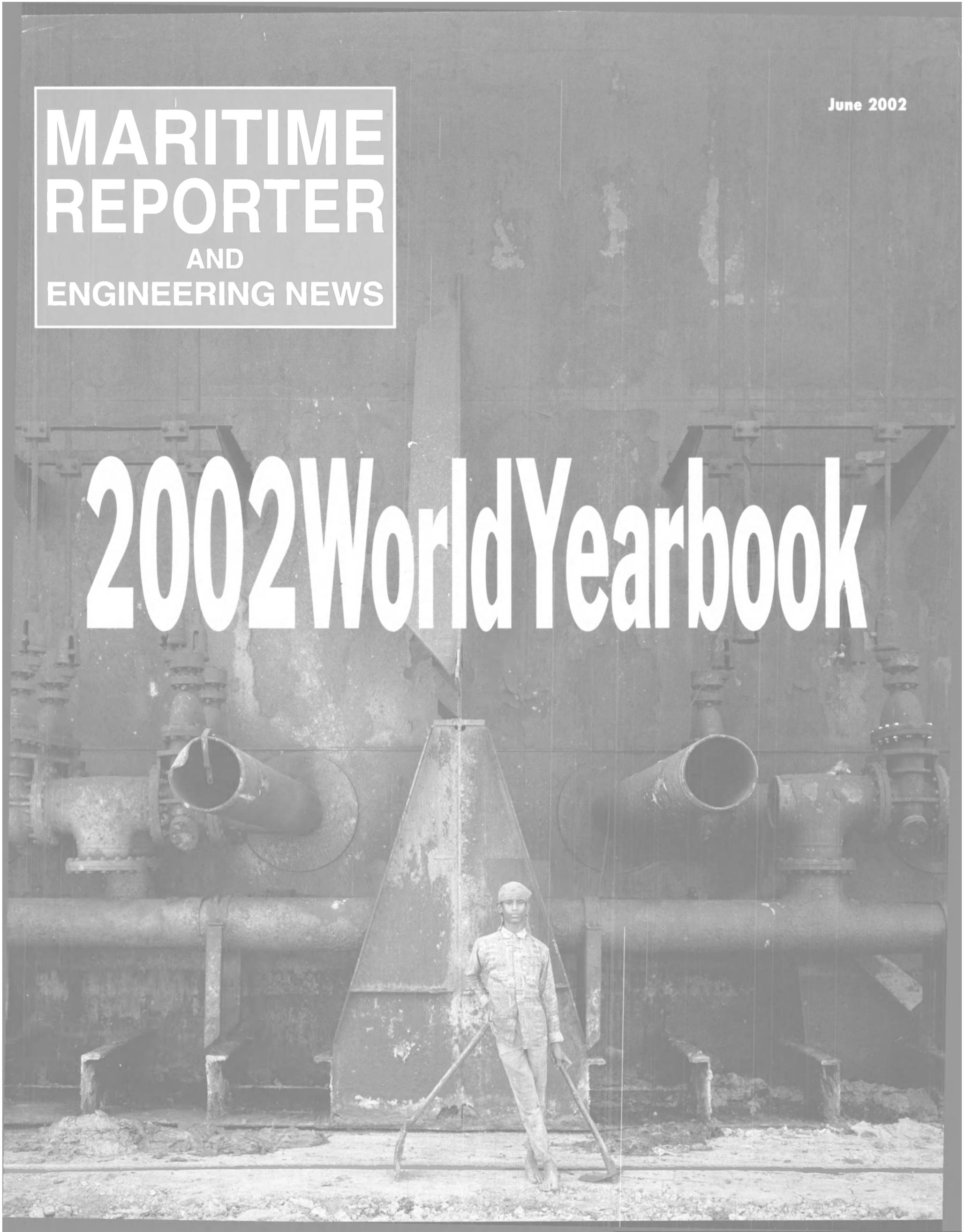


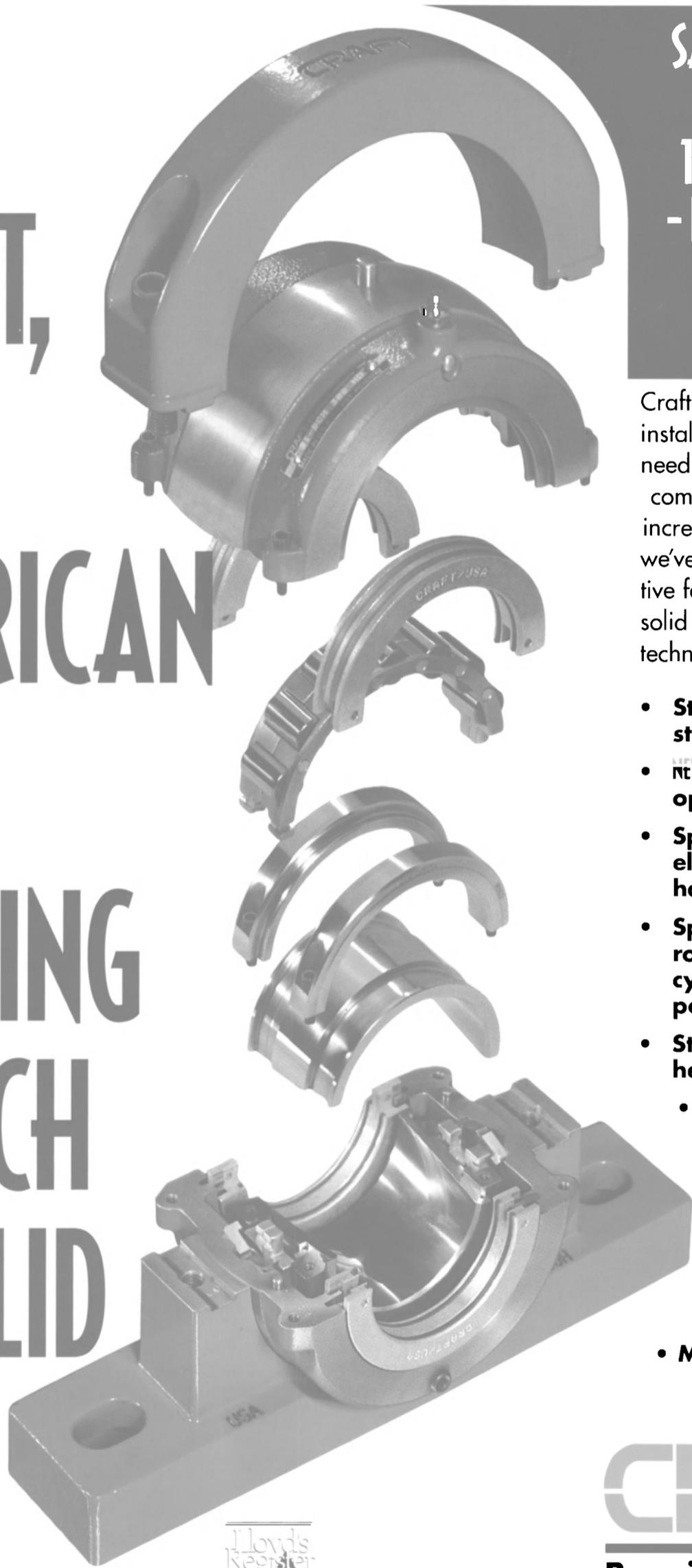
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ABS's Don Liu reasons for safer tankers at Intertanko's Rotterdam event. — by David Tinsley, technical editor

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Alan Haig-Brown

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Inspiring. Suffering. Life through Art. Death.

All of the above, and so much more, were my feelings when initially seeing Edward Burtynsky's photographs of shipbreaking operations in Bangladesh, as presented in a recent edition of *Smithsonian* magazine. Above all, though, I thought "I want those for our magazine," which, through the persistence of Regina Ciardiello and the professionalism and assistance of Mr. Burtynsky, evolved from train ride thought to reality.



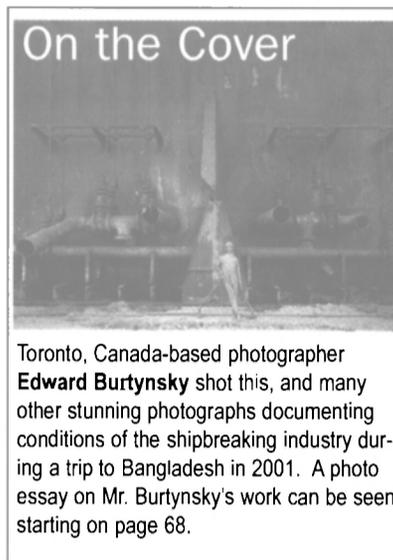
While hunks of steel piled on a beach halfway around the globe is a far cry from our traditional editorial focus — gleaming new ships and boats and marine equipment technology — the fate of ships when they are no longer suitable for operation is increasingly a topic of concern for world leaders, particularly with the expedited phase out of single hull tankers. Presented without political agenda, the profile of Mr. Burtynsky and a photo essay of his work, starting on page 68, provides you with unique visions of a practice traditionally fully cloaked.

Heading into the second half of 2002, there are as many questions as answers regarding the near-term prospects of marine business at nearly every level. A quirky economy continues to vex even the brightest minds, while the reality of war and near wars around the globe continue to cast uncertainty that is felt not only in the largest corporate boardrooms, but throughout the smallest corners of the marine business.

