at the Europort

January, 2002

2001 exhibition in Amsterdam in November 2001, allows instantaneous switching between the Navi-Sailor navigation software, Navi-Radar and Navi-Conning systems at any workstation.

Another characteristic feature of the future bridge will be its increased capability of displaying the information for the use in the decision support (i.e., the "what if"). With ever larger, deep draft vessels, decision support will become increasingly valuable in terms of tides, water levels, current flow, ships tactical characteristics (e.g., squat), cargo loading, just-in time-arrival, etc. Such functions of Transas Navi-Sailor systems as Trial Manuever or Weather Module allowing to overlaying 5-day weather forecast against the electronic chart screen, seem to be efficient leads towards this 'trial' functionality of the future bridge.

AIS (Automatic Identification System) in combination with Radar/ARPA will result in far more accurate and reliable information about the location and movement other vessels. Potentially, it will also lead to a significant reduction in voice communications (ship to ship and ship to shore).

VTS of the future will be more Vessel Traffic Information Services (VTIS) as well as port security operations. If information on a particular port exists, the key to be able to access and display it onboard a ship. Potentially, this will be similar to a Maritime Internet service (satellite or land based communications).

At the same time, un-manned ships will hardly become the reality in the foreseeable future.

One can seriously think of one-man ships — only for certain classes of vessels, not likely SOLAS. The advanced functions that can be expected in ECDIS, in the near future, include, for instance, the Route showing on both Autopilot (or Track Control) and ECDIS. Also, routes will be sent in digital format from VTIS center or shipping company to the vessel to notify of a change in route/destination if required.

At present, the Transas navigational product line consists of a range of marine navigation systems, including the world's first type-approved ECDIS, suitable for any type of vessel; a world collection of exclusive vector electronic navigation charts; software/hardware instruments for processing of radar information; and a wide choice of specialized software applications.

Transas products are successfully used onboard thousands of vessels, operating worldwide. Transas products are



designed in full compliance with the international requirements set out for navigation equipment, and with the SOLAS convention. This compliance has been confirmed many times by a number of classification societies in various countries.

Quality control procedures are carried out in accordance with the ISO-9001 standard.

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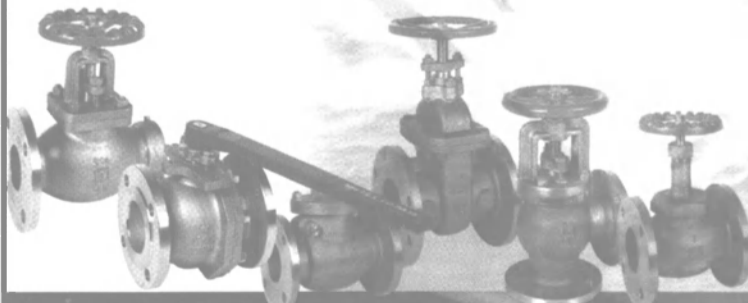
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Australia is a Tough Testing Ground for Marine Equipment

When heavy ships are maneuvered in rough waters with a small crew, or oil tankers are escorted through narrow confined channels, the strength and reliability of a tug boat's towline is paramount to safety and efficiency. Tugboats require ship-assist ropes that are

extraordinarily strong, yet light enough for a crew of only a few to handle. Tugboat operators around the world have found a solution: Plasma ropes manufactured from Honeywell's Spectra fiber. Made by the Puget Sound Rope Corp. with a unique, patented 12 x 12 braided construction, these are some of the world's strongest synthetic ropes for their weight and are so light, they float.

"Puget Sound's 12 x 12 construction method has proved to be a remarkable innovation," said **Joel Altus**, Foss Maritime's supervisor of vessel rigging. "Spectra fiber is an integral part of the program."

Marine towing companies find they are saving time and money by using Plasma ropes. Also, by using these lightweight ropes, companies have the potential to increase safety for workers and effectively lower workers' compensation costs. For example, the lighter ropes are cited as a factor in contributing to a significant drop in back injuries on deck, the number one insurance claim on boats. A nine-inch-diameter Plasma rope weighs slightly more than two lbs. / ft. (3 kg/m), whereas a comparable-size polyester rope is more than double the weight with only one-third of the strength.

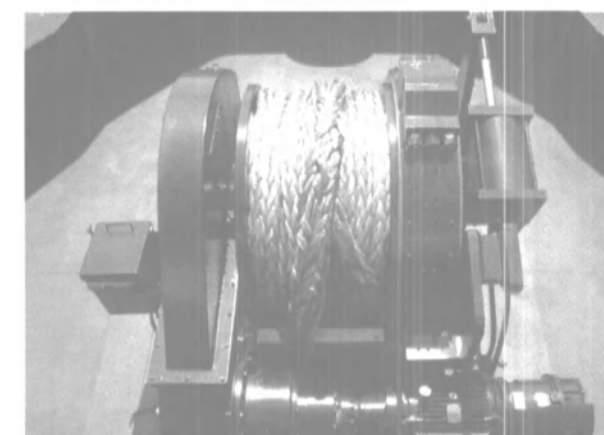
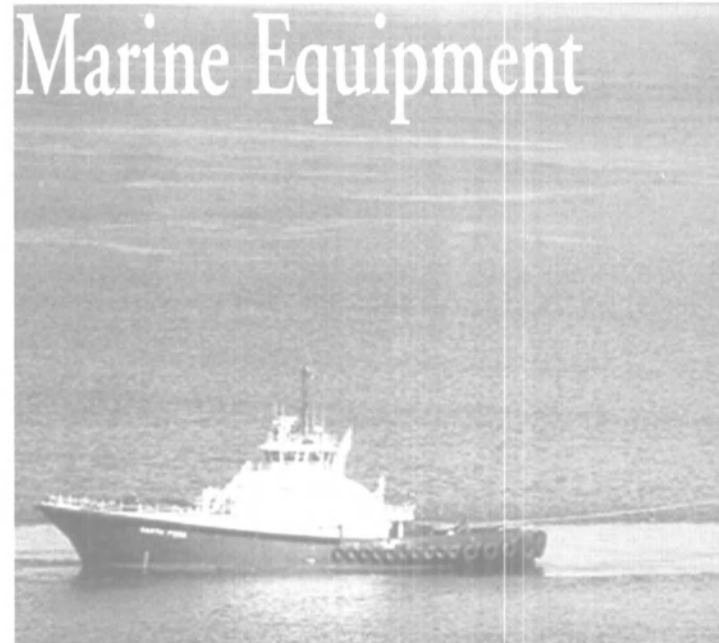
"The workers found it hard to believe a rope that small could have that amount of strength," said **Geoff Grosskreutz**, technical manager of Queensland Tug and Salvage, an Adstream Marine company. "Now, they accept it and are happy with it."

This case study considers the experiences of two Australian companies. Adstream Marine, the country's largest tugboat operator, and Jeyco Pty Ltd., a marine-rigging supplier.

Changing Tides

The introduction of tractor tugs in the early 1980s changed the way tugs assisted ships in their berths. The tractor tug represented a major advancement in tugboat design with its state-of-the-art propulsion system and controllable pitch blades. "The entire scheme of ship assist and high-speed tanker escort changed radically," said Altus of Foss, whose company pioneered tractor tug technology in North America. "It was revolutionary." Unlike conventional tugs, a tractor tug can apply power and thrust - the payload - in all directions. Because of their maneuverability, tractor tugs have been touted as a safer escort for ships, particularly oil tankers.

With tractor tugs, a single line replaced the three to four lines that were previously deployed to the ship. A towline was needed that had extraordinary strength and excellent impact resistance because of the tractor tug's swift maneuverability. In Australia, one of the biggest factors that drove tugboat operators to seek a better solution to multiple lines was a reform to reduce the crew size from four to three - a master, engineer and deckhand. The country's occupational health and safety laws mandated increased safety on tugboats



Plasma ropes manufactured from Honeywell's Spectra fiber.

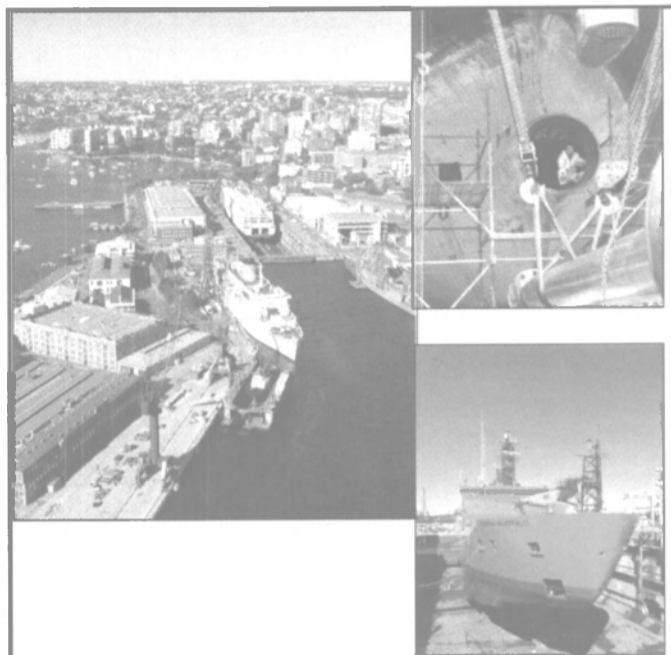
because of the high incidents of back injuries by deckhands. Tugboat operators in Australia sought a way to increase productivity with a smaller crew, while at the same time improving safety.

Plasma ropes made with Spectra fiber have proven to be a viable solution, offering one of the highest strengths, lightest weights, lowest stretch and meets the low creep required. Their soft, torque-free braided construction also makes it easy for the crew to handle. The introduction of Plasma ropes and the 12 x 12 construction has been the "biggest single change to the industry" in the past two decades, according to **Simon Taylor**, Jeyco's managing director. "Plasma rope came along at the right time. It is an enhanced form of Spectra fiber with higher strength."

The costs per tow using Plasma rope are about half — or \$7 per tow — according to average figures compiled from Jeyco's customers. The prices range based on the job being done. By switching from polyester ropes to Plasma ropes made with Spectra fiber, harbor towage contractor Queensland has cut its costs in half to under \$12 per tow. It is using the same mainline for as many as 1,200 jobs and Plasma rope towing tails for up to 600 jobs. Another cost-saving benefit is the ease of repairing this rope. In fact, Puget Sound's 12 x 12 braided rope is the first truly repairable braided rope, according to its manufacturer, and can easily be repaired by replacing a damaged strand, keeping it in use longer. The rope is also easy to inspect by the users to determine when retirement is necessary.

Adstream, Jeyco Cite Successes

Queensland Tug and Salvage, an Adstream Marine company, switched to Plasma ropes to fulfill safety mandates when the industry went to a three-man crew. Based on its successes, Queensland now uses the ropes



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on all 23 tugs in its fleet and has been truly satisfied with the results, said **Geoff Grosskreutz**, technical manager.

Like many other operators, Queensland uses Plasma ropes in a grommet configuration — a long circular loop of line with a Plasma rope tail, connected to the main double-braided polyester line that goes through the boat's fairlead. This configuration helps to prevent chafing of the rope and the Plasma rope handling tails provide easier hookup and handling.

"Queensland is getting as many as 1,500 jobs out of a grommet and up to 5,000 jobs out of the main line configuration - compared to previously only getting 500 jobs using the whole line," Grosskreutz said. "It's an excellent product and has a good service life," he added. "We're extending the product life while increasing safety and reliability. Puget Sound's rope is indeed cost-effective."

Jeyco Pacific, a marine rigging supplier, helps customers add value to their businesses and reduce costs. Offering Plasma ropes as a towing solution has enabled it to fulfill that mission. After using polyester and other high-strength hybrid materials, the company discovered Puget Sound's Plasma ropes in 1996. It initially took some trial-and-error to get the right sizing for its grommet configuration. But Jeyco now reports 100 percent success with all its customers and has helped make Plasma ropes an integral part of almost every fleet in Australia. Plasma ropes have helped improve labor relations in the country between the unionized workers and management, Taylor said. "Tug operators and crews love this product because it's easier to handle and they can do their jobs quicker and safer," he said.

Strength from the Start

The Puget Sound Rope Corp., part of the Cortland Companies, specializes in manufacturing high-performance braided rope for the most demanding applica-

tions, from emergency towlines to vessel assists. Puget Sound began a research program in the early 1990s to determine how to best manufacture ropes using Spectrafiber. As a result of this research, it developed a new generation of machinery specifically designed to utilize the full potential of Spectra fiber.

Company founders **Dick Ryan** and **Tim Sullivan** developed the exclusive

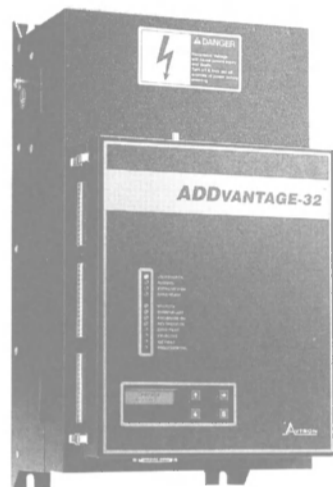
Plasma rope recrystallization process that was patented in 1994. This process improves the rope's translational efficiency giving it higher strength, lower stretch and better abrasion resistance.