Looking inward, prospects for the a significant pick-up of business in the U.S. is very real, spurred by new navy projects, port security initiatives and commercial need. H. Clayton Cook, Jr. summarizes the abundance of opportunities, as well as the key initiatives needed to get them moving, in his article on the U.S. marine market starting on page 32

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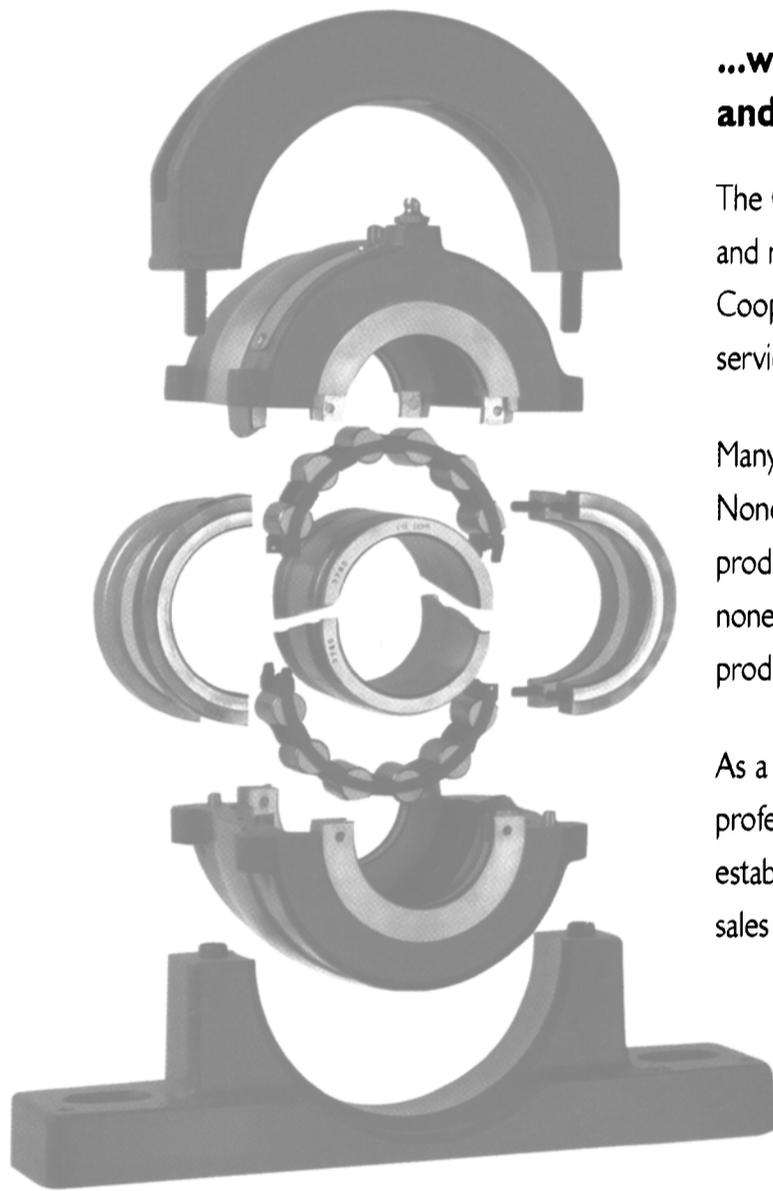
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Bollinger To Acquire Halter Marine

Bollinger Shipyards, Inc., Lockport, La., signed a contract, pursuant to approval of the U.S. Bankruptcy Court, to acquire the assets and operations of Halter Marine from Friede Goldman Halter, Inc.

If approved, Bollinger contemplates acquiring substantially all of Halter's operating assets, properties, extensive design library and construction projects in progress, including the following Shipyards: Halter-Pascagoula; Halter-Moss Point; Moss Point Marine; Halter-Port Bienville; Halter-Central; Gulfport-East, and Halter-Three Rivers—all in Mississippi and Halter-Lockport, in Louisiana. **Donald "Boysie" Bollinger**, chairman and CEO of Bollinger said, "We are very excited about this pending acquisition as it will expand our capacity and capabilities in new construction, establish our visibility and presence in new foreign and domestic markets and compliment our extensive inventory of designs. Best of all, we will retain substantially all of Halter's dedicated employees thereby gaining hundreds of highly talented and skilled designers and shipbuilders whose excellent reputation is known around the world. We look forward to welcoming them to the Bollinger family." "Our goal," said Bollinger, "is to make the transition for our new employees and customers as seamless as possible."

The transition went very smoothly when we acquired Halter's repair division in August 2000, and we will do it again." Jack Stone, president and CEO of Friede Goldman said, "The sale of Halter Marine to Bollinger Shipyards is a major step in providing a return to the creditors. The continued loyalty of the employees and customers has made this possible."

This acquisition will add eight new construction shipyards to Bollinger's three new construction and eleven repair and conversion shipyards for a total of 22 facilities with 43 drydocks strategically located from Pascagoula, MS to Houston, TX. Family-owned and operated since 1946, Bollinger is the foremost provider of marine repair and conversion services and a leading provider of new construction services to the energy, commercial and government marine markets specializing in a wide variety of small to medium-sized offshore and inland vessels.

Bidding War Comes to an End

The heated bidding war for what was left of American Classic Voyages' Delta Queen Steamboats abruptly came to an end at the beginning of May with Delaware North Companies sealing the deal for the vessel pair.

As originally reported in the May 2002 issue of *MR/EN*, (see Delta Queen Makes A Comeback, page 3), Chicago-based Waveland Investments and New Orleans-based Uniworld had submitted bids for the two steamships - Delta Queen and Mississippi Queen - the two remaining ships of the line, which declared bankruptcy this past October.

Waveland submitted its \$3.75-million bid, with intentions to take over the vessels following their auction on May 3.

Delaware North, however had other plans.

The Buffalo, N.Y.-based company, which specializes in hospitality, retail and food service, acquired successfully all the assets and business of the Delta Queen Steamboat Co. — including the two above-mentioned steamboats — as well as the American Queen.

The company plans to assume ownership of the brand, following federal regulatory approval within the next month.

According to Delaware North, the company plans to keep the steamboats' base of operations in New Orleans, along with its reservation and sales center. In addition, the company plans to interview and retain the majority of the operation's employees.

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Jotun And NOF Marine Coatings Join Forces

A keynote agreement was signed in Oslo, between Jotun A/S (Jotun) and NOF Kansai Marine Coatings Co., Ltd. (NKM). The new company, which will be known as SeaStar Alliance will serve

the worldwide marine and offshore coating market.

NKM is a joint venture between Kansai Paint Co. Ltd. And BASF/NOF Coatings Co. Ltd. — all of which are major players in the international coatings industry. This joint venture, presently

services more than 20 percent of the considerable Japanese market for marine coatings. Jotun, which is a leading participant in the marine coatings throughout Europe, South Africa, the Middle East, Southeast Asia, South Korea, China, Australia and the Americ-



as — holds a marketshare close to 20 percent.

The SeaStar Alliance will provide customers with access to the world's largest single-supplier range of advanced coatings.

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In the crucial task of replicating, in TBT free products, the predictable fouling control offered by conventional self-polishing antifoulings, NOF has provided groundbreaking development of silyl-based copolymers, which serve as the cornerstone for NOF's Takata Quantum and Jotun's Sea Quantum antifoulings.

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Carnival Corp. Charters Former AMCV Ship

Carnival Corp.'s Holland America Line brand has entered into a long-term agreement to charter the cruise ship, which was also once known as m/s Nieuw Amsterdam, to Cypress-based Louis Cruises, which will subcharter the vessel to Thomson Holidays in the U.K., effective immediately. The vessel will be marketed as the Thomson Spirit.

Holland America sold the vessel to U.S. Lines, a subsidiary of AMCV in 2000, which operated the ship in Hawaii under the name Patriot; however, it was reclaimed by Holland America in foreclosure proceedings earlier this year.

Carnival will account for this charter as a sale, which, including related expenses, is, expected to result in a charge to earnings of approximately \$9 million in its second fiscal quarter of 2002.

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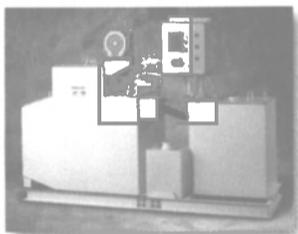
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News

Thunder Horse Will Get Wartsila Generators

Wartsila has been awarded a contract from BP to deliver an integrated package of auxiliary diesel generators totalling 15.3 MW for the Thunder Horse offshore project in the Gulf of Mexico. The power plant will be installed on the production, drilling and quarters platform Thunder Horse PDQ being built in Korea.

The integrated package of auxiliary diesel generators is to supply the hull and drilling rig loads, the emergency services, and the fire pumps, with control systems for all three services. The auxiliary diesel generators are powered by two Wartsila 18V26 engines, each rated 5580 kW at 900 rpm. The emergency generator has a Wartsila 12V200 engine, rated at 2100 kW at 1200 rpm. Two Wartsila 6L20 generating sets, rated 1020 kW at 900 rpm, provide independent power for the emergency fire water pumps.

The Thunder Horse field is the largest oil and gas discovery to date in the Gulf of Mexico. It is located approximately 150 miles southeast of New Orleans, La. The field will be developed by BP, with ExxonMobil owning a 25 percent interest in the field development. BP will act as the field operator. The hydrocarbons from this field



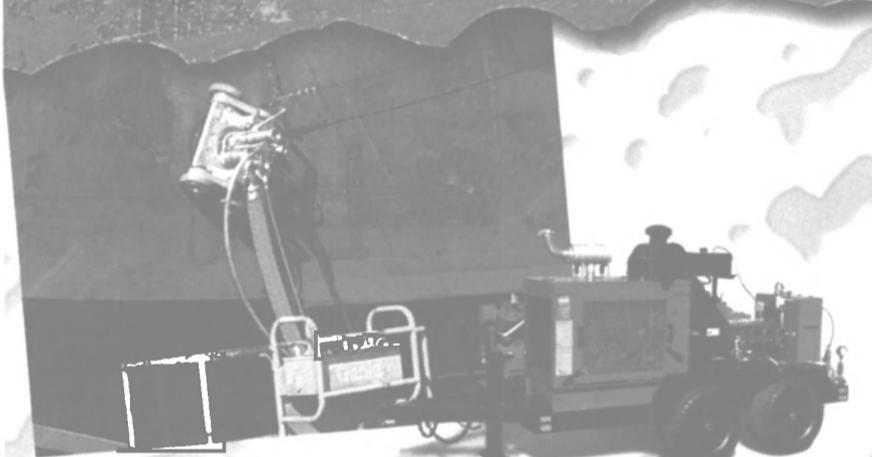
will be produced using the "Thunder Horse PDQ" platform. Displacing 129,000 tons, this will be the largest semi-submersible production platform in the world. It will be delivered from Korea in 2004.

The BP Thunder Horse order marks a milestone for Wartsila's offshore business as the first Gulf of Mexico production unit project. Wartsila has experience from floating production unit applications in the North Sea, Brazil, China and Africa, and are excited to move into this segment in the Gulf of Mexico as well.

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United Defense to Acquire United States Marine Repair

United Defense Industries has agreed to acquire closely held United States Marine Repair, Inc., a provider of non-nuclear ship repair, modernization, overhaul and conversion services to the United States Navy, for \$316 million. Based in Norfolk, Va., United States Marine Repair serves defense and commercial customers at six strategically located ship repair operations in the major ports of Norfolk, Va.; San Diego, San Francisco and San Pedro, Calif.; Pearl Harbor, Hawaii; and Ingleside, Texas. In addition to the company's primary customer, the U.S. Navy, its current customers include the Military Sealift Command, the U.S. Army, the Maritime Administration, the U.S. Coast Guard, and commercial cruise lines such as Holland-America and Royal Caribbean. In the 12-month period ended March 31, 2002, United States Marine Repair reported revenue of \$431.7 million, net income of \$12.3 million and adjusted EBITDA of \$47.8 million.

"This transaction balances and diversifies United Defense's portfolio, gives us a strategic growth platform and expands our mission to support the U.S. Navy with superior technology and services," said United Defense president and CEO **Tom Rabaut**. "As the leader in non-nuclear ship repair and modernization, United States Marine Repair brings a track record of excellence, expertise and on-time delivery. This acquisition is an ideal fit that complements United

Defense's current programs for the U.S. Navy." Rabaut said United Defense expects this transaction to be immediately accretive to earnings in the second half of 2002 in the range of approximately 5 to 10 percent annually. United Defense expects the acquisition to add approximately \$200 million in incremental revenue in 2002, all in the second half of the year, Rabaut added.

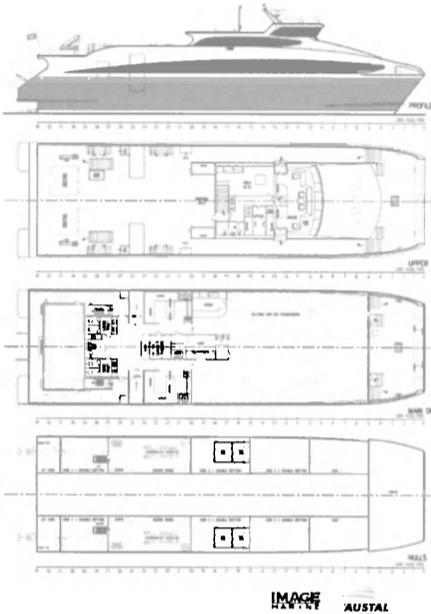
United Defense initiated acquisition discussions in March 2002 after United States Marine Repair filed a registration statement with the Securities and Exchange Commission for an initial public offering of its common stock. As a result of the transaction, United States Marine Repair will withdraw the S-1 registration.

"This acquisition reflects our long-term strategy to increase revenue, profits and shareholder value by expanding our role as a leading systems integrator and prime contractor for the U.S. Department of Defense and allied militaries," Rabaut said. "Naval ship modernization is a national defense priority. Adding United States Marine Repair enhances our company's ability to offer full life cycle support for Navy ship repair, maintenance and modernization programs, just as we do on many Army programs today."

United Defense plans to retain the management of United States Marine Repair and the company's employees. **Al Kreklich** will continue as CEO of United States Marine Repair, which will become a business unit of United Defense Industries.

Austal Gets Contract For Passenger Catamarans

Austal Ships has received a contract for two 136-ft. (41.4-m) passenger/cargo catamarans for ferry



operator, Ofotens og Vesteraalens Dampskibsselskad ASA (OVDS) of Norway.

The aluminum catamarans are due for delivery at the end of April 2003 and will be built by Austal subsidiary, Image Marine. Capable of carrying 216 passengers and 30 Euro pallets (12 tons of refrigerated cargo), the two vessels will operate from the Norwegian port of Bodo.

Principal Particulars - Passenger Catamarans	
Length, (o.a.)	135 ft. (41.3 m)
Length, (waterline)	118 ft. (36.1 m)
Beam (molded)	38 ft. (11.6 m)
Hull Depth (molded)	15 ft. (4.5 m)
Maximum Draft	4 ft. (1.4 m)
Passengers	216
Crew	six
Cargo	30 Euro pallets 1.2m x 0.8m @ 400kg each
Propulsion	
Engine	2 x MTU 16V4000 M70
Gearbox	2 x Reintjes or ZF
Waterjet	2 x Kamewa 71 SII
Speed (@ 85percent MCR)	34.5 Knots
Fuel consumption	207g/kW/hr
Range	360 nm approx.
Class	DNV

This contract adds to the 128-ft. (39-m) live-aboard catamaran currently under construction at Image Marine for operation in the Maldives, and follows closely the delivery of two 121-ft. (37-m) river catamarans for Portuguese operator, Transtejo.

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KMSS Wins Cargo Monitoring Orders

Kongsberg Maritime Ship Systems (KMSS) has recently won a variety of orders for its cargo monitoring systems in Japan and Korea. The first order is for

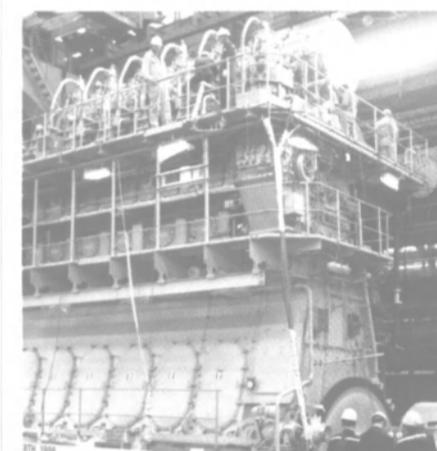


a Custody Transfer System (CTS) for MOL and Qatar Gas Hull 1561 currently under construction at Mitsui Engineering and Shipbuilding Co., Ltd. in Japan. The second order is also for a CTS cargo system for Shell Hull 2183

currently under construction at Mitsubishi Heavy Industries Ltd., in Nagasaki, Japan. The ship is the last to be built in a series of three, which have also been fitted with equipment from KMSS. The third contract is for a KMSS CTS/CLS system for Bergesen Hull 2217 currently under construction at Daewoo in Korea. Again, this is the final vessel in a series of three; all have been fitted with KMSS CTS/CLS equipment.

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New Order For MAN B&W Diesel ME-Engines



Viken Shipping in Norway has ordered a 6S70ME-C electronically-controlled engine from MAN B&W Diesel A/S.

The engine, which was ordered for a highly specified Suezmax "shuttle light" tanker with upgraded specification, will be housed in this vessel that will be delivered from Samsung in Korea in November 2003 and will enter a long-term charter for Navion in the North Sea. Four more ships, two more Suezmax and two Aframax, are being negotiated with the yard for this owner, and they, too, are planned to have ME-C engines; the Aframax will more than likely incorporate the 6S60ME-C type. The 6S70ME-C engine develops an output of 18,660 kW at 91 rpm. It has all the usual features of the ME engines, notably: Variable electronically-controlled timing of fuel injection and exhaust valves for lower specific fuel consumption and better performance parameters;

Lower rpm possible for maneuvering; better astern and crash stop performance; improved emissions characteristics, such as lower NOx and smoke values at any load; and equalized thermal load in and between cylinders minimizing the risk of premature need for overhaul.

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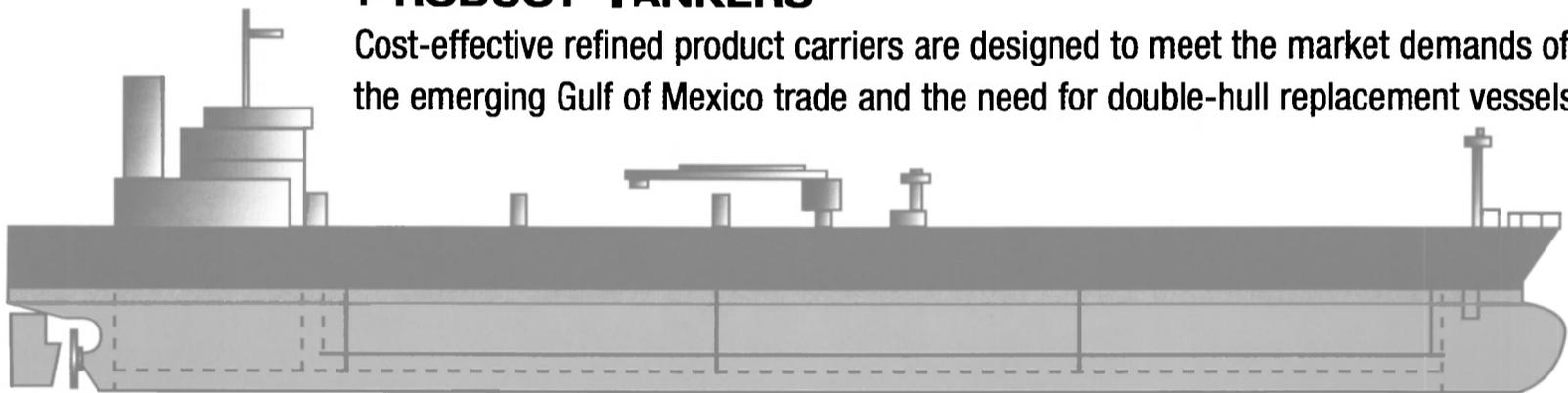
BP Tankers

NASSCO will soon begin construction of four BP tankers for the shipment of crude oil from Alaska to U.S. West Coast refineries. These environmentally safe, double-hull, diesel-electric tankers feature the latest navigation, machinery and cargo-control technologies.

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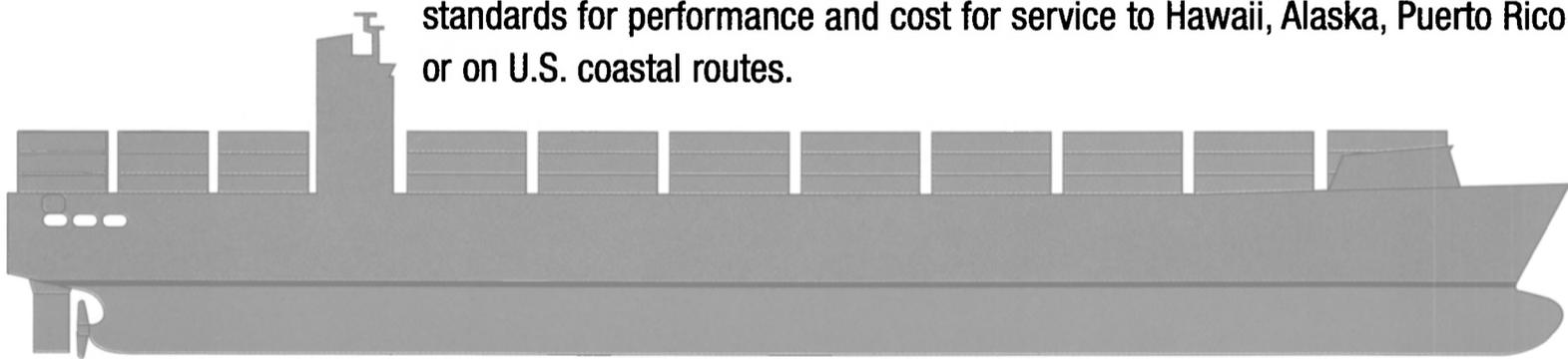
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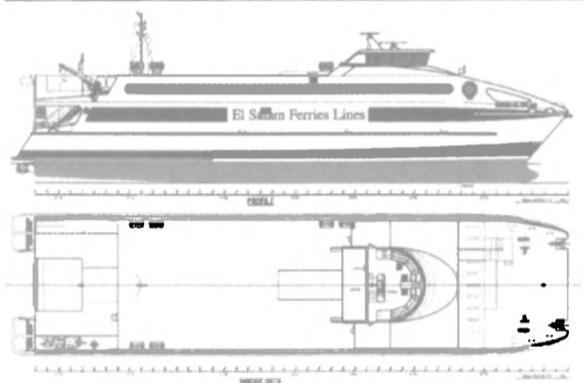
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Fares Al Salam Parts The Red Sea

Austal Ships has delivered the 184-ft. (56-m) vehicle/passenger ferry, Fares Al Salam, to its Saudi owner The Maritime Co. for Navigation and Egyptian ferry operator, El Salam Maritime Co. of Egypt.