Spectra fiber provided Puget Sound with the high-strength-to-low-weight ratio needed to produce ropes that match wire on a strength-per-size basis. "The properties of Spectra fiber allowed us to

do what we do with our Plasma rope process," said **Sam Bull**, vice president of the Cortland Companies. "Essentially we take Spectra 900 fiber, process it through our Plasma line and depending on the final rope size and construction we see strength increases of up to 80 percent compared to a similar rope."

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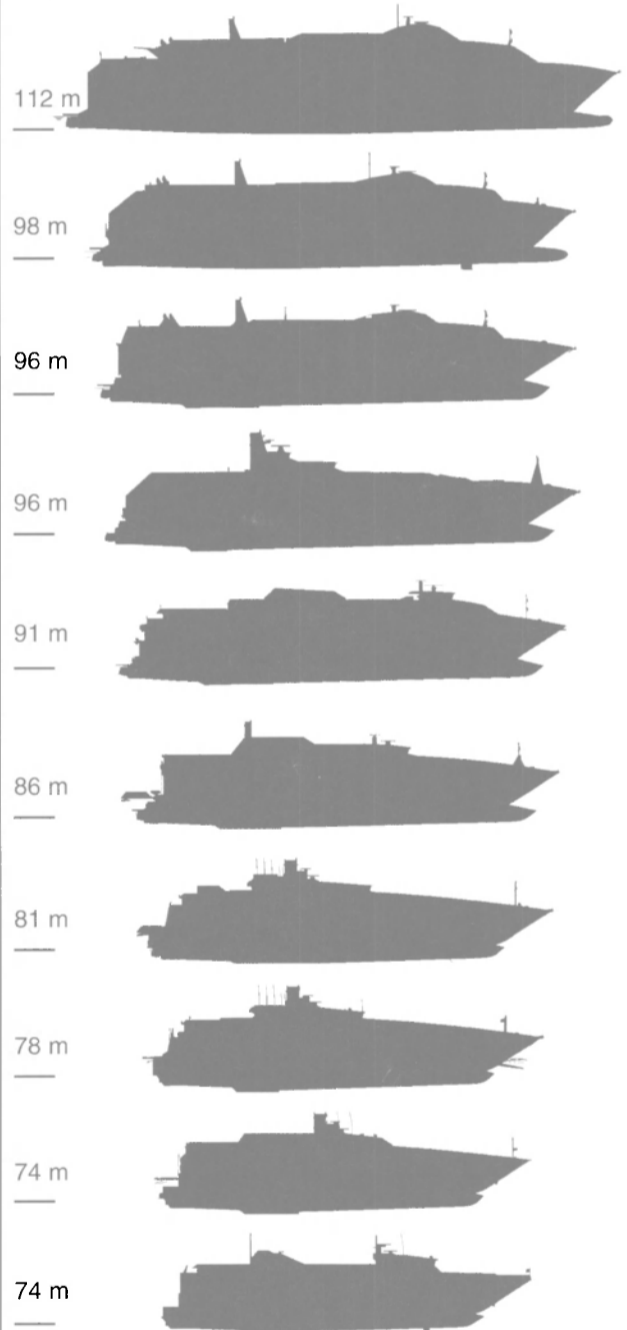
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AUSTAL USA Launches 150-ft. Crew Boats

Austal USA has launched its first two vessels, Anapaula and Veronica from the new, high-tech facility in Mobile, Ala. The 120 man workforce watched as on December 2 — and then December 20, — each of the vessels made its way onto

the launch barge supplied by part owner, Bender Shipbuilding and onto a dry-dock for floating off. The Austal USA team produced these two vessels in just eight months in the large construction hall on the edge of the Mobile river. These vessels are also the first of a new range of crew boats designed by Austal Ships of Australia which vary in length

from 135 ft. (41.1 m) up to 170 ft. (51.8 m). While alongside, these vessels will be commissioned followed by sea trials which are already underway for Anapaula, the first to be launched. Handover to Otto Candies LLC will take place during January 2002.

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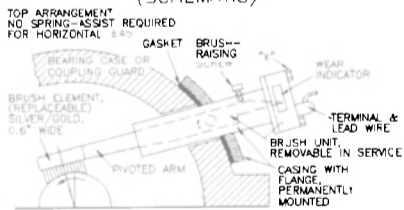
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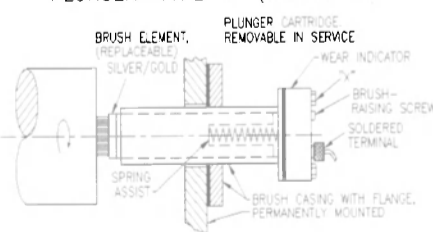
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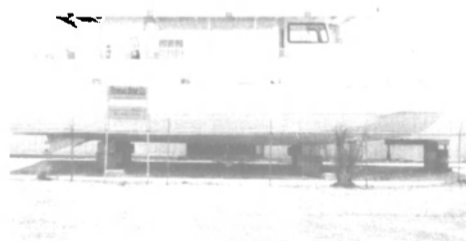
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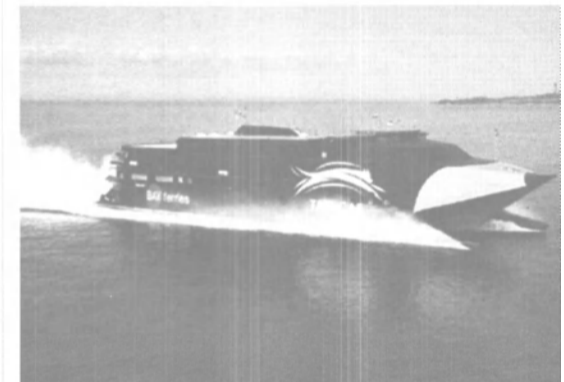
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The Cat Completes Record Canada-Australia Passage

A new record for the fastest sea passage between Canada's East Coast and Australia has been established by the Incat's The Cat.

The Cat set out on its 10,294 nautical



miles passage to Hobart, Tasmania from Nova Scotia's Bay of Fundy on November 13. Just 15 days, two hours and 30 minutes later the craft was safely alongside at Incat's shipyard in Hobart.

The first leg of the voyage, a distance of 2,238 nautical miles averaging an impressive 37.5 knots, was completed on November 15 when The Cat arrived at the Panama Canal.

The next stage of the voyage, 4,500 nautical miles at an average speed of 26.47 knots, was accomplished when the craft arrived at Tahiti on 23 November.

The third and final leg from Tahiti to Hobart, a distance of 3,556 nautical miles, placed The Cat in Hobart at 0900hrs GMT (2,000 hrs. local) on November 28, beating all previous passages between Canada and Tasmania.

Since The Cat started making the twice-yearly journey in 1998 the typical time taken has been around 20 days.

Each year since her delivery to Canada in 1998, The Cat has been chartered to TT Line by owners Bay Ferries of Nova Scotia for the southern hemisphere summer season on Australia's Bass Strait.

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Wärtsilä EnviroEngines For P&O Princess Cruises

P&O Princess Cruises will utilize Wärtsilä EnviroEngines, which employ electronically-controlled common-rail fuel injection to provide optimum combustion over the entire load range, to give the particular benefit of no visible smoke at any load and when starting or during transient load changes. The engines also employ electronically controlled direct water injection to achieve the low NOx emission value of 6 g/kWh. These EnviroEngines for P&O Princess Cruises are the first to incorporate both technologies. As diesel engines, their high efficiency also means they have the lowest CO2 emissions of all prime movers.

The smokeless operation of EnviroEngines meets the need for a clear engine exhaust when operating in environmentally sensitive areas such as Alaska.

The first eight Wärtsilä EnviroEngines, two Wärtsilä 9L46 engines, two Wärtsilä 8L46 engines and four Wärtsilä 16V46 engines, have successfully completed factory acceptance tests for Mitsubishi Heavy Industries, Chantiers de l'Atlantique and P&O Princess Cruises. On December 5, the eighth engine was tested in Turku in the presence of **Charles Arkinstall**, executive vice president, and senior technical staff of P&O Princess Cruises, together with **Mikael Makinen**, group vice president, marine & licensing, Wärtsilä Corporation.

Two ships are building at Chantiers de l'Atlantique in France, with delivery scheduled in 2002 and 2003 - each will have two Wärtsilä 16V46 EnviroEngines, each delivering 16,800 kW at 514 rpm. Named Coral Princess and Island Princess, respectively, when delivered, the Coral Princess will be the first vessel to enter

service with EnviroEngines.

Two ships, the Diamond Princess and Sapphire Princess, are also being built at Mitsubishi Heavy Industries in Japan. Due for delivery from the Nagasaki yard in 2003 and 2004, respectively. These ships will each be equipped with two Wärtsilä 9L46 and two Wärtsilä 8L46 EnviroEngines. The nine-cylinder engines are rated at 9,450 kW output each at 514 rpm and the eight-cylinder engines 8,400 kW at the same speed.

Twenty-seven Wärtsilä EnviroEngines of three different engine types have been ordered for 16 ships and in addition low-speed engines with similar technology have been ordered for six further ships.

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American Vulkan Enhances L Couplings

American Vulkan has enhanced its couplings with a new Vulastik-L style for shock load applications such as those found on winches, excavators and ferry operations with constant forward and reverse maneuvering. The new style embeds an aluminum ring in the silicone element for added strength required by frequent clutch engagement. Vulastik-L couplings include a hub and alloy housing, which are connected by an elastomeric element. The element is vulcanized to a center ring at its inner diameter and the outer diameter of the element has teeth that fit the alloy housing. These teeth, supported by the aluminum ring, provide the axial plug-in feature and compensate for angular displacement of the coupling up to 0.50 degrees. The Vulastik-L coupling compensates for axial, angular and some radial displacement of connected machines making it an ideal

coupling for two-bearing generators, pump drives and diesel driven compressors. For ease of service, this coupling features plug-in tooth design that allows for blind assembly and requires no lubrication. The product also offers precise system tuning with sizes from 295 lb-ft. to 18,500 lb-ft. and several grades of stiffness per size.

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Thrustmaster Adds New Personnel



Thrustmaster of Texas, manufacturer of marine propulsion systems, has added three new personnel in key positions.

Jeff Miller has joined the company as marketing manager. Miller, who has more than 25 years of experience in marketing communications (including 15 in the oil and gas, manufacturing and offshore sectors), will be in charge of market research, advertising, public relations and all other marketing-related activities for the company. He will also be responsible for setting up a network of international manufacturer's representatives to help maintain the company's international presence.



Miller holds a degree from the University of South Florida in Tampa, and is a member of The International Association of Business Communicators (IABC).



Assisting Miller will be **Amanda Casey**, who has been

hired as Thrustmaster's marketing coordinator. Casey, who previously worked with Miller at Kaldair, a former division of British Petroleum (BP), will work to develop Thrustmaster's web site, as well as the company's database. She will also be responsible for writing and editing collateral material, coordinating trade shows and management of internal communications.

Gene Little has joined Thrustmaster as quality manager with more than 35 years of experience in directing and managing quality policies and procedures for manufacturing firms. Little has been handling ISO policies and procedures since 1987, and is currently implementing those procedures throughout Thrustmaster.

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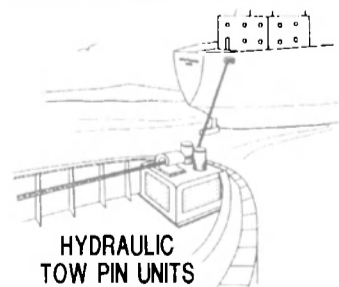
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Creating a Portable Dynamic Positioning System

Imagine being able to take something as simple as a barge, and convert it into a highly sophisticated dynamically positioned vessel. Now, imagine this conversion being done dockside, in the water, in a week's time. Thrustmaster's deck-mounted Portable Dynamic Positioning System (PDPS) eliminates the need for dry-docking, structural changes to the vessel, and only takes a minimal amount of deck space, so a vessel can be ready to go with a minimal amount of down time. The Arctic Discoverer was the first vessel on which a Thrustmaster portable DP system was installed in 1988, and the Thrustmaster 4 x 500-hp portable DP system was used by Nippon Salvage on its 270 x 85 x 17-ft. (82.2 x 25.9 x 5.1-m) deck barge, which has been outfitted for reel pipelay.

Installation of the thrusters and HPUs is accomplished dockside by the use of cranes, either shore-based or on the vessel.

The equipment is modular and easily trucked over-the-road, even to remote locations - installation and mobilization can be accomplished in just a few days. A service technician, who uses a laptop computer for program fine-tuning, troubleshooting and performance analysis, is required during mobilization of the system. Demobilization of the system is simple and is performed via the interconnecting hydraulic hoses and cables, which are removed, drained and packed. The thrusters, HPUs, and controls are removed from the vessel and transferred to the next project vessel, or stored until needed.

How It Works

Thrustmaster's PDPS is a computer-controlled propulsion system that allows a vessel to maintain its position in open waters against wind, waves and current. It can also let a vessel follow a predetermined track at a specified heading and speed, or follow an independent target such as an ROV or AUV.

The PDPS consists of four thrusters controlled by a computer, which calculates and controls the amount and direction of thrust necessary to control the vessel's heading, position and speed.

Position reference sensors, combined with wind sensors and a gyrocompass, continuously provide data to the computer regarding the vessel's position, heading

and wind forces.