The vessel arrived in Jeddah in April with a combined crew of Austal and El Salam Maritime Company employees following a successful 17-day delivery voyage, via the Cocos Islands and the Maldives.

The vessel, which represents Austal's premiere vessel within the Red Sea region and the first newbuild for the Australian high-speed ferry industry, will operate between the Egyptian ports of Safaga, Hurghada and Sharm El Sheik and the Saudi Arabian port of Duba.

Designated as a high speed vehicle/passenger catamaran, the vessel also has the ability to operate on a number of routes across the Red Sea. Its design, construction and delivery signify the beginnings of a fleet upgrade for El Salam Maritime Co., which currently has an existing fleet of 14 vessels. With a maximum speed of 38 knots, the aluminum catamaran will be the operator's first high speed ferry.

Main Particulars - Fares Al Salam	
Class	Germanischer Lloyd
Length, (o.a.)	184 ft. (56 m)
Length, (waterline)	163 ft. (49.8 m)
Beam, (molded)	46 ft. (14 m)
Hull depth, (molded)	16 ft. (5 m)
Maximum draft	9 ft. (2.7 m)
Engine	4x MTU 16V 4000 M70
Gearbox	4x Reintjes VLJ930
Waterjets	4x Kamewa 71 S11
Speed	34.5-knots
Passengers	430
Crew	12

Fares Al Salam's vehicle deck has the capacity to hold 43 cars in lanes with bay sizes of 15 x 7 ft. (4.5 x 2.2 m) and a clearance height of 8 ft. (2.6 m). The vessel's wheelhouse holds an array of equipment that is the latest in terms of maritime technology, mainly two Furuno/Kelvin Hughes radars, Leica DGPS, Skipper echo sounder, speed log and gyrocompass suitable for high speed vessels.

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Vyborg Shipyard Delivers CS50 Platform

Vyborg Shipyard delivered a multi-purpose semi-submersible platform project CS50, which has been constructed in full conformity with the production schedule and the terms and provisions of the contract.



The multi-purpose bare-deck platform CS50 represents the fifth generation of semi-submersible platforms designed by Moss Maritime AS (Norway). The platform, which measures 389 x 231 x 133 ft. (118.6 x 70.4 x 40.6 m) with a hull weight of approximately 15,000 tons, is of a catamaran type with two pontoons and six stabilizing columns supporting the upper structure.

The platform has an upper deck capable to carry the top structure of the hull 20,000 tons, and is adapted for installation of the both systems of dynamic positioning and passive positioning by means of anchors, and combined system of stabilization of the platform.

Blount Barker Delivers Sea Wolf Marine Tug

Bristol Harbor Marine Design (BHMD) was recently awarded the contract from Blount/Barker Shipbuilding, of Warren R.I. to modify the design of an 85-ft. (25.9-m) tug.

The new tug is based on a tug of the same size that is currently under construction at the yard, the design of which was developed by BHMD and based on a classic Blount design. BHMD will take advantage of Computerized Numeric Controlled (CNC) cutting for



the hull and deckhouse modification. Two CAT 3512 engines and 4:1 Twin Disc gears will power the tugboat. Two 65kW generators will supply the ship's service power.

In August, Blount/Barker Shipbuilding signed a contract with Sea Wolf Marine of Bayonne, N.J. to build the 2,200 - bhp, 85 x 26 ft. (25.9 x 7.9-m) double chine, all welded twin-screw tug.

The tug, which was delivered on April 25, 2002, will be used for marine towing along inland and intra-coastal waterways on the East Coast.

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First of Two Halter-Built Vessels Christened

Halter Marine, Inc. (HMI) christened the first of two articulated tug-barges (ATB) for Vessel Management Services (VMS), a Crowley Maritime Corporation subsidiary. Christened Sea

Reliance, the 9,280-hp tug design is the result of a joint project between Halter Marine and VMS. The 155,000-barrel barge christened 550-1 is double hulled. Built, documented and maintained to the requirements of the American Bureau of Shipping (ABS) SafeHull, the barge is equipped with an inert gas system.

enhanced cargo system, and a fully redundant ballast system.

Tug Sea Reliance was built at Moss Point Marine and Barge 550-1 at Port Bienville, two of Halter's Mississippi facilities.

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Northrop Grumman Redelivers Frigate

Northrop Grumman Corporation redelivered the first of two modernized Lupo-class frigates to the Venezuelan Navy on May 16.



A crewmember of the modernized Lupo-class frigate Mariscal Sucre (F-21), presents the National Flag of Venezuela to Cmdr. **Jesus Ortega Hernandez**, the ship's new commanding officer, as Capt. **Jose Del Rosario Garcia**, chief of the Venezuelan Inspection Commission, second from left, and Adm. **Carlos Alberto Millan Millan**, Venezuelan director of Naval Logistics, stand at attention during a redelivery ceremony for the ship at Northrop Grumman Ship Systems Ingalls Operations in Pascagoula, Miss on May 16.

The ships, Mariscal Sucre (F-21), and Almirante Brion (F-22), arrived in Pascagoula in January 1998 to undergo extensive modernization and upgrade. F-22 will be redelivered this summer.

The modernization project aboard the two 20-year-old Italian-built frigates included repairs, modernization and upgrades in most areas, from the ship's hull to propulsion, weapons, electronics and communications systems.

The 2,500-dwt frigate is 372-ft. (112.8-m), with a beam of 53 ft. (15.9 m) and a draft of 22 ft. (6.5 m). The ship's propulsion is supplied by two 35,000 hp gas turbine engines and/or two diesel engines and can power the ship to a top speed of 36 knots. With the modernization, berthing space was reduced from 182 to a crew of 131.

Diamond Services Adds Crew Boat

Diamond Services will soon take delivery of another 170-ft. (51.8-m) crew/supply boat from Swiftships Inc. The new 170 x 30 x 13-ft. (51.8 x 9.1 x 3.9-m) aluminum vessel will have a 105 x 24-ft. (32 x 7.3-m) open cargo deck with a 200 long ton capacity. Tankage will include: ship's fuel 5,800 gallons; transferable fuel 17,800 gallons; transferable potable water 24,800 gallons; fresh water 1,230 gallons; sewage tank 720 gallons; ballast tank 12,200 gallons. Propulsion features four Hamilton HM651 water jets powered by Cummins KTA38-M2 12-cylinder engines rated 1,350 hp continuous at 1,900 rpm.

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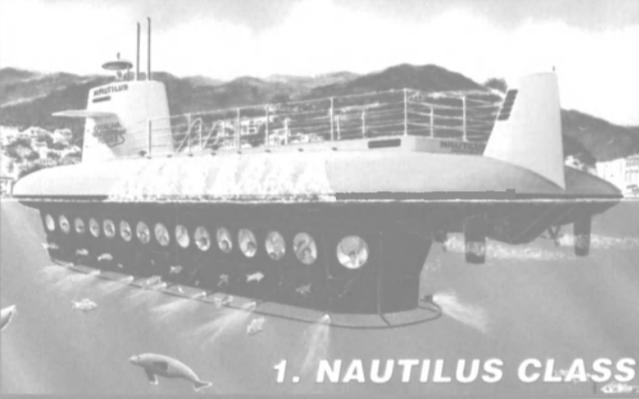
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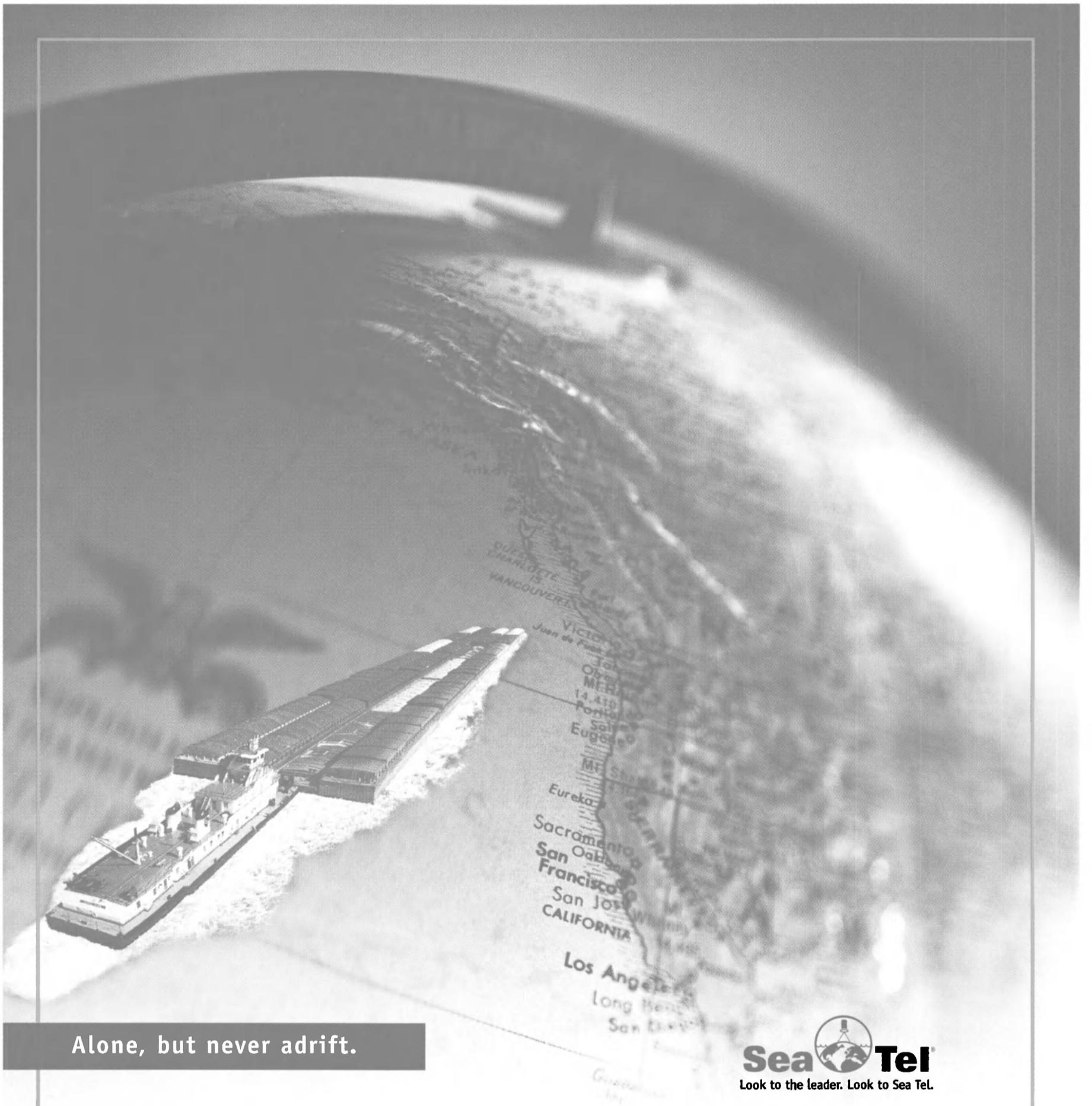


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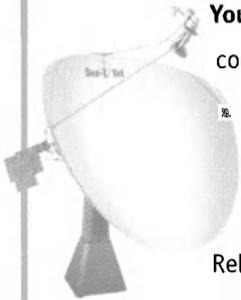
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A&P Shipcare Gets Conversion Project

A&P Shipcare was awarded the contract to convert Union Arrow from a mini bulk carrier into a self discharge bulk carrier at its Chatham facility.