In addition to the thrusters, the PDPS also has four containerized HPUs, one remote manual bridge common control panel, one DP computer system, the interconnecting hydraulic hoses between the thrusters and HPUs, and the electrical cable between the HPUs and the control consoles. Standard thruster sizes are 300, 500, and 1,000-hp, and using multiple thrusters, systems up to 8,000-hp can be configured.

Accurate control of thruster output is essential in DP applications. The PDPS uses fixed-pitch propellers with hydraulic podded drives, thruster output is regulated through control of the propeller speed and the closed-loop hydraulic drive facilitates precise propeller speed control from zero to maximum rpm.

Thrustmaster's portable thrusters are deck-mounted using a minimum amount of space. The variable speed hydraulic drive motor is in the lower foot of the thruster, directly in line with the propeller shaft. This direct hydraulic drive eliminates the need for right angle gear transmissions and drive shafts used on other thrusters. Hydraulic hoses run from the deck-mounted upper thruster assembly down to the propulsion motor in the lower foot of the thruster. Other than the hydraulic fluid running through the hoses, there are no moving parts in the thruster stem. The stem length can easily be adapted to accommodate different vessel hull depths. Each thruster comes with a self-contained HPU, consisting of a marine-type hydrostatic transmission unit using a radiator-cooled diesel engine as a prime mover. The HPU may be installed at any convenient location on deck.

Each HPU comes with: Diesel engine; hydrostatic pump package; a fuel day tank; an independent battery-powered electric start; control system with automatic alarms and shutdown; critical grade muffler and noise attenuating equipment; and a standard ISO 20-ft. container as an enclosure (on some HPUs)

These power packs produce the hydraulic power for the propeller drive system as well as hydraulics for steering and auxiliary functions. The power is provided through hydraulic hoses that run on deck from the HPU to the thruster. The basic PDPS uses a compact dynamic positioning computer specifically adapted for use with Thrustmaster's hydraulically driven



The PDPS solution from Thrustmaster offers cost effective solutions, as its use eliminates the need for dry-docking, structural changes to the vessel, and only takes a minimal amount of deck space.

azimuthing thrusters. The basic DP computer system is designed to satisfy IMO DP Class 0/1 and communicates with the thruster output steering systems through conventional signal cables. The basic system consists of a controller unit and an operator terminal. The controller provides interfaces to the position reference systems, wind sensors and the hydraulic thrusters. Using a three-axis joystick, course adjustment wheel, a selection of dedicated buttons, and an LCD display, the operator can automatically hold or manually adjust the position and heading of the vessel. Thrustmaster also furnishes a drop-in style manual remote bridge control panel to provide manual control over each individual thruster when the DP computer is off-line.

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The Marine Engine Elixir

Pictured next to this MAN B&W Diesel Ltd, Paxman, 18VP185 engine for a High Speed ferry Fraser Toyne, who is the son of Roy Toyne, the Head of Engineering of Regulateurs Europa, has been a devotee of all things Marine since a very early age.

Starting at an early age, Fraser has developed into an authority on what is happening in the world of ships and engines. Using his own initiative, he has visited many engine rooms, engine manufacturers and other installations. He is not averse to enlisting the help of anyone from the Chairman of a major shipping company to a Marine Superintendent, to ensure that he gets to



Fraser Toyne, in the VP185 test cell. Toyne has used an interest in marine diesel engines to overcome seemingly insurmountable medical hurdles.

see a new ship.

At Fraser's recent 30th birthday party, he was presented with a certificate to acknowledge his tireless contribution and assistance which he has freely given to Regulateurs Europa. The certificate, presented by Robin Grigsby, the General Manager of Regulateurs

Europa now takes pride of place in Fraser's bedroom.

After reading all this you may be surprised to learn that following a childhood medical incident, Fraser unfortunately suffered brain damage and was not expected to learn how to read and write. However, his passionate interest in marine engines spurred him on and he has learned to read and write using engineering magazines such as the Maritime Reporter & Engineering News.

Regulateurs Europa is a long established supplier of governors and control systems for marine applications and is a business unit of MAN B&W Diesel Ltd., and offers control and monitoring solutions to a wide range of engine builders and end users. Their Viking digital electronic controls have been used extensively to control the propulsion and auxiliary engines, such as the 18VP185, of conventional and high-speed ships.

Of course all of this means that Roy is unlikely to be able to turn off from thinking about work because he has this fantastic and interesting son who is passionate about ships and diesel engines.

RoPax Propulsion Concept Proves Efficient

Wartsila, in conjunction with the Finnish research project SEATECH 2000+, has been developing some new machinery solutions for RoPax vessels. A promising concept is a semi-diesel electric machinery, where mechanical propulsion is combined with a diesel electric power plant. This new RoPax concept was presented for the first time at the Europort 2001 exhibition.

The RoPax vessel has a semi-diesel electric machinery featuring a diesel mechanical part driving a conventional CP propeller and a diesel electric power plant powering a contra rotating electric pod and the entire hotel load of the ship.

The machinery features Wartsila EnviroEngines equipped with Common Rail and compact SCR units. It is designed for high speed operation, able to maintain a service speed of over 30 knots fully loaded in most operating conditions. The RoPax is large compared to other high-speed ships and it has a gross tonnage of about 37,000 gt.

The superstructure, with day facilities for 2,000 passengers, is located in mid-ships leaving the aft end of the vessel open. The cargo is transported on two large car decks. Trailers and trucks are located on the main car deck, which has enough free height over the entire deck for high vehicles, and on the open aft part of the upper deck. The enclosed forward part of the upper deck is used for personal cars only due to restricted

free height on the deck. The hull sides have a large flare angle to allow for an extra wide car deck while keeping the hull beam at the waterline level narrow. This makes it possible to increase the car deck area and thereby the lane meters without any impact on the resistance. The enlarged car decks makes it possible to carry all cargo on two decks and no lower cargo hold has therefore been incorporated in the design. This allows for faster loading and unloading since no internal ramps are needed. The loading and unloading of vehicles is handled over the stern ramps directly to both the main and upper deck. Two level ramps are therefore needed on shore. This simple and fast cargo-handling concept is in line with the high-speed philosophy of the proposed ship. The hull is of displacement type and features a very long and slender form with a single skeg in the center of the stern. The block and prismatic coefficient are optimized to offer the lowest possible resistance. The large flare angle of the hull sides gives a very narrow tanktop and engine room compared to conventional ships, which must be noted in the engine room layout.

The Machinery

The RoPax vessel has a semi-diesel electric machinery featuring a contra rotating electric pod behind a conventional mechanically driven CP propeller. It features a pair of 16V46C EnviroEngines for main propul-

sion, and a pair of 12V46C EnviroEngines plus a 6L32 EnviroEngine genset for the diesel electric power plant. Total installed power equals 61,500 kW.

All engines are equipped with common rail and SCR to reduce exhaust emissions, and the ship is designed for operation on HFO in order to keep the fuel costs low. The RoPax vessel features a propulsion solution with a contra-rotating FP propeller mounted on an electrical pod located directly behind a conventional CP propeller mounted on a single skeg in the center of the hull. This configuration offers much better hydrodynamical efficiency compared to a conventional vessel with twin screws on open bracket shafts due to the following reasons:

- The rotation energy from the forward propeller is utilized in the aft propeller
- Single skeg hull form gives lower resistance
- More favorable wake field from the single skeg hull
- Less appendage drag
- No rudder
- No shaft brackets
- No stern thrusters (However, the pod gives rise to some extra drag, but not as much as that of the appendage in a conventional vessel)

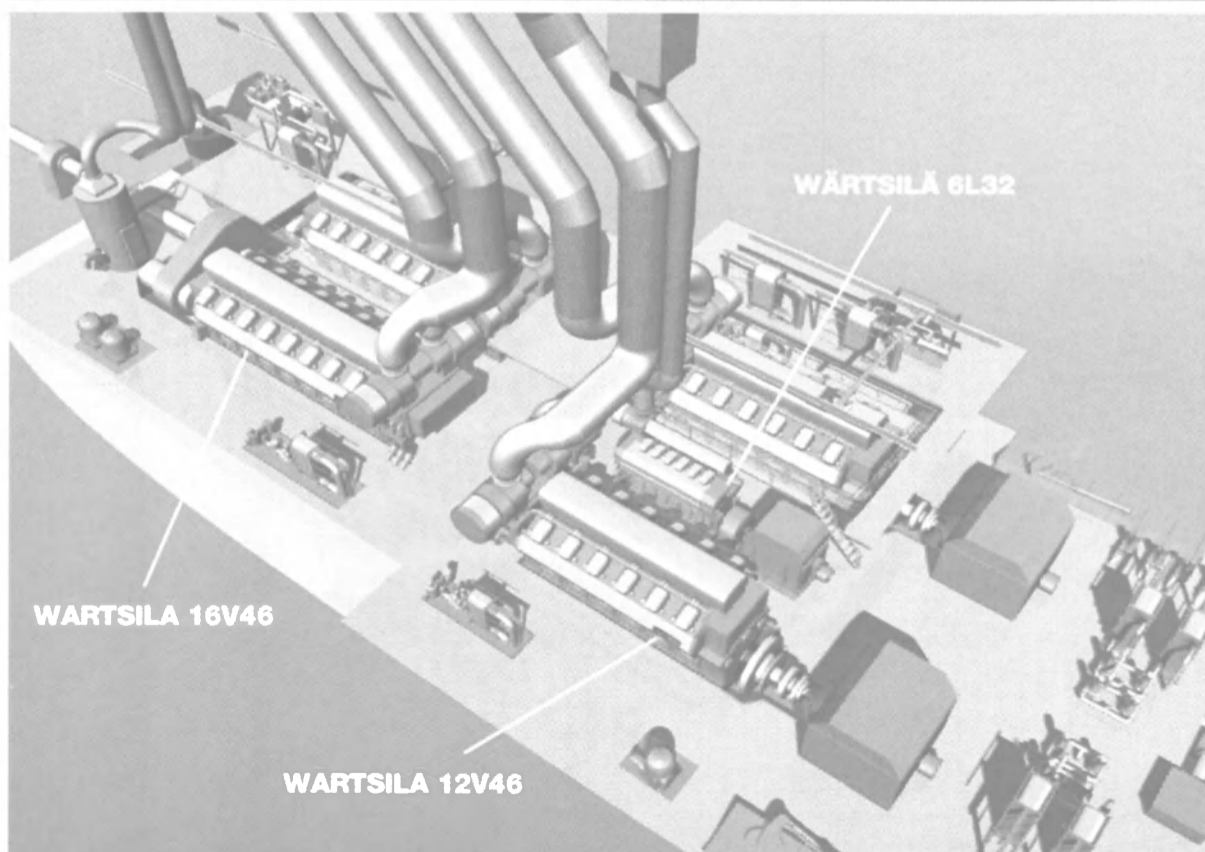
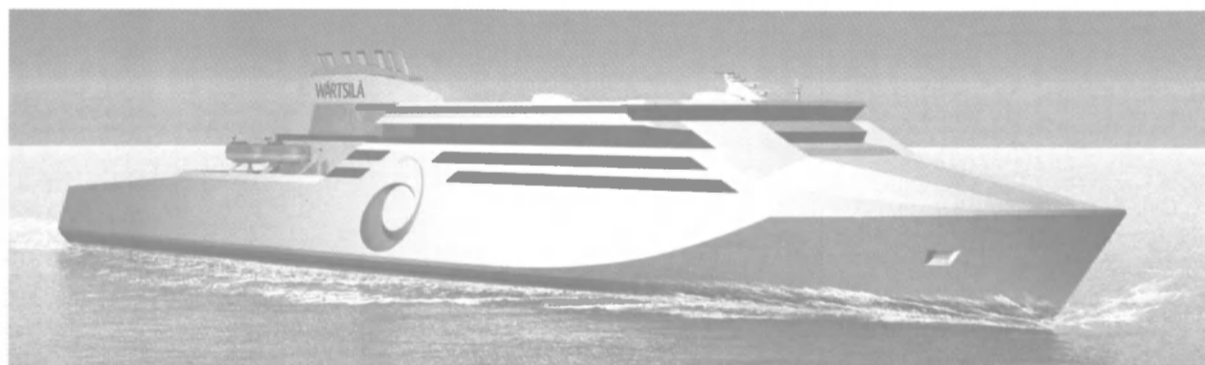
The propulsion also give rise to some other beneficial characteristics:

- Better transmission efficiency
- Lower total installed power
- Good maneuvering performance

Auxiliary systems

The ship is equipped with a SCR unit for each engine to reduce the NOx emissions. The SCR units are located above the car deck to reduce the engine casing space demand on the car deck level. The exhaust economizers are located above the SCR units in order to keep the exhaust temperature high in the SCR unit. There are water traps below the economizers to prevent dirty wash water to fall into the SCR units. The central coolers and the sea chest are located in the same compartment as the large generators. The fuel handling equipment on the other hand is located in the compartment in front of generators. The oil-fired boilers (OFB) are located in the same compartments as the main propulsion engines directly aft of the gearbox. The OFBs have a capacity of 3,000 kg steam per hour each. The fuel consumption of the semi-diesel electric machinery is lower than that of both a diesel mechanical and a fully diesel electric machinery. This gives rise to lower operating costs. However, the capital cost is higher than that of the diesel mechanical alternative, but still much lower than that of the fully diesel electric alternative. The total economical result is then dependent on the operation profile in question for the vessel. For a normal operation profile the proposed semi-diesel electric machinery offers the best economical performance. However, if the ship spends a lot of time in port, then the fuel cost will have relatively less influence on the total cost than the capital cost. In this case a conventional diesel mechanical solution, with low first costs, will offer the lowest total cost. The capital cost of the semi-diesel electric machinery is greatly influenced by the power ratio between the electrical and mechanical part of the machinery. This power ratio must be optimized on a project specific base.

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RK280: Cutting A New Path

The RK280 from the MAN B&W Diesel stable offers the best of both worlds, in that it was designed and built using the accumulated experience garnered since **Rudolf Diesel** introduced the diesel engine in 1893, melded with modern engine making methodologies which include predictive engineering techniques such as Finite Element Analysis, Dynamic Analysis, Thermodynamic Cycle Simulations and Fluid Dynamic Analysis. Incorporated into this new engine are the results of extensive field study and experience was gained from the RK270 series, which have performed well in the fast ferry, naval and power generation sectors.

The new unit is billed by its maker as "the most powerful and fuel efficient 1,000 rpm diesel engine in the world." Marketing claims and bragging rights notwithstanding, the unit does boast some convincing numbers, as evidenced by the attached charts.

Available in 12, 16 and 20 cylinder V formats, with a continuous rated power of up to 9,000 kWb, the RK280 embodies the continuation of the "less is more" trend, in that particular attention has been paid to

reducing the component count of the engine and minimizing the maintenance activities necessary. In addition, the engine has a slim profile and clean lines, and with ease of maintenance and installation in mind, it incorporates integrated passages and pipes that result in its compact dimensions.

Also, the engine comes complete with lube oil coolers, filters and all thermostatic valves, reducing the volume of separately connected ancillary equipment required.

The crankcase is machined from spheroidal graphite cast iron and features underslung main bearings, which are retained by two vertical studs and two cross bolts per side for overall stiffness.

The main bearing caps are secured by hydraulically tensioned studs to ensure maximum integrity of the crankcase system. The engine has a 52 degree vee angle, which is said to minimize torsional effects, and allows location of the intercooler within the engine vee, effectively reducing engine height.

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RK280 Diesel Engine

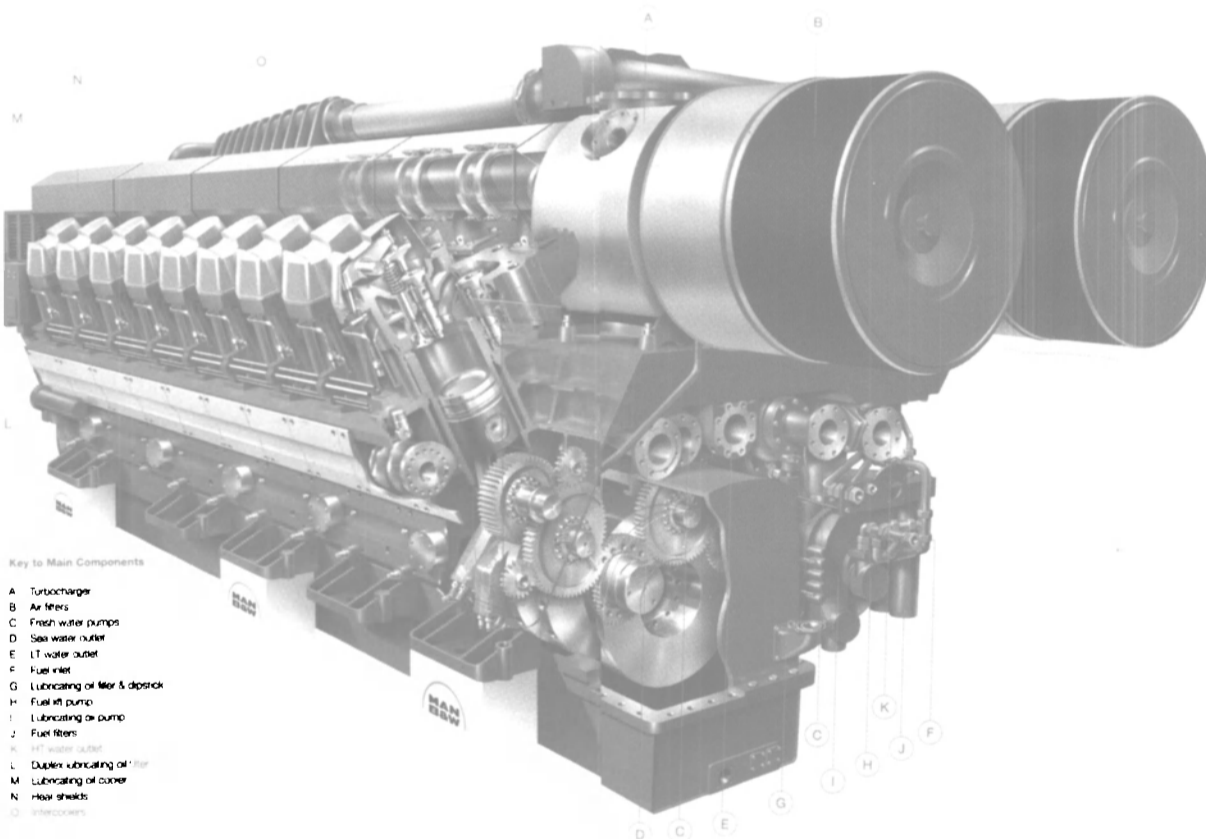
| | |
|-------------------|---|
| Cycle | 4 |
| Bore | 280 |
| Stroke | 330 |
| Mean Piston Speed | 11.0 m/s at 1,000 rpm |
| Standard Rotation | Anti-Clockwise looking on the drive end |
| Aspiration | Turbocharged and intercooled |
| Fuel | Marine BSMA 100 (ISO 8217), Class DMA & DMB or equivalent |

Dimensions & Weights

| | 12 | 16 | 20 |
|----------------------------|--------|--------|--------|
| # Cylinders | 12 | 16 | 20 |
| Configuration | V | V | V |
| Sump cap. (l) | 1,300 | 1,600 | 1,900 |
| Weight, less flywheel (kg) | 30,000 | 37,000 | 46,000 |
| Length (mm) | 5,490 | 6,410 | 7,330 |
| Width (mm) | 2,100 | 2,100 | 2,100 |
| Height (mm) | 3,180 | 3,180 | 3,180 |

Rating -kWb (bhp) kWc

| rpm | 12 | 16 | 20 |
|-----------|---------------------|---------------------|----------------------|
| 750 rpm | 4,050 (5,430) 3,890 | 5,400 (7,245) 5,158 | 6,750 (9,050) 5,158 |
| 900 rpm | 4,860 (6,515) 4,665 | 6,480 (8,690) 6,220 | 8,100 (10,860) 7,775 |
| 1,000 rpm | 5,400 (7,250) 5,158 | 7,200 (9,670) 6,910 | 9,000 (12,090) 8,640 |



CORRECTION: Product portfolio Rolls-Royce Marine AS, Engines Bergen

The Rolls-Royce portfolio of marine engines was erroneously omitted from our Diesel Engine guide published earlier this year. Following are complete details

Allen, Rolls-Royce Power Engineering, Diesel Business, Queens Engineering Works, Ford End Road, Bedford MK40 4JB, UK
tel: +44 1234 272000; fax: +44 1234 353934

| Model | Bore | Stroke | Cycle | Cylinder no. | kW/Cyl | Speed RPM | MEP bar | Piston Speed (m/s) | Output Range (kW) |
|--------------|------|--------|-------|--------------|-----------|-----------|---------|--------------------|-------------------|
| 4000B Series | 320 | 360 | 4 | 6, 8, 9, V12 | 424 - 442 | 720-750 | 24.4 | 8.9 - 9.25 | 2,545-5,300 |
| 5000 Series | 320 | 410 | 4 | V12, V16 | 525 | 720-750 | 25.5 | 10.25 | 6,060-8,240 |

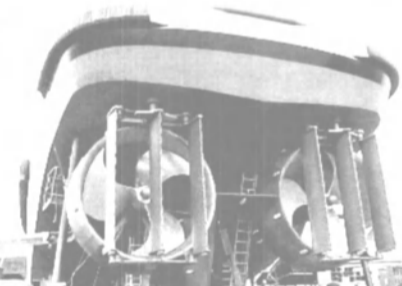
Bergen, Rolls-Royce Marine AS, Engines Bergen, PO Box 924, N-5808 Bergen, Norway
tel: +47 55 536000; fax: +47 55 190405, e-mail: bergen.sales@rolls-royce.com

| Model | Bore | Stroke | Cycle | Cylinder no. | kW/Cyl | Speed RPM | MEP bar | Piston Speed (m/s) | Output Range (kW) |
|----------|------|--------|-------|------------------------------|-----------|-----------|-----------|--------------------|-------------------|
| B (aux) | 320 | 360 | 4 | 6, 8, 9, V12 | 424-442 | 720-750 | 24.4 | 8.6-9 | 2,545-5,300 |
| B (prop) | 320 | 360 | 4 | 6, 8, 9, V12 | 442 | 750 | 24.4 | 9 | 2,650-5,300 |
| K (aux) | 250 | 300 | 4 | 3, 5, 6, 8, 9, V12, V16, V18 | 195-221 | 720-900 | 18-22 | 7.2-9 | 585-3,975 |
| K (prop) | 250 | 300 | 4 | 6, 8, 9, V12, V16, V18 | 202-223 | 750-900 | 20-22 | 7.5-9 | 1,215-4,010 |
| B32:40 | 320 | 400 | 4 | 6, 8, 9, V12, V16, 18V | 480 - 500 | 720 - 750 | 24,9 | 9,6-10 | 2880-9000 |
| B32:40 | 320 | 400 | 4 | 6, 8, 9, V12, V16, V18 | 500 | 750 | 24,9 | 10 | 3000 - 9000 |
| C25:33 | 250 | 330 | 4 | 5, 6, 8, 9 | 230-300 | 900-1000 | 22.6-24.7 | 7.9 - 11 | 1100 - 2700 |

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C/S Agile—shows remarkable 2.0 knots increase in Speed and Efficiency after installing NautiCAN High Efficiency Nozzles.



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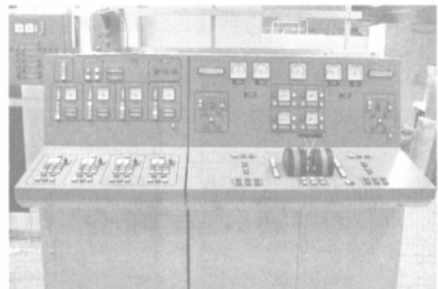
NautiCAN Research & Development Ltd.

Phone: 604-921-1920 Fax: 604-921-1925
email: josip@nautican.com www.nautican.com

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World's First Full Mission Diesel Electric Simulator Debuts

RTM STAR Center (Simulation, Training, Assessment and Research) has installed what it dubs the world's first



Full Mission Diesel Electric Simulator - DE III. The simulator is located at STAR Center's Dania Beach, Fla., facility and is based on a previous design by Kongsberg Maritime Ship Systems. This simulator, however, has enhanced mechanical and electrical systems enabling it to meet the demanding STCW '95 requirements for Class "A" full mission simulation. The simulator is based on a large cruise ship requiring 40 MW of power at 6,600 volts. There are four diesel generator sets, each rated at 11 MW, connected to two 14 MW synchronous propulsion motors. In addition there are four thrusters (two forward, two aft) and two 600 KW emergency generators. The ship modeled is 77,000 grt, with a cruising speed of 18.5 knots.

The simulator equipment is arranged in a three-room suite consisting of a Control Room, Engine Room, and High Voltage Room. The training can be specific in nature for equipment familiarization or more general when used for plant management or Engine Room Resource Management (ERM).

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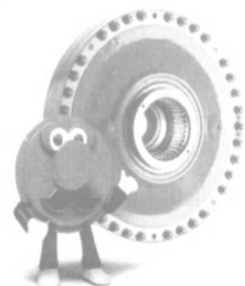
Vericor Signs Gas Turbine Agreement With MTU

Vericor Power Systems signed an agreement with MTU Friedrichshafen GmbH (MTU), whereby MTU will package and distribute Vericor's TF40 and TF50 aeroderivative marine gas turbines. The TF40 is rated at 4,000 shp/2,983kW and the TF50 provides 5,100 shp/3,803 kW.

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Hagglunds Drives Makes Major Changes

Hagglunds drives is kicking off the new year with, what it dubs, a radical image change that includes a new slogan



"Our Drive is your Performance," the emphasis on red as the brand color and a mascot named Max. "We hope our customers will take our new mascot Max to heart," said **Per Nordgren**, the company's new managing director. In addition to the new marketing ploys, the company is planning to expand its presence in

North and South America, which currently accounts for 30 percent of its business but is believed to contain much more potential.

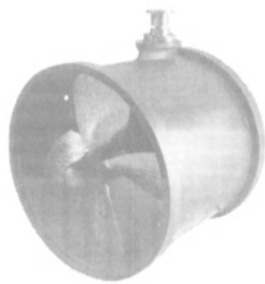
The company has developed a new range of radial piston motors called Compact CB, to be available in 2002. The motor range, designed into a com-

compact package, builds upon the strengths of current designs.