The vessel, which is owned by the Union Transport Group, arrived in Chatham on April 18 for a scheduled



Union Arrow alongside at A&P's Chatham facility.

12-day conversion period, during which a four-ton Samsung crane was installed.

Work also included fitting of sloping bulkheads fore and aft, construction and fitting of a main deck insert, construction of a void area to house a bobcat machine, installation of strengthening columns, construction of hatch end coverings.

In addition to the above work, the vessel was fit with a new engine to assist with the extra requirements of the vessel as a self discharger.

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Voyager of the Seas Arrives at Grand Bahama Shipyard

Royal Caribbean's Voyager of the Seas arrived at the Grand Bahama Shipyard on May 5 for a two-week dry-docking.

This is the first time that the vessel has been docked since the vessel was delivered in November 1999; it is



also the first time ever that this class of vessel has been docked in a floating dock.

The vessel, which measures 1,020 ft. (311m) with a beam of (127 ft. 38.7 m) carries 3,144 passengers and 1,176 crew, and weighs approximately 140,000 gt. It is the largest vessel ever to dock at the yard and purportedly the heaviest vessel ever to dock in a floating dock.

The ship is planned to be in dock at the yard for a 14-day maintenance period, which will include work on the ABB Azipod propulsion units, regular underwater maintenance, hull treatment and work on board the vessel on systems and accommodation.

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Celebrity's Constellation Returns To Shipyard

Celebrity Cruises' next ship delivery, Constellation, returned to Chantiers de l'Atlantique, following sea trials, to correct a leak in its starboard propulsion pod. This delay in the ship's delivery caused the cancellation of one chartered cruise, which was scheduled for May 5.

The ship's builder performed immediate repairs to correct the leak, which is allowing seawater to enter the pod. The repair was completed on schedule at the yard, thus allowing for the May 12 sailing, a seven-night Western Mediterranean cruise departing from Barcelona.

Cal Dive's M/V Eclipse Converted

Mobile, Ala.-based Offshore Inland Marine & Oilfield Services has completed the conversion of Cal Dive International's M/V Eclipse from a fiber optic cable-laying vessel to a Saturation Dive Vessel. The installation of the saturation dive and associated systems was a complete turkey operation that required extensive engineering and fabrication.

Systems and components designed by Offshore Inland Marine & Oilfield Services professional engineers include: gas distribution control consoles, proportional hydraulic controls, cursor frame, trolley frame, hydraulically actuated gangway (extendable to 70 ft.), clump weight, and a hydraulic power unit.

In addition to the engineering and fabrication work, general installation includes: new water makers, hyperbaric lifeboat, cable tray system, and oak decking.

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between fenders	56.5m	(228ft)
Vessel draft	9.1m	(30ft)
Lifting capacity	82,500	tonnes



Redundancy The Next Watchword?



by David Tinsley,
technical editor

The fact that the actual incidence of oil cargo spills as a percentage of global shipments is minuscule can never be a reason for any relaxation in the constant vigilance and unerring drive for risk minimization which must be practiced in all fields of tanker shipping.

Certainly, there is no evidence of complacency. The industry's continual striving for improvements in vessel and system design, operating procedures, risk management processes and training has a powerful motivator in the increasing, manifold penalties associated with marine pollution. But professionalism and the striving to meet business objectives in a competitive world tend to be understated as the real drivers of advance, in an era in which oil shipping attracts public and political interest only for the times when things go wrong.

The tanker sector has constantly pushed the technical envelope, adopting innovative thinking to make the transportation of oil and products more efficient and safer. There is no let-up in that process, as evidenced in new breeds of crude carrier and distributive products traders now coming into service where design is underpinned by the perception of an inextricable link between transport efficiency, service dependability,

vessel and system reliability, safety and environmental compatibility.

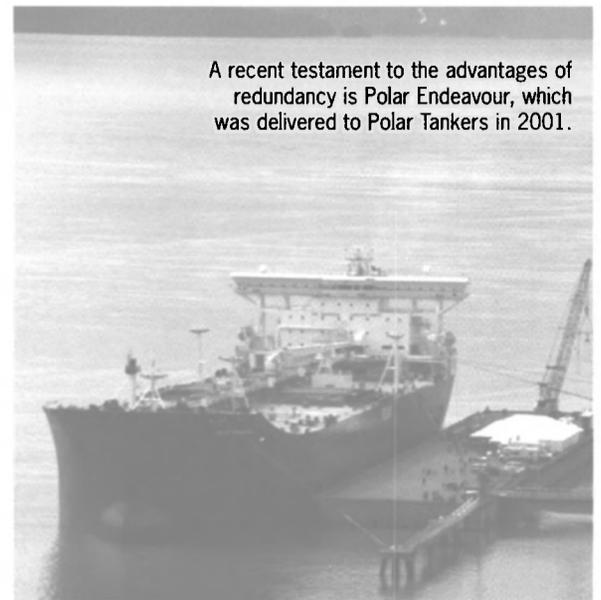
Nonetheless, as has been seen in recent years, major accidents to which environmental damage is attributed can be expected to impact fundamentally on future design, as legislators act in political deference to public outcry.

In a characteristically circumspect address to a recent Intertanko event in Rotterdam*. American Bureau of Shipping's (ABS) Executive Vice President Dr. Don Liu suggested that the next mandatory requirement to be imposed by the rulemakers in response to a casualty producing large-scale pollution could be system redundancy. Dr. Liu said that most of the technological changes over the years in the tanker sector had been developed by the industry, for the industry, in response to market forces. But some were the outcome of regulatory mandate, most notably the wholesale switch to double-hull designs. He cited the Exxon Valdez casualty as providing "a classic example of the manner in which regulators respond to human error".

However, as human factor issues are more intangible for the type of immediate, legislative response to a casualty sought by governments, the rulemakers look for technical solutions, which, it is felt, might better avert future accidents.

In Dr. Liu's view, mandatory redundant systems

**Tankers of Tomorrow, Intertanko Tanker Visions Panel, Rotterdam Tanker Event 2002.*



A recent testament to the advantages of redundancy is Polar Endeavour, which was delivered to Polar Tankers in 2001.



ABS executive vice president, Dr. Don Liu.



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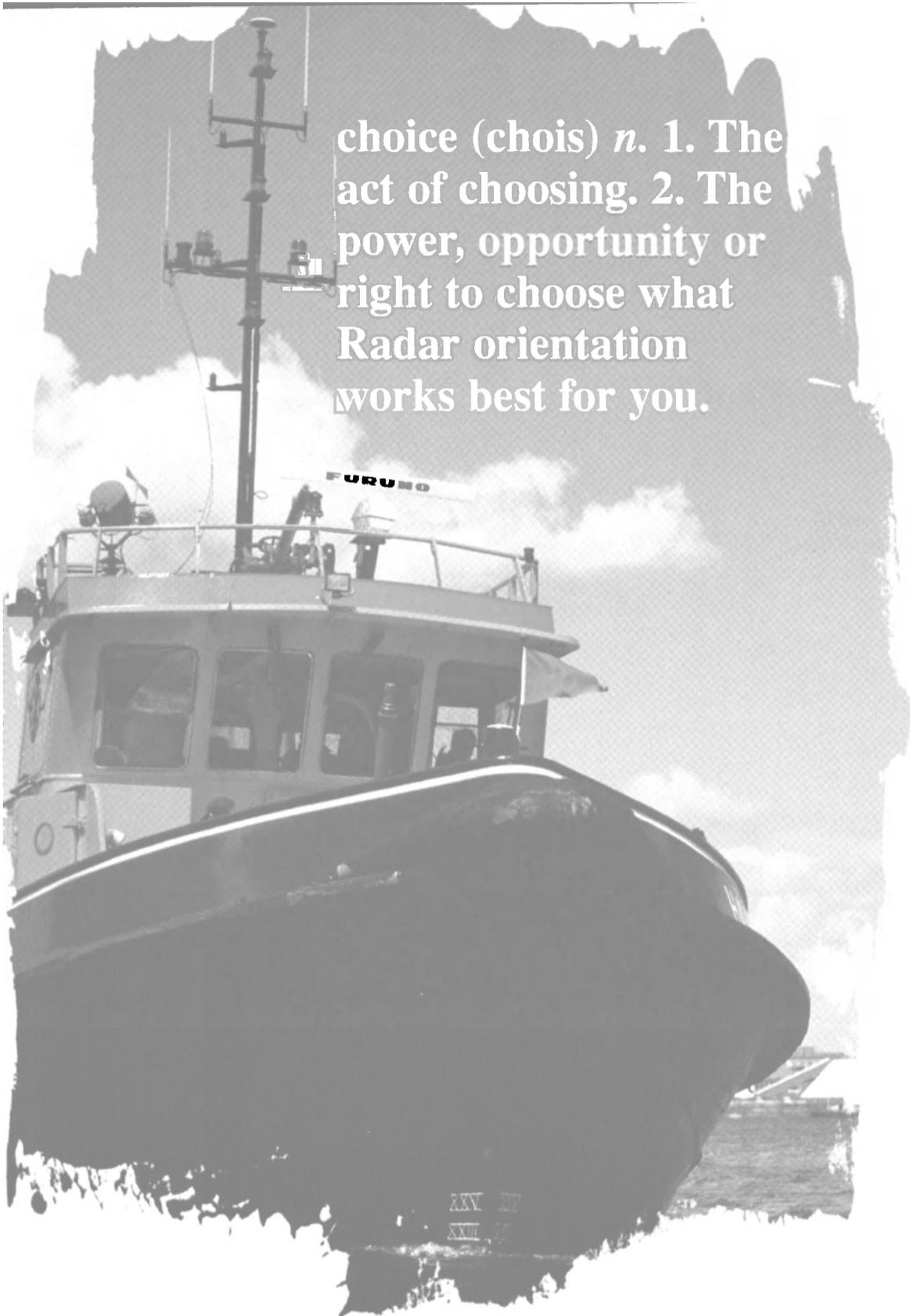
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Investment in Design

could be the result of the response by regulators to the next high profile tanker casualty and ensuing pollution, especially if a double-hull tanker is involved. "We now have a redundant hull. The next step will be redundant engine rooms, possibly double hull engine rooms, redundant steering gear, two propellers, twin rudders, redundant navigation systems, perhaps even double collision bulkheads," he suggested.