It can provide torques of up to 213,500 lbf-ft., displacements of between 3.9 and 13.7 gallons and speeds approaching 100 rpm.

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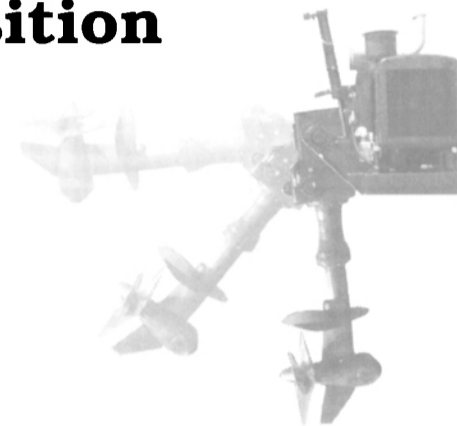
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LNG Risks Assessed

It was less than eight months ago that the Liquefied Natural Gas (LNG) ship market seemed poised to — excuse the expression — explode, as oil prices flew high and gas increasingly ingrained itself as a viable means of providing efficient, cost effective energy. In June, Lloyd's Register issued a report that cited a tremendous need for new ships, specifically citing age and demand in an estimate that the U.S. market alone would require an additional 27 to 75 ships of this type in the next decade.

Entering 2002, the focus on the maritime sector is less on rosy projections for certain ship sectors and more on security both at sea and in port. The potential for the use of ships for mass destruction, particularly in light of published reports linking terrorist to the shipping market, has given business and civil leaders a cause for pause in giving the go ahead for any new projects, particularly projects involving massive ships carrying compressed gas. Regardless of heightened security, it is impossible to avoid the fact that the LNG ship fleet is getting old, and replacements ... whether five or 50, will be forthcoming. The following news sections highlights some recent activities in the LNG market.

Breakthrough For CTS Radar Tank Gauging Onboard FSO

For the first time a Saab TankRadar CTS radar tank gauging system will be installed onboard a FSO tanker, which will store all produced LPG (Propane and Butane) and Condensate (Crude Oil), currently under construction at Samsung, Korea for Phillips Petroleum, who has been appointed Unit Operator for the Bayu-Undan development in the Timor Gap Zone.

The Propane is stored in three refrigerated tanks at a temperature of -44 degrees C and the Butane is stored in three refrigerated tanks at a temperature of -7 degrees C. For storage of Condensate there are eight tanks and two slop tanks. All six LPG tanks are fitted with two separate Saab TankRadar CTS Still Pipe gauges for double measurement of level, temperature and pressure. To achieve full redundancy the LPG gauges are connected to two separate

Level Units, which are in turn connected to two separate I/O boxes that are connected to two separate Workstations; all interfaces to the onboard DCS system are also doubled for full redundancy.

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LNG Carrier Ordered

Leif Hoegh and Mitsui O.S.K. Lines, have entered an agreement with Mitsubishi Heavy Industries, Ltd., for the construction of a 145,000 cu. m. LNG carrier. An agreement was also made with Statoil on behalf of the Snoehvit field partners (excluding TotalfinaElf and Gaz de France) for the chartering of the vessel for 20 years plus two 5-year options. The vessel specification is high both for operation in North Atlantic waters and to meet strict safety and environmental requirements. The vessel will be delivered in 2005.

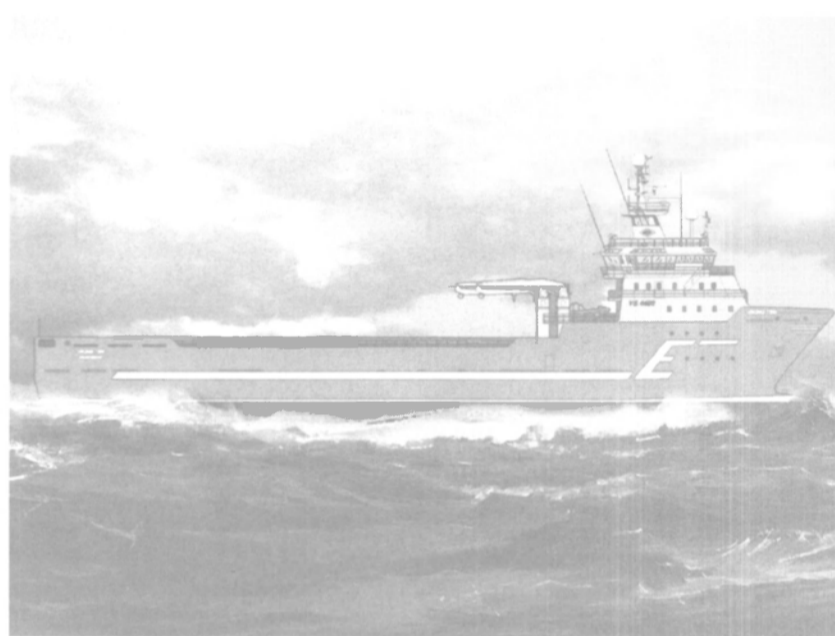
Wärtsilä Delivers LNG-Fueled Engines

Wartsila Corporation has received a contract to deliver eight dual-fuel engines to two offshore supply vessels. The first offshore vessels using gas as a fuel, these vessels will be built at Kleven Verft A/S in Norway, and will be powered by Wartsila 32DF engines running on liquefied natural gas (LNG).

Using gas as a fuel has environmental benefits; it burns very cleanly and NOx emissions diminish to one-tenth of those of the standard diesel version. The combination of the engine's low fuel consumption and its maximum use of natural gas means the Wartsila 32DF also has low CO2 emissions. Dual-fuel engines can be run simultaneously on natural gas and diesel oil, and can be switched over from gas to liquid fuel automatically, should the gas supply be interrupted, while continuing to deliver

full power. The two vessels, which have been ordered by the Norwegian owners Eidesvik AS and Simon Møkster Shipping AS, will be delivered in 2003 operating as supply vessels for oil and gas platforms in the North Sea.

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Artist's impression of the pair of 4,000 grt offshore supply vessels, which will each be equipped with four Wartsila 6L3DF dual fuel engines.

Cove Point LNG Proposal Under Review

The Coast Guard recently held meetings with local, state and federal officials as part of its ongoing review to help evaluate the suitability of the Chesapeake Bay for importing Liquefied Natural Gas (LNG) aboard tankships.

The Coast Guard Captain of the Port (COTP) Baltimore received a letter of intent to resume LNG import operations from the Williams Company at its Cove Point facility in Calvert County, Md., last October. If approved, LNG import operations will involve moving LNG in tankships on the middle and lower Chesapeake Bay to Cove Point where the cargo will be handled and off-loaded at the company's waterside facility. Under federal regulation (33 CFR Part

127.009), the COTP is required to evaluate the suitability of the Bay for conducting LNG operations.

The Coast Guard Atlantic Area Marine Safety Division brought officials and other stakeholders together for the two-day meeting to identify and discuss the risks associated with conducting LNG operations on the Chesapeake Bay. Officials and stakeholders included the Coast Guard Captains of the Port for the ports of Hampton Roads and Baltimore, Department of Energy, NOAA, Federal Energy Regulatory Commission, Virginia Marine Resource Commission, Virginia Department of Environmental Quality, Maryland Natural Resources Police, Maryland Emergency Manage-

ment Agency, members of the Maryland and Virginia Pilot's Associations, Williams Company representatives and a number of shipping and towing industry officials.

Experts in risk-based decision making from the Coast Guard's Research and Development Center in Groton, Conn., guided the meeting participants through a five-step risk assessment process. The assessment is designed to identify, characterize, and manage changes in risk expected if the LNG shipments resume at the Cove Point facility early next year as requested.

Information obtained over the two days will be used by the COTP Baltimore, along with comments, reports and

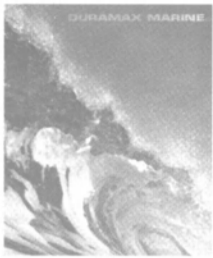
other information obtained during a public comment period and public meeting held earlier in the year, to help make a final determination if the Bay is suitable for allowing LNG operations to resume. The Coast Guard will also be working with Maryland, Virginia and federal agencies to help identify safety and security measures that may be necessary to permit LNG operations on the Bay. The Atlantic Area Marine Safety Division intends to use the results of this risk assessment to develop and implement a consistent framework for evaluating and determining the suitability of LNG operations in ports and waterways throughout the Eastern seaboard and Gulf of Mexico.

Products Marine Propulsion

Duramax Marine

For over 40 years, Duramax Marine has provided reliable marine solutions for the commercial, government and pleasure marine markets. In addition to manufacturing bearings, shaft sealing systems, fendering systems and heat exchange systems, the company is dedicated to research programs and continually raising the bar in service and innovation.

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WildCat Propellers

WildCat Propellers has invested wisely in the most sophisticated, computerized propeller inspection system available, Prop Scan. Today's complicated and sophisticated propellers cannot be repaired with traditional equipment. Enhanced Propeller Standards is used in the propeller repair and modification process and has been created to further enhance the well respected International ISO 484 Standards.

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Ballast Technologies

Ballast Technologies, Inc. (BTI) has been the premier provider and installer of fixed ballast materials since 1983. The company's product and service known as Perma Ballast, is widely acknowledged to be the quickest and most cost-effective method of ballast installation today. Our environmentally safe process and materials require minimal vessel modification, providing savings to the vessel owner of a shipyard.

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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.

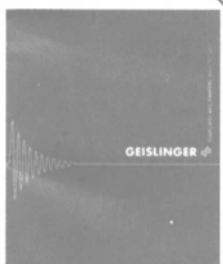
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Geislinger

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.

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Reintjes

Reintjes presented the L.P.P. system developed along with our partner Lips for the first time at the shipbuilding trade fair SMM two years ago in Hamburg. This marked the beginning of an unprecedented product offensive at Reintjes GmbH and is thus the form the focus of this issue of our Reintjes Report.

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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.

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France Helices

In the past 21 years since its foundation, France Helices has become one of the world's leading authorities in marine propulsion systems. It is the only manufacturer in its market to control every aspect of production. France Helices facility is equipped with an in house foundry, where machinery is digitally operated and where research teams continue to study new propellers in cavitation tunnels.

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John Crane-Lips

John Crane-Lips continues to strengthen its position as market leader, supplying complete marine propulsion systems with an emphasis on systems integration. John Crane-Lips are innovators, developing new propulsion systems and technologies to lead the industry.

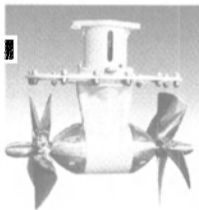
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Machine Works

Machine Works at Essex is the Northeast distributor for Wesmar Bow Thrusters. Wesmar engineers its Bow Thrusters for years of service in the most extreme marine environments. All 28 Wesmar Bow Thruster models are available from Machine Works, including the new Vortex series Counter-rotating Thrusters, which make close-quarters maneuvering a simple task.

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Cincinnati Gear Company

The Cincinnati Gear Company was founded in 1907 to serve the rapidly expanding machine tool industry in the Cincinnati, Ohio area. The Cincinnati Gear Company has been instrumental in the development and perfection of ground tooth, carburized, and hardened gearing. During the 1950's, the Cincinnati Gear Company entered the industry of designing and manufacturing epicyclic gear units for a wide range of powers and speeds.

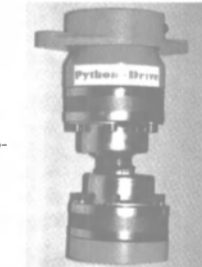
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PYI, Inc.

PYI Inc. is known as one of the premier manufacturers and distributors of high quality marine equipment and supplies. The company's Python-Drive allows the propulsion system to push your boat, not your engine. Available for engines from 10 to 10,000-hp, the system separates the vibration of the propeller from the vibration of the engine, thus decreasing vibration and noise to deliver a smoother ride and longer equipment life.

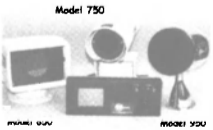
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Arion International THERMAL IMAGING CAMERAS FOR SHIPS AND PORTS

Arion International, Inc., has introduced three Marine Thermal Imaging Cameras for night-time use, collision avoidance, and search/rescue. Unlike image intensifiers that require low levels of light to operate, thermal cameras require no visible light to operate. The cameras see in total darkness, smoke and some fogs. Three models are available with varying range and performance.

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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.

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American Shipyard

American Shipyard is a full-service company catering to military, commercial vessels i.e. offshore fishing, tugs, barges & ferries and megayachts, both sail and power. We offer in-house: welding (steel, aluminum, stainless) pipe-fitting, carpentry, machining, painting (both Awlgrip and epoxy coatings) electrical and rigging.

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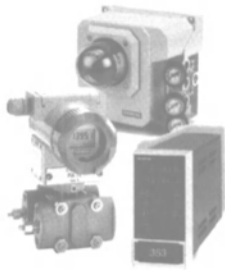
All Centa composite shafts are bespoke designed in-house to ensure minimum weight and optimum dimensions. Unique to Centa, is a positive locking system of the composite shaft to the metal flanges (in steel or aluminum) using tapered titanium pins, a method which provides an economic and reliable solution to the problem and is protected by a Patent application.