Models for future designs can already be found, according to Dr. Liu: "They have been taking shape in U.S. shipyards and elsewhere with the first series of tankers, having many of these redundant features delivered to Polar Tankers from Avondale shipyard. So will the next series of tankers for BP from NASSCO, to be followed by the innovative series of shuttle tankers for Conoco." While many of the projects have been driven by oil majors, Concordia

Maritime's V-Max series of VLCCs (very large crude carriers) was referred to as an example of innovative thinking on the part of the shipowning community. "If the case of the Amoco Cadiz were to occur today, there is no doubt in my mind that redundant system legislation would follow almost immediately," considered Dr. Liu. He felt that mandatory introduction of such requirements would have an equally disruptive effect on the industry as the double-hull stipulations, with the fundamental difference in the nature of implementation. The double-hull process started with U.S. unilateral action in the shape of OPA 90, and continued a decade later with unilateral action on the part of the European Union, in the aftermath of the Erika disaster. With the redundant system approach, Don Liu considers that it will be worked out within IMO and will impact the global fleet from the outset.

Cargo Handling's New Force

A bold investment policy by TTS Technology of Bergen has hoisted the Norwegian group into the world's top three equipment suppliers in its specialized market segments. In many minds, the TTS name is synonymous with shipyard production systems and design, which remains an important part of its activities. But diversification and acquisitions since 1997, reaching a new high point with the purchase of Hamworthy KSE's dry cargo division and takeover of cranemaker Hydralift Marine at the tail end of last year, has seen the emergence of a powerful new force in the market for shipboard equipment, including total vessel packages. Annual turnover has doubled to approximately \$96.3 million as a result of the absorption of Hamworthy KSE and Hydralift Marine, and the

group is set fair for income growth. Headquartered in Gothenburg, the home of the erstwhile Kvaerner Ships' Equipment, the new TTS Dry Cargo Handling Division embraces the former Swedish and German cargo access specialist companies and Chinese joint venture of Hamworthy KSE, along with TTS' existing interests in the field, hitherto vested in TTS-Mongstad. The various cargo access firms have now been retitled TTS Ships Equipment, while the assimilated Shanghai operation has become TTS Hua Hai Ships Equipment.

The Marine Cranes Division has been formed from the existing TTS-Norlift augmented by Hydralift Marine, while the long-established business in shipyard production and heavy load handling equipment as well as recently developed activities in container terminal systems have been vested in TTS Handling Systems.



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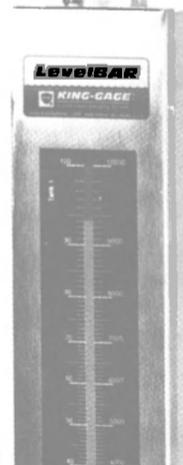
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A Naval Architect's Look At Design Trends

By John W. Waterhouse, P.E.,
President, Elliott Bay Design Group.

Reading tea leaves on a boat underway is an exercise in frustration because just as the leaves start to settle, another wave comes along and changes the picture. Similarly, trying to foresee trends in the marine industry. Just as you see things shaping up, a change occurs and the industry is re-shuffled. However I believe that I can discuss three particular trends that are part of our collective future.

Regulations

The first of these is the fact that the marine industry will continue to see a

growing body of regulations affecting how we design, build, and operate vessels. Some examples of the alphabet soup that we must deal with include ADA, STCW, ISM, EPA, etc. These regulations are being created by organizations both within and outside of the marine industry. Many marine regulators such as the U.S. Coast Guard are increasingly relying upon other bodies such as the American National Standards Institute (ANSI), National Fire Protection Association (NFPA), and American Society for Testing of Materials (ASTM). Their purpose in doing so is to try and keep the regulations more current. However, this also can mean that the regulations are getting further

away from our industry.

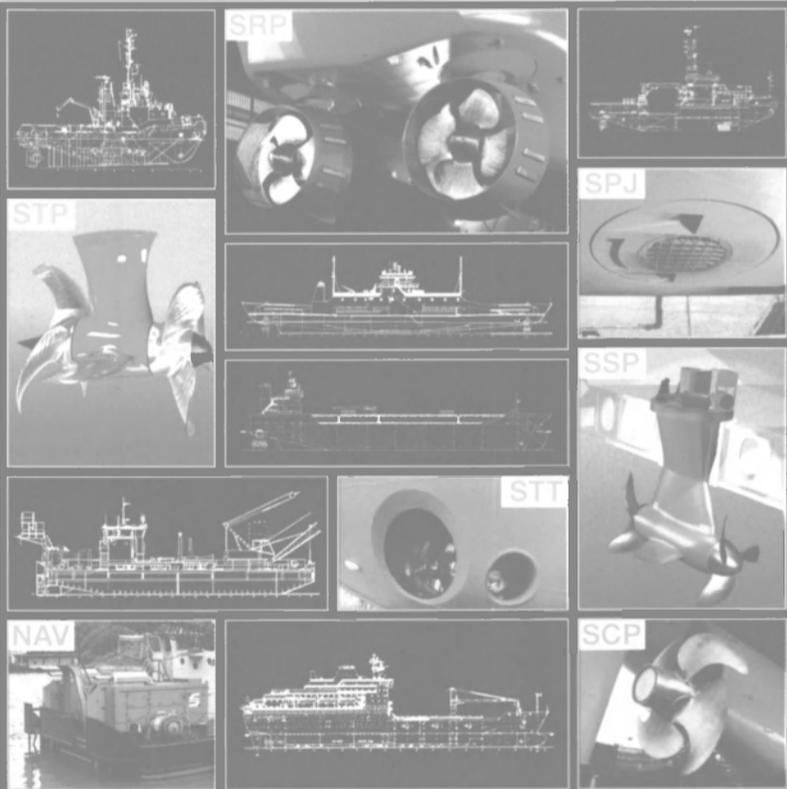
We have also seen a shift from prescriptive regulations to performance-based regulations. What does this mean to the industry? Let's look at some examples:

- **Prescriptive Regulation** — "Each compartment must have two means of escape, one of which must be a pathway or ladder meeting regulation ABC, the other way be a vertical ladder on horizontal egress via a designated widow with minimum dimensions of X by Y."
- **Performance Based Regulation** — "Demonstrate that there is a safe egress path from each compartment given the following hazard scenarios: fire, flooding, extreme heel and trim."



The prescriptive regulation is more objective. It's easier to measure compliance. The performance based regulation is more flexible but requires more effort by all parties (designer/builder/operator/regulator). We have seen that both the U.S. Coast Guard and the International Maritime Organization (IMO) are increasingly working on risk-based approaches to regulations, which are

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clearly performance based. By introducing the notions of risk and associated consequences, the regulations are potentially more rational and objective. I fear however that the cost of demonstrating compliance to such risk based regulations will be expensive.

Increase in sophistication of systems

The second trend that I see is the increasing sophistication of systems and equipment onboard vessels. Perhaps our future vessels will be "smart" with voice-activated systems, integrated command, control, and communication, and self-checking equipment to facilitate maintenance and improve reliability.

We are already seeing smart equipment as shown by two examples.

- **Electronic combustion controls on diesel engines** — improve power, reduce emissions, adapts to load/misison profiles.
- **HVAC systems** — Self adjusts to reflect time of day, season, handles dif-

ferent latent and sensible heat loads, varies air volumes to suit occupancy.

Every technology has its flip side, however. "Smart" equipment needs to be programmed just as your VCR needs to be programmed to record programs. Just because you can program your VCR to receive TV programs two months in advance on alternate Tuesdays, how many of us need or want that capability? Who remembers how to reprogram them when the power fails? We see the same challenges in these new sophisticated systems. As a firm, Elliott Bay Design Group has had to help customers with:

- Programmable electronic circuit breakers that trip off-line for no apparent reason.
- False readings from sensor affected by radio frequency interference from power circuits or from voltage spikes.
- Elevator controls where a loss of power causes the system to re-boot with a consequent loss of programming.

As an industry we need to carefully consider the benefits and potential problems that come with modern technology.

Vessel Affordability

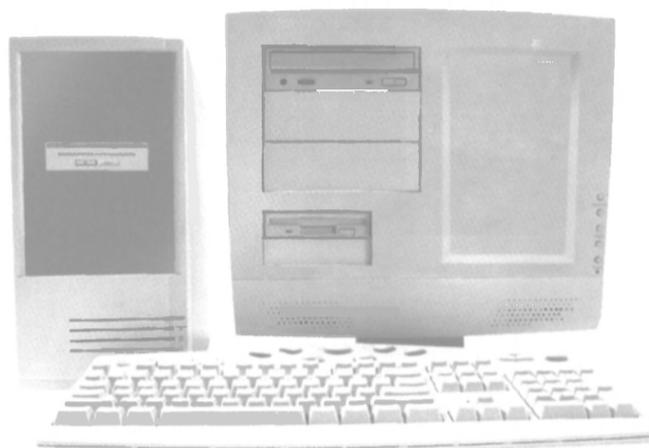
The third trend is a little harder to define but is no less real. I believe that U.S. ship owners and shipyards will increase working together to make vessels more affordable. This means that the ship owners must become more knowledgeable about construction practices. They need to understand the balance between labor costs and materials costs, the impact of scheduling on labor productivity, and how contract provisions such as quality standards can impact the shipyard overhead. For example, bulkheads and decks can be stiffened by bulb flats instead of angles. The material cost is higher but coating systems are easier to apply so the coatings last longer. A proactive owner will understand the life cycle cost benefits that result from different construction techniques.

Smart owners will ask their designer and/or builder about where the dollars are in the vessel. Sometimes spending more money on a piece of equipment that is easier to install can result in a net saving. Does the yard have preferred suppliers for doors, electrical equipment, valves, etc.? Why do they prefer them and is there a savings to the customer? Is the yard's standard detail for a handrail acceptable rather than the designer's approach? I think that more owners will ask questions and conduct a dialogue with the shipyards. Everyone will benefit.

The U.S. shipbuilding industry will also work smarter, not harder. On a recent contract for a fishing vessel we compared an overseas yard that could

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Maritime Reporter & Engineering News

build the vessel with 40,000 labor hours vs. a U.S. yard that required 50,000 labor hours. This kind of gap will be closed as U.S. yards spend more effort on improving their production practices and the associated planning. For example: I recently visited a yard where they traditionally spent 60 labor hours to fit a bow wrapper plate with come-alongs, wedges, and trimming excess from the plate. After learning about line-heating methods they were able to fit a similar plate within 12 labor hours. The plate was cut neat and treated with line heating to take a numerically predicted shape.

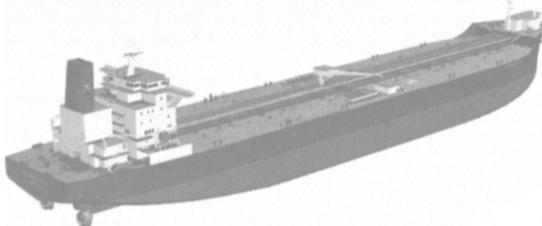
Successful shipyards will adopt some new technologies and processes.

Technologies will include line heating, statistical accuracy control, 3-D product modeling, and product work breakdown structures. New processes will include a detailed build strategy, increased use of shipyard standards and specific vendor equipment, better control of schedule and material flow, and zone-by-stage construction.

At a recent meeting of the Passenger Vessel Association Sen. **Trent Lott**, (R-Miss.), expressed his opinion that the U.S. could be competitive in shipbuilding. We will do so if we continuously seek to improve our shipbuilding processes, benchmark ourselves against our international competitors and train our work forces to use the tools we have.

There you have my three trends. I think that they apply to all market sectors of the diverse and interesting marine industry. A common theme among them is communicating information and asking questions. At a seminar on regulations a speaker said, "You're either a player or a victim." Let's all be players and work together.

Conoco Leads The Way For GOM Shuttle Tankers



Seahorse Shuttling and Technology LLC, a wholly owned entity of Conoco, has completed the functional design of a new tanker for shuttling crude oil from the deepwater Gulf of Mexico to shore. The 80,000-dwt double-hulled "GoMAX 550" shuttle tanker will be capable of transporting 550,000 barrels of crude oil. With a 40-foot draft, the new shuttle tanker will be able to enter most ports in the U.S. Gulf of Mexico.

The GoMAX 550 design is the result of a shipbuilding alliance between Conoco, Alabama Shipyard of Mobile, Ala., and Samsung Shipbuilding and Heavy Industries of South Korea.

Designed by Samsung specifically for production at Alabama Shipyard, the new shuttle tankers would meet the Jones Act requirement that vessels operating totally in U.S. waters must be constructed in the U.S.

Earlier this year, the U.S. Minerals Management Service (MMS) approved in principle the use of FPSO's and shuttle tankers for crude oil production

and transportation from the deepwater Gulf of Mexico.

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Daewoo Shipbuilding To Build, Refit LNGs For Exmar

Daewoo Shipbuilding & Marine Engineering Co. has won a \$270 million order to build a liquefied natural gas carrier and refit three other LNG carriers for Exmar N.V. of Belgium for delivery by 2005. The vessels are capable of carrying 4.83-million cu. ft. of liquefied natural gas each and will be chartered to Houston, Texas-based El Paso Global LNG for positioning in the Gulf of Mexico and along the U.S. East Coast. It has also been confirmed that the trio of LNG carriers will be modified into EP Energy Bridge Vessels, which can regasify and deliver a minimum of 400 million cu. ft. of natural gas/day. An EP Energy Bridge ship connects to a pipeline infrastructure through an offshore buoy and turret system that has been used worldwide, including approximately 10 years of service in the harsh North Sea. In order to achieve a continuous flow of natural gas, a typical EP Energy Bridge system will have two offloading buoys to ensure uninterrupted delivery. In addition, the offshore systems will provide a cost-effective solution to serve seasonal or peaking loads, and small- to medium-size markets where natural gas delivery has been unavailable.

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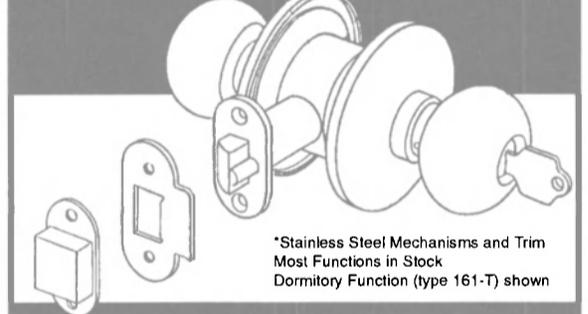
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Navy League Comes to NY for Centennial Celebration

More than 600 Navy Leaguers from around the world will be in New York City from June 28 to July 2, 2002, attending the organization's national

convention and celebrating the Centennial of the Navy League of the United States (NLUS). The Navy League is a civilian organization that supports all of

the U.S. sea services — the Navy, Marine Corps, Coast Guard, and U.S.-flag Merchant Marine. For 100 years, the Navy League has been providing



Citizens in Support of the Sea Services

The Navy League was launched in 1902 with much support from then-president Theodore Roosevelt.

direct support to millions of active duty men and women and their families as well as educating elected officials and the public about the need for strong sea services.

It is most appropriate that New York is the site for this centennial convention and celebration since the Navy League was founded in this city.

Rear Admiral Albert Barker, Commandant of the New York Navy Yard, urged the formation of a navy league "to enlighten people ... on naval matters and tell them what a navy means to the country and what it ought to mean to them."

In 1902, the Navy League was launched, with the enthusiastic support and personal funding of President Theodore Roosevelt. As a former Assistant Secretary of the Navy and recipient of the Nobel Peace Prize, Roosevelt contributed part of his peace honorarium to build a legacy for sea power. Roosevelt's great grandson, Simon Roosevelt, will greet NLUS members at the Tuesday evening dinner bringing to full circle the participation of the Roosevelt family in the Navy League.

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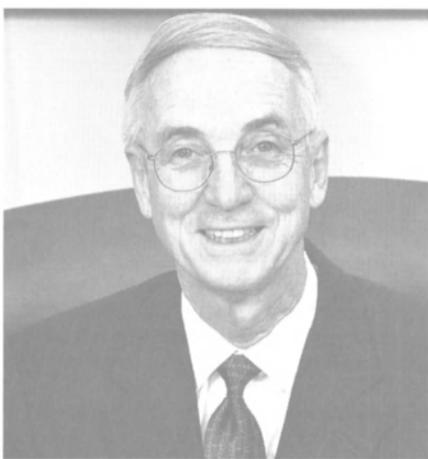
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Secretary of the Navy, **Gordon R. England** will make an appearance at the Navy League's Awards Luncheon and Final Dinner on July 2.

encouraged women to knit sweaters, mufflers, and mittens for seamen. Navy League members have provided physical and spiritual comfort to sea service members and their families.

Today more than 77,000 Navy League members, belonging to 330 councils around the world, still devote time, money, and energy to support and improve the well being of American service personnel and their families. Councils adopt ships and units; honor enlisted personnel through various types of professional and leadership awards; host social events for military personnel; and support family members left behind when spouses or parents are deployed. In addition, they provide scholarships for military personnel and their family members; raise money and provide volunteer workers for Fleet Week activities, ship welcomings, and ship commissionings; and host birthday celebrations for the various sea services.

This year also marks the 40th anniversary of the Naval Sea Cadet Corps, a Navy League program with more than 10,000 members throughout the U.S. Councils invest in the youth of our nation by sponsoring and supporting Sea Cadet programs across the country.

The convention will feature informative sessions involving senior officers from the sea services and industry who will talk about shipbuilding, the Mer-

chant Marines, Coast Guard operations, and Operation Enduring Freedom.

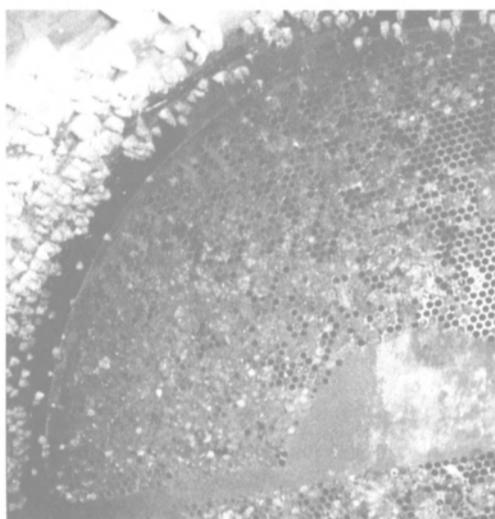
A highlight of the five-day convention will include a visit by Secretary of the Navy **Gordon R. England** on Tuesday, July 2, for the awards luncheon and the final dinner that evening.

So as the Navy League gathers in New

York City to celebrate their Centennial, it is with a renewed patriotic spirit and vigor we look to the future and rally around our Centennial theme: Citizens In Support of the Sea Services. We ask that you join us in this worthy effort.

For more information, contact the Navy League at 2300 Wilson Blvd, Arlington, VA 22201-3308, 703-528-1775 or check the website at www.navyleague.org.

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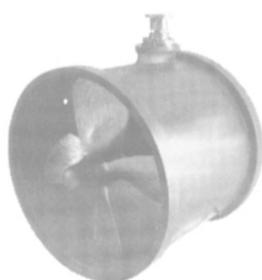
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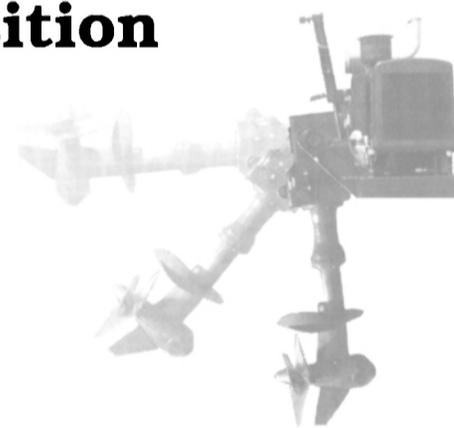
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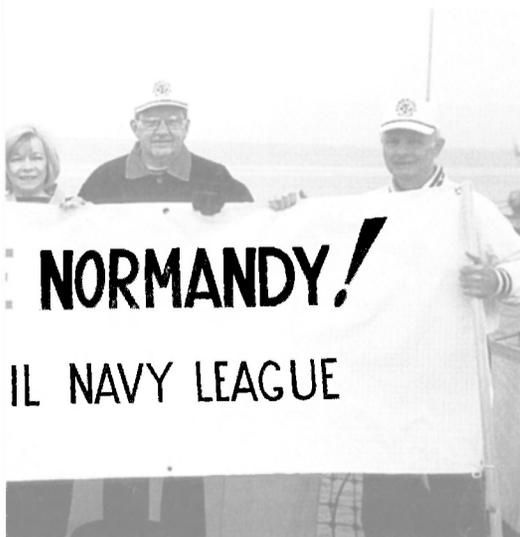
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OceanGrafix, Inc., NOS (National Ocean Service's) CRADA partner

(cooperative research and development agreement) successfully concluded a pilot program for the charts in the United States.

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**Pardini Named New
LASCO President**

Lasco Shipping Co. has appointed **Anton U. Pardini** as president and COO.

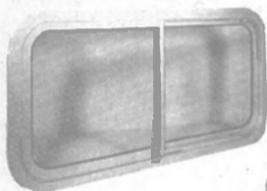
The company has also signed a contract with Sincere Steamship Co.'s for the construction of two newbuildings to the LASCO Logger Pool. Lasco is also purchasing two bulk carrier new buildings from Namura Shipbuilding. There are indications that LASCO will be purchasing even more new logger vessels and further expanding the memberships in the Logger Pool. The Lasco Logger Pool, one of the largest logger fleets in the world, has 17 vessels in the pool.