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Quantic

Engineering and Logistics Corporation

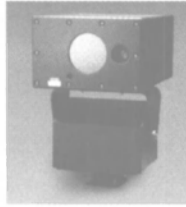
Quantic Engineering

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.

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Oregon Camera Systems

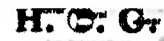
Designs, manufactures 24-hour, multi-sensor, modular Super Cam camera systems. Innovative, easy-to-use Touch-Screen Controller. Proprietary Shock Dampening, Anti-Vibration Mounting, Environmentally sealed, purged housing. Long range detection/recognition. Dependable in harshest conditions. Shipboard, airborne, land applications. Basic platform: Thermal Imager, Daytime Camera, Controller, Monitor.



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Hoffer Flow Controls

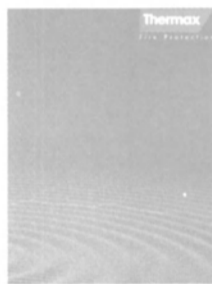
Hoffer Flow Controls' new Positive Displacement Flowmeters are designed for industrial use and are constructed of 316 stainless steel with other materials of construction optional. This product has a high temperature range of up to 850 degrees F, is pressure rated up to 3,000 PSI standard, and has been independently tested at .25 percent better accuracy on viscous applications above 100 CSTKS.



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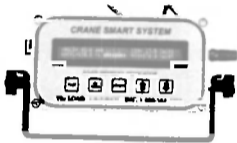
Thermax, non-combustible, non-toxic, marine construction boards are used worldwide for joiner bulk heads, panels, liners, ceilings, door and furniture cores. Thermax has all major regulatory body certificates (USCG, Canada, DNV et al) and meets the requirements of IMO/SOLAS resolutions. Thermax is sold,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



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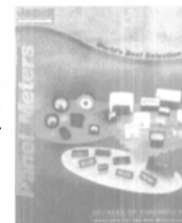
Fassmer Shipyard offers various service works in the field of development, construction and manufacturing of ships, maintenance and repairing of lifeboats, delivery of spare parts. Fassmer-Shipyard has, over the years, turned more and more to new materials such as seawater resistant and/or high quality precipitation-hardened aluminum and aluminum semifinished products as well as high-tech fiber composites.



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Lapeyre Stair

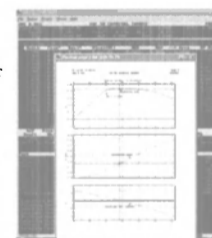
Where space is tight and safety is important, managers specify the Lapeyre Stair. Building codes permit its use in place of vertical ladders or ship's ladders, and it's safer and easier to use than both. The unique alternating-tread design allows for a comfortable, face-forward decent. Lapeyre Stairs are custom-built to fit specific height requirements. Free DFX file drawings, demonstration videos, dimensional prints and sample specifications are available.



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Creative Systems

Creative Systems, Inc. makers of GHS (General Hydro Statics) ship stability software, has released version 8.0, a major update that incorporates many improvements, including a new on-screen report preview. Shipments of the update to existing users with maintenance subscriptions are now complete.



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Racor

Hydrocarbon Filters upgraded RVFS Vessel family offers operators excellent water separation and contaminant removal for flows of up to 200 gpm. The RVFS Series can be used to filter jet fuels, aviation gas, kerosene, diesel fuel, gasoline, insulating oils, lube oils, solvents and other hydrocarbon products where water and particulate are problems.

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Total Marine Solutions (TMS) was specifically developed to support ship owners and operators in the challenge to meet over increasing regulatory compliance relating to safety and environmental protection.



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Maritime Associates

Maritime Associates is your marine and off-shore signage expert, manufacturing a complete range of IMO/SOLAS safety signs, posters and LLL pathway systems. Our vast capabilities extend beyond conventional safety sign requests. We can create and manufacture any sign and sign system required, utilizing an array of materials including our NEW product lines and unique base materials, mounting and installation methods, all cost effectively manufactured in the USA.



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New Ship Contracts by Ferliship

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|------------------------------------|--------------|--------------------------------|-------------|----------------------------|----|-------|---------|-------|------------|
| SHENGLI OILFIELD CO | CHINA | WUHU SHIPYARD | CHINA | AHSV | 1 | | | 02 | 10 |
| UNIE VAN REDDING BELGIE | BELGIUM | ORSKOV | DENMARK | AHTS | 1 | | | 03 | 0 |
| KLYNE TUGS (LOWESTOFT) | UK | YANTAI RAFFLES SHIPYARD | CHINA | AHTS | 1 | | | 03 | 0 |
| JAPANESE INTERESTS | JAPAN | IMABARI SHIPBUILDING | JAPAN | BULK CARRIER | 1 | | 171,000 | 05 | 0 |
| K LINE | JAPAN | FUKUOKA SHIPBUILDING | JAPAN | BULK CARRIER | 2 | | 76,500 | 03 | 40 |
| NIPPON YUSEN KAISA (NYK) | JAPAN | TSUNEISHI | JAPAN | BULK CARRIER | 1 | | 76,300 | 03 | 0 |
| HEINRICH JUNGERHANS | GERMANY | KANASASHI CO. | JAPAN | BULK CARRIER | 1 | | 52,200 | 03 | 0 |
| UNKNOWN | UNKNOWN | SANOYAS CORP | JAPAN | BULK CARRIER / ORE CARRIER | 1 | | 75,500 | 03 | 0 |
| SHOEI KAIUN | JAPAN | IMABARI SHIPBUILDING | JAPAN | CONTAINER | 2 | 5,500 | | 03 | 0 |
| K LINE | JAPAN | KOYO DOCK | JAPAN | CONTAINER | 1 | 5,500 | | 02 | 0 |
| YANG MING MARINE CORP | TAIWAN | KOYO DOCK | JAPAN | CONTAINER | 1 | 5,500 | | 03 | 0 |
| LEONHARDT & BLUMBERG | GERMANY | GUANGZHOU | CHINA | CONTAINER | 4 | 1,200 | | 04 | 0 |
| AYANOGLU DENIZCILIK | TURKEY | TORGEM GEMI | TURKEY | CONTAINER | 1 | 820 | | 02 | 0 |
| BOCKSTIEGEL REEDEREI | GERMANY | QING SHAN SHIPYARD | CHINA | CONTAINER | 2 | 502 | | 03 | 0 |
| GREEK INTERESTS | GREECE | VAN DER GIESSEN | NETHERLANDS | CRUISE SHIP | 1 | | | 02 | 0 |
| IINO KAIUN KAISHA | JAPAN | FUKUOKA SHIPBUILDING | JAPAN | CHEMICAL TANKER | 2 | | 19,500 | 03 | 0 |
| WW MARPETROL | SPAIN | FACTORIAS VULCANO | SPAIN | CHEMICAL TANKER | 1 | | 16,500 | 02 | 0 |
| PETROMARINE | FRANCE | NIESTERN SANDER | NETHERLANDS | CHEMICAL TANKER | 2 | | 15,000 | 03 | 0 |
| PETROLEUM MANAGEMENT | GREECE | NOK-BOG | KOREA | CHEMICAL TANKER | 1 | | 7,800 | | 0 |
| BROSTROM / ERIK THUN | SWEDEN | FERUS SMIT | NETHERLANDS | CHEMICAL TANKER | 2 | | 7,600 | 03/04 | 0 |
| KASIF KALKAVAN | TURKEY | SEDEF GEMI | TURKEY | CHEMICAL TANKER | 1 | | 7,100 | 02 | 0 |
| TARBIT SHIPPING | SWEDEN | DE BIEBOSCH-DORDRECHT | NETHERLANDS | CHEMICAL TANKER | 1 | | 6,400 | 503 | 0 |
| ARCO IN SRL | ITALY | CANTIERI NAVALE DE POLI | ITALY | CHEMICAL TANKER | 1 | | 6,000 | 02 | 0 |
| SEVEN MOUNTAIN | KOREA | SAMHO NEW SHIPYARD | KOREA | CHEMICAL TANKER | 1 | | 3,000 | 03 | 10 |
| DENIZCILIK NAKLIYATIA (GEDEN LINE) | TURKEY | MARMARA SHIPYARD | TURKEY | CHEMICAL TANKER | 1 | | 2,000 | 02 | 0 |
| JAN DE NUL NV | BELGIUM | IZAR | SPAIN | DREDGER SUCTION HOPPER | 2 | | 20,000 | 03 | 0 |
| UNKNOWN | UNKNOWN | HIGAKI ZOSEN | JAPAN | GENERAL CARGO | 1 | | 11,500 | 02 | 0 |
| UNKNOWN | UNKNOWN | HIGAKI ZOSEN | JAPAN | GENERAL CARGO | 1 | | 8,200 | 02 | 0 |
| REDERIJ GEUSE | NETHERLANDS | DAMEN SHIPYARDS | NETHERLANDS | GENERAL CARGO | 2 | | 2,400 | 02 | 0 |
| ARMAWA SHIPPING & TRADING | NETHERLANDS | DAMEN SHIPYARDS | NETHERLANDS | GENERAL CARGO | 1 | 193 | | 02 | 0 |
| NIGERIA LNG | NIGERIA | HYUNDAI HEAVY INDUSTRIES (HHI) | KOREA | LNG | 4 | | | 05 | 0 |
| PETRONAS | MALAYSIA | MITSUJ | JAPAN | LNG | 1 | | | 03 | 0 |
| KUMIAI SENPAKU | JAPAN | KAWASAKI H.I. | JAPAN | LPG | 1 | | 49,000 | 04 | 0 |
| HANS PETER ECKHOFF | GERMANY | OKEAN SHIPYARD | UKRAINE | MULTI-FUNCTION SERVICE | 2 | | 10,000 | 02 | 0 |
| BRITISH PETROLEUM | UK | DAEWOO | KOREA | OIL RIG | 1 | | | 04 | 380 |
| HARVEY GULF INTERNATIONAL | US | EASTERN SHIPYARDS | US | PLATFORM SUPPLY VESSEL | 4 | | | 03 | 0 |
| HARVEY GULF INTERNATIONAL | US | EASTERN SHIPYARDS | US | PLATFORM SUPPLY VESSEL | 2 | | | 03 | 0 |
| DISTRICT OFFSHORE | NORWAY | FITJAR | NORWAY | PLATFORM SUPPLY VESSEL | 1 | | | 02 | 0 |
| EIDESVIK & CO. | NORWAY | KARMSUND MARITIME | NORWAY | PLATFORM SUPPLY VESSEL | 1 | | | 03 | 0 |
| DISTRICT OFFSHORE | NORWAY | MYKLEBUST MEK VERKSTED | NORWAY | PLATFORM SUPPLY VESSEL | 1 | | | 02 | 0 |
| EDISON CHOUQUEST OFFSHORE | US | PROMAR | BRAZIL | PLATFORM SUPPLY VESSEL | 1 | | | 03 | 17 |
| FORMOSA PLASTICS | TAIWAN | HITACHI MUKAI | JAPAN | PRODUCTS TANKER | 1 | | 70,000 | 04 | 31 |
| D'AMICO | ITALY | DAEDONG SHIPBUILDING | KOREA | PRODUCTS TANKER | 2 | | 46,000 | 03 | 54 |
| FORMOSA PLASTICS | TAIWAN | DAEWOO | KOREA | PRODUCTS TANKER | 1 | | 45,000 | 04 | 24.5 |
| UNICORN LINES | SOUTH AFRICA | SHIN-A SHIPBUILDING | KOREA | PRODUCTS TANKER | 1 | | 37,000 | 04 | 25.3 |
| D'AMICO | ITALY | DAEDONG SHIPBUILDING | KOREA | PRODUCTS TANKER | 2 | | 35,000 | 03 | 0 |
| UNKNOWN | UNKNOWN | SELAH MAK SANAYII | TURKEY | PRODUCTS TANKER | 1 | | 6,000 | 02 | 0 |
| WW.MARPETROL | SPAIN | SELAH MAK SANAYII | TURKEY | PRODUCTS TANKER | 2 | | 4,700 | 02 | 0 |
| BIRLESIK YATIRIM GROBU | TURKEY | TORLAK | TURKEY | PRODUCTS TANKER | 1 | | 4,250 | 02 | 0 |
| TURKISH INTERESTS | TURKEY | TORLAK | TURKEY | PRODUCTS TANKER | 1 | | 4,200 | 02 | 0 |
| TURKISH INTERESTS | TURKEY | TORLAK | TURKEY | PRODUCTS TANKER | 1 | | 3,000 | 02 | 0 |
| UNKNOWN | UNKNOWN | HIGAKI ZOSEN | JAPAN | RO-RO | 2 | | 9,450 | 02 | 0 |
| DFDS | DENMARK | FLENSBURGER | GERMANY | RO-RO | 1 | | | 04 | 0 |
| MARMARAS NAVIGATION | GREECE | SAMHO NEW SHIPYARD | KOREA | TANKER | 2 | | 105,000 | 03 | 76 |
| DEIULEMAR COMP DI NAVIGAZIONE | ITALY | NEW CENTURY | CHINA | TANKER | 2 | | 73,300 | 04 | 65 |
| IONIA MANAGEMENT | GREECE | SAMSUNG | KOREA | TANKER | 1 | | 70,000 | 03 | 32 |
| PETROMARINE | FRANCE | ZHEJIANG | CHINA | TANKER / BITUMEN | 1 | | 4,450 | 02 | 8 |
| UNKNOWN | NORWAY | LARSNES VERKSTED | DENMARK | UTILITY VESSEL | 1 | | | 02 | |

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 Susan Cosme at (212) 477-6700.

ABS/USCG APPROVED VALVES

Norseal PO Box 40525 Houston, TX 77240

ACTUATORS, VALVE

J.A. Moody Equipment Specialist, Inc. 3223 Phoenixville Pike, Malvern, Pa 19355
(800) 355-3810 (Northeast); 808 Pecan Forest Court, Chesapeake VA 23322
(757) 641-0080 (Southeast); 2130 7th Ave W. Seattle, WA 98119
(206) 691-1000 (West); www.jamesi.com

AIR CONDITIONING AND REFRIGERATION

Adick Marine, 81 Mahler St., W. Babylon NY 11758
Repair & Installation, Equipment & Services
Flagship Marine 2427 SE Dixie Highway, Stuart, FL 34996
Stork Canada, 47 boul. Marie Victorie, Candiac, Quebec, Canada J5R 1B6
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 Chasse, LA 70037
SECLOC 563 A Albany Commons Dr. Atlanta, GA 30338

ALUMINUM BOATS

Island Boats 6806 Highway 90 East New Ibera 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
G.J. Wortelboer Jr., B.V. PO Box 6003 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
Beier Marine, 1915 Veterans Ave, Vancouver, B.C. CANADA
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 10612-1031

BEARING - RUBBER, METALLIC, NON-METALLIC

American Babcock Bearing PO Box 3069 Ft 2 Huntington, WV 25702
Craik 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
Thorbon 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)

Daitch LLC 2925 Northwest Blvd Ste 150 Plymouth MN 55441 USA

BOATBUILDER

Alten Marine PO Box 1049 Sitka, AK 99835
Hike Metal, Box 658, Wheatley, ON Canada N0P 2P0
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. Vermion Street #212, Lafayette, LA 70501

BROKERS

Marcon International, Inc., P.O. Box 1170, Coupeville, WA 8239-1170
Newbrays Tug & Barge Sales Corp., 35 De Hart St., Monstown NJ 07960

BUSINESSES

Sohre Turbomachinery Inc 132 Gilbertville Rd PO Box 889 Ware, MA 01082-0899

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
Uniflour Products 3076 Rosecrans Ave Belflower, CA 90706

BUTTERFLY VALVES

Norseal PO Box 40525 Houston TX 77240

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 Kashian Place Victoria, B.C. Canada V8X4L7
Autship Systems Corp., 403 611 Alexander St. Vancouver BC Canada V6A1E
Creative Systems, Inc., P.O. B. 1916, Port Townsend WA 98368

CAD/CAM SYSTEMS

Marine Marine Communications, 16 E. 41st St. NY NY 10017
Maritime Telecommunications Networks, Inc., 3044 N Commerce Pkwy Miramar FL 33025

CLASSIFICATION SOCIETY

Lloyd's Register 71 Fenchurch St London EC3M 4BS
Ferry International Corp. 23500 64th Ave South Kent WA 98032
Jamestown Distib., P.O. Box 348, Jamestown RI 02835
Jotun Paints Inc. 1401 Severn St. Baltimore MD 21230
Mascoat Products, 10890 Alcott Unit 102 Houston, TX 77043
Nace Intl 1440 South Creek Dr. Houston TX 77043
Reslo Motive Laboratories PO Box 1335 Monstowntown NJ 07962-1235
Wasser High Tech Coatings 8041 South 228th St. Kent WA 98032

COMMUNICATIONS SERVICE

Cosial Maritime Services, 6580 Rock Spring Drive, Bethesda, MD 20817-1146
Marine 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

ITW Philadelphia Resins, 130 Commerce Dr, Montgomeryville PA 18936

COMPRESSORS

Hatappa Uetersener Maschinenfabrik Tomscher WEG 5-7 D.25436 Uetersen, Germany

COMPRESSOR PARTS

CMP Corporation, P.O. Box 15199, Oklahoma City, OK 73155

COMPUTER / COMPUTER SOFTWARE

Autship Systems Corp., #403 611 Alexander St. Vancouver, BC, CANADA V6A1E
Creative Systems, Inc., P.O. B. 1916, Port Townsend, WA 98368

Fleet Technology 311 Leggett Dr., Karata Ontario Canada K2K 1Z8
Lloyd's Register 100 Leadenhall St., London England EC3A 3BP
M.I. Systems, 200-1150 Morrison Drive, Ottawa Ontario K2H 8S9
Ship Motion Associates, 10 Danforth St., Portland, ME 04101

COMMUNICATIONS

Beier Radio1990 Industrial Ave Harvey, LA 70058
Mackay Comm Inc. 2721 Discovery Dr. Raleigh NC 27616-18
Autship 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
Mackay Communications, 2721 Discovery Dr., Raleigh N.C. 27616-1851

CONSULTANTS

Eliot Bay Design Group 5301 Shishole Ave NW Ste 200 Seattle WA 98107
Hornblower Marine PO Box 112476 Campbell CA 95001

CONTROL SYSTEM - Monitoring/Steering
Beier Radio1990 Industrial Ave Harvey, LA 70058
Electronic Marine Systems, 800 Female Pl. Rahway N.J. 07065
Governor Control Systems, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315

G.P. Bowler 2261 Lake Rd., Ontario, NY 14519
Kobelt Manufacturing Ltd., 8238-129 street, Surrey, B.C. V3W0A6
Kockum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068
MMC International, 60 Imp. Dr., Irwood NY 11096

Motor Services Hugo Stamp, 3190 S.W. 4th Ave., Ft. Lauderdale, 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 Sneek, Netherlands

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 Loner Terrace Stuart, FL 34996

COULPERS - Tug & Barge

Intercontinental Engineering, P.O. Box 9055, Kansas City, MO 64168

COUPLINGS

American Vulkan 2525 Dundee Rd., Winter Haven, FL 33884
American Vulkan, P.O. Drawer 673, Winter Haven, FL 33882
Certa Corp., 815 Back Hawk Dr., Westmont, IL 60559
GeislingerAligner Striebe 30 A-5026 Salzburg

Lo-Rez Vibration Control, Ltd., 186 West 8th Ave., Vancouver, B.C. V5Y1N2
Mascoat Products, 91 Wilenbrock Rd., Unit B, Oxford, CT 06478
MMC Intl., 60 Imp. Drive, Irwood, NY 11096

CRANE-HOIST-DERRICK-WHIRLEYS
Bisso Marine Co P.O. Box 4113, New Orleans, LA 70178
E. Crane 241 Executive Dr., Marion OH 43302
Edgewater Machine & Fabricators, P.O. Box 358, Edgewater, FL 32132-0358
Holy Host Corp., P.O. Box 86, St. Clair Shores, MI 48060-0086
Liebher-Weik Nenzing GmbH PO Box 10 A6710 Nenzing Austria
Westmont Industries, 10805 Panter Ave. Santa Fe Springs, CA 90670

CRANKSHAFT DEFLECTION ANALYZER
Prisma Teknik AB, Sweden; www.prsimateknik.com

CRANKSHAFT OILING
Gottens - New York Corp., 160 Van Brunt St., Brooklyn, NY 11231

CRANKSHAFT REPAIR
Gottens - New York Corp., 160 Van Brunt St., Brooklyn, NY 11231
In-Place Machining 1929 N. Buffum St. Milwaukee WI 53212

CUSTOM CLOSURES
Waltz & Krenzer 91 Wilenbrock Rd., Oxford, CT 06478

CUTTING AND WELDING MACHINES
Bug-O-Systems, Inc., 3001 W. Carson St., Pittsburgh PA 15204

DATA RECORDERS
L3 Communications PO 3041 Sarasota FL 34230-3041

DECKING & FLOORING
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
Hatappa Uetersener Maschinenfabrik Tomscher WEG 5-7 D.25436 Uetersen, Germany

Intercontinental Engineering, P.O. Box 9055, Kansas City, MO 64168
New England Travler Equipment Co., 291 Eastern Avenue, Chelsea, MA 02150
Rapp Hydema, 4433 27th Avenue West, Seattle WA 98199

Seabulk Systems, 365 - Shell Rd Ste 200 Richmond, BC Canada V6X-2W2
Skookum, Inc., P.O. Box 290, Hubbard, OR 97032
Smith Berger Marine, Inc., 7915 10th Ave. S., Seattle WA 98108
Superior Ledgerwood Mundy, 1101 John Ave., Superior WI 54880
W.W. Patterson 3 Riverside Rd Pittsburg PA 15233

DESALINATION - REVERSE OSMOSIS
G.E.T., Inc., 3135 Golden Avenue, Long Beach, CA 90806
Palf Rochem, 5775 Rio Vista Drive, Clearwater FL33760-3114
Reverse Osmosis of South Florida 12301 SW 133 Court, Miami, FL, 33186

DESIGN CONSULTING
Fleet Technologies, 311 Leggett Dr., Karata Ont. K2K 1Z8 Canada
FCS, Inc., 22 Main Street, Centerville CT 06409

DIESEL ENGINE - Spare Parts & Repair
Caterpillar Inc., Engine Div., P.O. Box 610, Mossville, IL 61552-0610
Deutz Canada Inc., 4420 Garden St., Montreal Que H4R 2A3
GE Marine Engines 1 Neuman Way Cincinnati, OH 45215
Gottens - New York Corp., 160 Van Brunt St., Brooklyn, NY 11231
H.P. International, Inc., 3812 W. Lruebaugh Ave., Tampa, FL 33624
Industrial Estate, New Territories, HONG KONG

MAN B&W Diesel AG, Stactbachstrasse 1, D-86159 Augsburg 1, GERMANY
MAN B&W Diesel A/S, Teglholtsgade 41, DK-2450 Copenhagen SV, DENMARK
MAN Turbo Diesel, 17 State St., New York, NY 10004
Manne Turbo & Diesel Inc. 1090 7th St Richmond CA 94801
Marisco USA, Inc., 100 Davidson Ave., Sommerset, NJ 08873

Motor-Service AB, Box 2115, S-144 04 Rominge SWEDEN
Motor Services Hugo Stamp, 3190 S.W. 4th Ave., Ft. Lauderdale, FL 33315
NREC 1701 Engineers Rd Belle Chasse LA 70037
Rois - Royce Commercial Marine Houston 10255 Richmond Ave
Scandinavia Americas Bgl, 502 Empire St., Greehlee Park, J4V1V7 Canada
Wartsila Diesel, 201 Defense Highway, Annapolis, MD 21401

DIESEL ENGINE OVERHAUL
Gottens - NY Corp., 160 Van Brunt St., Brooklyn, NY 11231
Governor Control Systems 3190 W. 4th Ave Ft. Lauderdale FL 33315
Manne Turbo & Diesel Inc. 1090 7th St Richmond CA 94801

DIESEL FUEL DECONTAMINATION
(www.bunkerbuoy.com)
Algae X Intl PO Box 4011 Ft Myers Beach FL 33932
PRI 3750 Haensda Blvd Suite A Davis FL 33314

DIGITAL TORQUE METER SYSTEMS
Instruments Computer & Controls 78 Londonderry Tpke Hookset NH 03106

DISTRESS SIGNALS
Datex, Inc., P.O. Box 1150, Kinder, LA 70648

DIVING & SALVAGE
Bisso Marine Co P.O. Box 4113, New Orleans, LA 70178
H.J. Merihue, P.O. Box 23123, New Orleans LA 70183

DOCK FENDERING SYSTEMS
Plastic Piling Inc., 1485 South Willow Ave., Raibo, CA 92376

DOORS - MARINE & INDUSTRIAL
Juniper Intl, 72-15 Metropolitan Ave., Middle Village, NY 11379
Manly Marine, PO Box 86788, N. Vancouver B.C. Canada V7L 4L3
Mascoat, Inc., 90 Forest Ave., Locust Valley, NY 11560
Waltz & Krenzer 91 Wilenbrock Rd., Unit B4, Oxford CT 06478

DRIVES
Alied Systems 2300 Oregon St. Shenwood OR 97140

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

DYNAMIC POSITIONING & AUTOMATION
Alatom Power Conversion 3 Ave. Des Trois Chenes 90018
Belport Cedex France

ELECTRICAL EQUIPMENT
Callenberg Equipment 2010 N Miami Ave Miami, FL 33127
MMC International, 60 Imp. Dr., Irwood, NY 11096

ELECTRONIC INFORMATION SUPPORT
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolbotn, NORWAY
Scientific Marine Svcs., 101 State Pl., Ste. P, Escondido, CA 92029

ELECTRICAL INSTRUMENTS
Seico USA, 2508 Lake Brook Ct., Atlanta, GA 30360
Standard Horizon, 17210 Edwards Rd., Cerritos, CA 90703

ELECTRONIC CHARTS
C-Map Commercial 133 Falmouth Rd. Mashpee MA 02649
Manne Electronics
Edgewater Machine & Fabricators, P.O. Box 358, Edgewater, FL 32132-0358
Solutions, 1522 Crabapple Cove, Jacksonville FL 32225

ELECTRONICS
C-Map, P.O. Box 212, 4371 Eggersund Nordway
Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607
Sure Seal Connections, 3851 South Plaza Dr., Suite 240, Santa Ana, CA 92704
Standard Horizon 17210 Edwards Rd Cerritos CA 90703

ELEVATORS
C-Map Commercial, 133 Falmouth Rd. Mashpee, MA 02649

EMPLOYMENT
All American Marine P.O. Drawer 191237, Tilmans Corner, AL 33619
Military Sealift Command PO Box 120 Code APM-124 Virginia Beach VA 23458-0120
Peter D. Juan ESO, 14 Lafayette Court, Greenwich CT 06830

ENGINEERING SERVICES / MARINE ENGS
Callenberg Equipment 2010 N Miami Ave Miami, FL 33127
Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029
U.S.M.M.A., 300 Steamboat Rd., Kings Point, NY 11024
Vibtech, Inc., Box 435, N. Kingston, RI 02852

ENGINE ROOM LIGHTING/MONITORING & CONTROL
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851

ENGINE ROOM REPLACEMENT PARTS
Marisco USA, Inc., 100 Davidson Ave., Sommerset, NJ 08873

ENGINES
GE Marine Engines 1 Neuman Way Cincinnati, OH 45215
BF Goodrich 701 White Ave., Beloit, WI 53511
WARTISLA NSD CORPORATION Box 252 Vasa Finland FN65101

ENVIRONMENTAL MANAGEMENT CONSULTANTS
Modern Maritime 67 Bow St. Ste 3, Portsmouth NH 03801

EVACUATION SYSTEMS
DBC, 12351 Bridgeport Rd., Richmond, BC Canada
Fleet Technology 311 Leggett Dr. Karata Ontario K2K 1Z8

EVAPORATORS
Afa-Laval Separation, Inc., 955 Meams Rd., Warminster, PA 18974
Saskara Engineering, 7-32 Teikomas 4-chome, Nihiyodogawa, KY 054555, Japan

EQUIPMENT DISTRIBUTOR
Total Marine Solutions 4350 Oaks Rd Ste 501 Ft Lauderdale FL 33314

EXPANSION JOINTS
Elasto Valve Rubber Products 1691 Pioneer Rd Sudbury ONTARIO Canada P3G 1B2
Slax Inc 6559 Ordan Dr Mississauga ON CANADA L5T 1K6

EXTRUDED RUBBER PRODUCTS
Clean Seal Inc., P.O. Box 2919, South Bend, IN 46880
Karlensberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241
Maritime International, 100 E. Vermilion Street #212, Lafayette, LA 70501
Plastic Piling Inc., 1485 South Willow Ave., Raibo, CA 92376
Schuyler Rubber Co., 16901 Woodford Rd., Woodville, 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 Belflower, CA 90706/Viking Fender Co., 1160 State St., Perth Amboy NJ 08861

FILTERS/FILTER SYSTEMS
(www.bunkerbuoy.com)
Algae X Intl PO Box 4011 Ft Myers Beach FL 33932
G.E.T., Inc., 3135 Golden Avenue, Long Beach, CA 90806
Helian Strainer 3245 East 80th St Cleveland, OH 44104

FIRE & SAFETY PRODUCTS
Brookdale International, 1-8755 Ash St., Vancouver, BC, V6P6T3
F. Fassmer & Co D-27804 Berne-Motzen, Germany, IndustriestraBe2
Port Canaveral Marine Fire Fighter Equipment, Canaveral Port Authority
P.O. Box 267 Cape Canaveral, FL 32920
Zero International 415 Concord Ave Bronx, NY 10455

FLANGES
Jesse Engineering, 5225 7th St. E. Tacoma, WA 98424

FUEL CONTROLS
Hoffer Flow Controls 107 Kitty Hawk Lane Elizabeth City NC 27906
Power Research Inc 3750 Haensda Blvd Ste A Davis FL 33314

FUEL DECONTAMINATION
(www.bunkerbuoy.com)
Algae X Intl PO Box 4011 Ft Myers Beach FL 33932

FUEL TREATMENTS
Power Research Inc 3750 Haensda Blvd Ste A Davis FL 33314

FULL SERVICE SHIPYARD & REPAIR
Marisco USA, Inc., 100 Davidson Ave., Sommerset, NJ 08873

GALLEY EQUIPMENT
Cosposh Refrigerator Co PO Box 1206 Deshran LA 70047
Dutless 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 Marine Engines 1 Neuman Way Cincinnati, OH 45215

GANGWAYS
Washington Aluminum 1330 Knecht Ave Baltimore, MD 21229

GASKETS & TREADS
Zero International 415 Concord Ave Bronx, NY 10455

GEARS & GEAR REPAIR
Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati, OH 45227
Gottens - New York Corp., 160 Van Brunt St., Brooklyn, NY 11231
The Falk Corp., PO Box 452, Milwaukee, WI 53201-0492

GENERATOR CONTROLS
Cor>Select Inc PO Box 8745 Mandeville LA 70471

GOVERNORS
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, Goettinger Street 73, 86159 Augsburg, 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, 17210 Edwards Rd., Cerritos, CA 90703

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 Intl, 72-15 Metropolitan Ave., Middle Village, NY 11379
Manly Marine, P.O. Box 86788, N. Vancouver, BC V7L 4L3 Canada

HEAT EXCHANGERS
Afa-Laval Separation, Inc., 955 Meams Rd., Warminster, PA 18974
Tranter, Inc., P.O. Box 2289, Wichita Falls, TX 75307

MARINE ENGINEERING
Eliot Bay Design Group, 5301 Shishole Ave NW Ste 200 Seattle, WA 98107

MARINE EQUIPMENT
Baltic Spare Services Ltd 8 Astronomow 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 Plings Inc., 1495 South Willow Ave., Rialto, CA 92376
Scardana Americas Bkg, 502 Empire St., Montreal, Greenfield Park, J4V1V7

Superior Ligerwood-Muncy, 1101 John Ave., Superior, WI 54880

Waterman Supply, P.O. Box 596, Wilmington, CA 90748

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

MARINE RADIOS
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|------|-------------------------------|----------------------------|------|------|------------------------------|--------------------------|------|
| 6 | ABB Turbo Systems AG | turbochargers | 200 | 19 | International Yacht Training | training & education | 231 |
| 5 | ABS | classification society | 201 | C2 | Inventory Locator Service | parts & locator service | 232 |
| 42 | ADI | shipbuilding | 202 | 44 | Island Boats | boat builders | 233 |
| 11 | Albacore Research | cad-cam | 203 | 13 | IZAR | shipyard | 234 |
| 17 | Allen Marine | catamarans | 265 | 19 | Jeamar Winches | winches | 235 |
| 15 | Americ Corporation | portable ventilators | 204 | 16 | Kawasaki Heavy Industries | shipbuilding | 236 |
| 35 | American Vulkan | couplings | 205 | 3 | Leica Navigation | marine electronics | 279 |
| 45 | Arion International | marine thermal imager | 206 | 25 | Liebherr Werk Nenzing | marine cranes | 237 |
| 44 | Atlas Metal Sales | shipbuilding materials | 207 | 18 | Marine Safety International | simulation training | 238 |
| 22 | Aurand Manufacturing | surface prep tools | 208 | 44 | Microphor | sanitation devices | 239 |
| 43 | Avtron Manufacturing | propulsion | 209 | 15 | Military Sealift Command | employment opportunities | 240 |
| 21 | Ballast Technologies | ballast | 210 | 48 | Nautican Research | nozzles | 241 |
| 10 | Bug-O-Systems | cutting & welding | 211 | 20 | Norma Products | pipe fittings & cuttings | 242 |
| 22 | Cambridge Applied Systems | viscometers | 212 | 22 | NREC | diesel engines | 243 |
| 37 | Chesapeake Specialty Products | deck coatings | 213 | 21 | Omnithruster | thrusters | 244 |
| 27 | Electronic Marine Systems | sensors | 214 | 2 | Panduit Corporation | wiring products | 245 |
| 29 | Electronic Marine Systems | sensors | 215 | 10 | Sasakura Engineering | fresh water generators | 247 |
| 31 | Electronic Marine Systems | sensors | 216 | 23 | Seaward International | fenders | 248 |
| 33 | Electronic Marine Systems | sensors | 217 | 44 | Sohre Turbomachinery | grounding brushes | 249 |
| 30 | EM Products | marine products | 218 | 4 | Superior Energies | insulation manufacturer | 264 |
| 14 | Esab Cutting Systems | cutting/welding | 219 | 49 | Superior Lidgerwood Mundy | deck machinery | 250 |
| 1 | Furuno | Navigation/Communication | 220 | 17 | Thermax | bulkhead panels | 251 |
| 24 | G.R. Bowler | automation control systems | 221 | 4 | Thrustmaster of Texas | thrusters | 252 |
| 22 | Gibbs & Cox | naval architects | 222 | 39 | Transas Marine Overseas Ltd. | simulation training | 253 |
| C4 | Goltens Marine | diesel engine repair | 223 | 35 | Viking Life Saving | life saving equipment | 254 |
| 49 | Harbormaster Marine | propulsion | 224 | 19 | Walter Garschagen | maritime photography | 246 |
| 45 | Harrington Marine | kort nozzles | 225 | 7 | Wartsila Corporation | propulsion | 255 |
| 15 | Harris Corporation | satellite communications | 226 | 45 | Washburn Doughty | boat builder | 256 |
| 43 | Hepworth Marine | windscreen & window wipers | 227 | 49 | Waterman Supply | marine equipment | 257 |
| 11 | Houston Marine Training | marine training | 228 | 45 | Western Machine Works | deck machinery | 258 |
| 9 | Huntington Legal Service | legal services | - | 8 | William E. Munson | aluminum boats | 259 |
| 43 | Incat Australia Pty Ltd. | high speed ferry builder | 229 | 41 | William E. Williams | valves | 260 |
| 11 | In-Place Machining | crankshaft repair | 230 | 8 | Woods Hole | employment opportunities | 261 |
| 40 | International Maritime Assoc. | consulting | 263 | 30 | Wynn Marine | windscreen & wipers | 262 |

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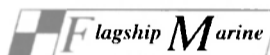
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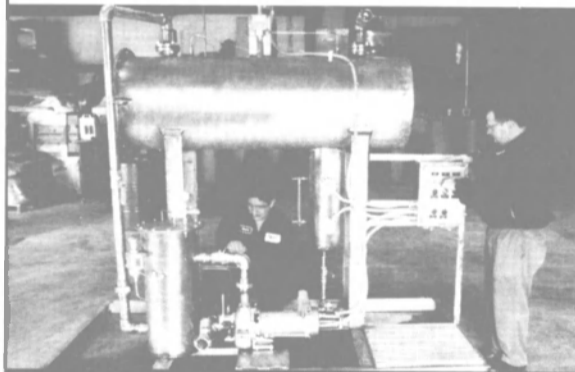
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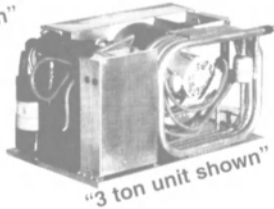
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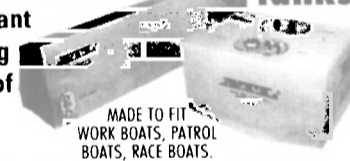


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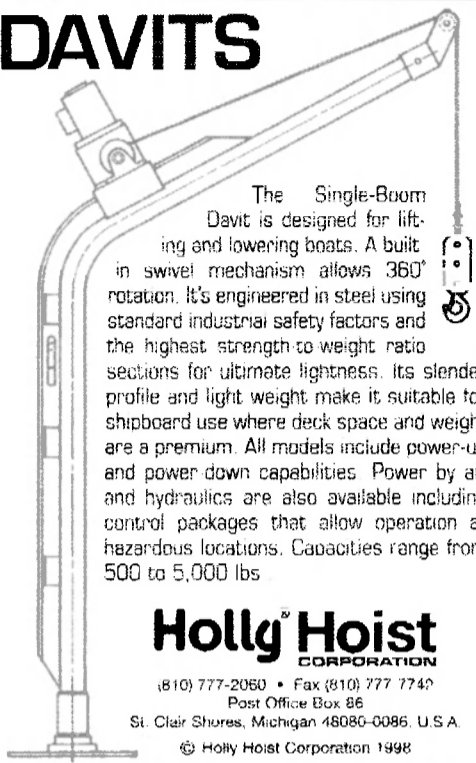
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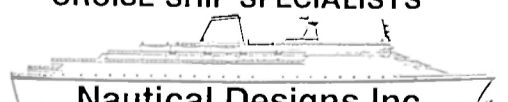
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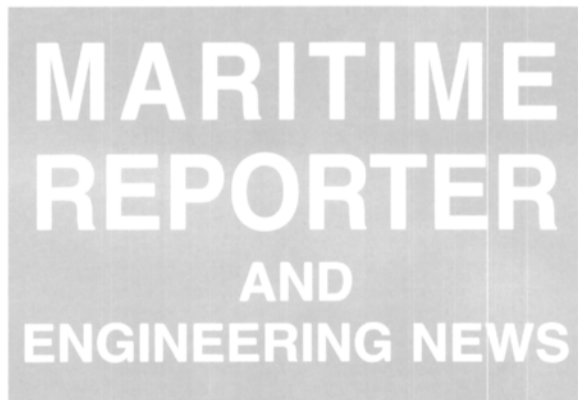
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