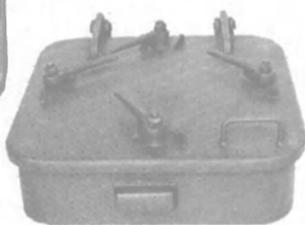
Prior to his appointment as LASCO's president, Pardini had advised the company on business strategy and growth. He has previously been the CEO of a wireless communications technology development company and served for six years as General Counsel for The Schnitzer Group of companies.

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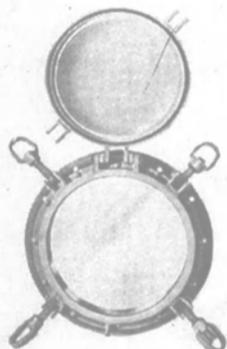
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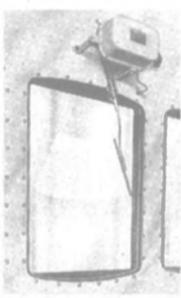
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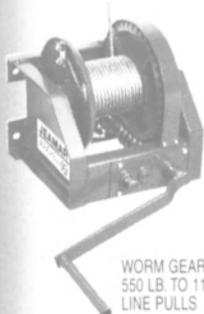
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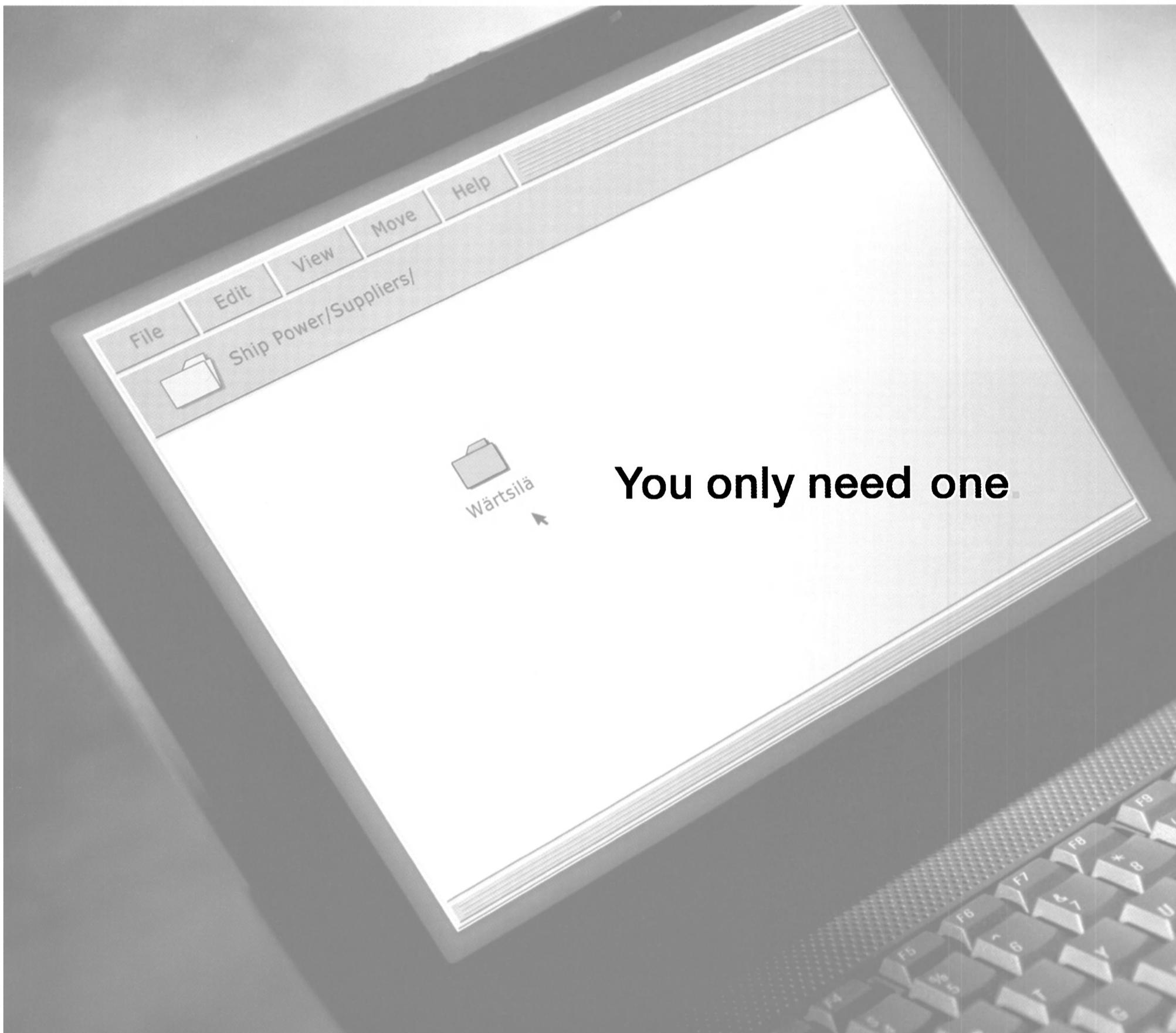


John Garfitt, Elliott Bay Design Group.

Seattle-based Elliott Bay Design Group announces the addition of **John Garfitt** to its marine engineering team. Garfitt has over 10 years of marine engineering experience and

has worked on projects all over the world. As a senior marine engineer, Garfitt is involved in the Repower Study for the M/V Columbia and will be lending his expertise to the Pierce County Waterborne Transportation Study.

Garfitt is a licensed professional engineer in Canada and is currently working toward his U.S. license. Prior to joining EBDG, Garfitt served as vice president for Queenship Yachts.



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Prospects Abound, But Where's the Money?

By H. Clayton Cook, Jr., counsel,
Bastianelli, Brown & Kelley

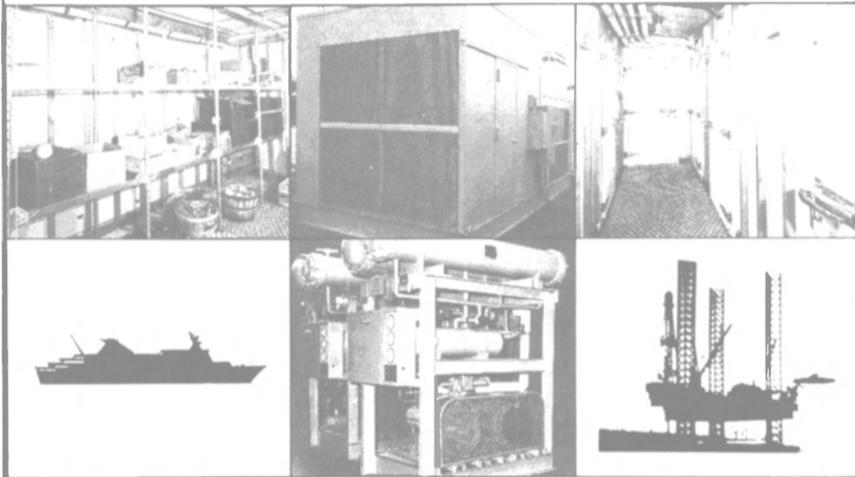
While the U.S. commercial shipbuilding industry outperformed the U.S. economy between 1992 and 2001, this period witnessed the construction of barely a dozen large ocean going vessels for our U.S. domestic trades with an aggregate cost of not much more than \$500 million. In contrast, U. S. national transportation needs for the current decade will require the construction of four to five dozen such commercial vessels which, taken together with the building of smaller vessels to meet our other domestic needs, will involve shipbuilding contracts in excess of \$6 to \$7 billion. The majority of this work is federally mandated by the Oil Pollution Act of 1990, or involves the replacement of vessels in our U.S. non-contiguous trades that have reached the end of their useful lives. The balance is driven by U.S. population growth and environmental

concerns that are not likely to abate.

These U.S. national transportation needs are clear and immediate. However, the means for financing the vessels to meet these needs remains uncertain. During the last such period of major U.S. shipbuilding activity two important federal government assistance programs administered by the U.S. Maritime Administration (MarAd) under Title VI and Title XI of the Merchant Marine Act of 1970 (the 1970 Act) were employed to meet vessel financing needs. To date, in this decade, there has been only limited recourse to these two potentially important financing programs. And, the Bush Administration Office of Management and Budget (OMB) has apparently targeted both of these programs for termination. What conclusions can we draw concerning U.S. shipbuilding to meet our U.S. national transportation needs for the current decade?



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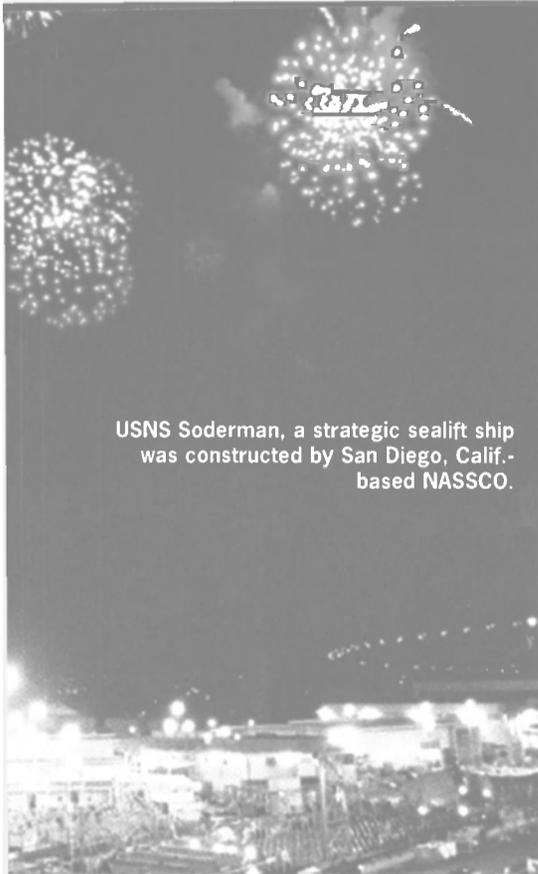
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USNS Soderman, a strategic sealift ship was constructed by San Diego, Calif.-based NASSCO.

The U.S. Shipbuilding Scene: Vessel Needs

The Jones Act and the Passenger Vessel Services Act reserve the carriage of cargo and passengers between U.S. ports to vessels built in the United States, operated under U.S. registry and owned and operated by U.S. citizens. These Acts protect U.S. shipbuilders from competition by foreign shipyards and provide a relatively stable maritime investment opportunity. While the world shipbuilding market is such that U.S. shipbuilding opportunities are limited to the U.S. domestic trades, there are well documented, existing and near-term transportation needs which will provide significant building opportunities for U.S. commercial shipbuilders. The most important opportunities are those which result from the Oil Pollution Act of 1990 and the needs for double hulled vessels in our U.S. coastwise and Gulf of Mexico energy related services. These and other petroleum related requirements should provide varieties of employment which will bridge the entire spectrum of shipyard size. Supplementing this work, and of equal importance for our larger shipyards, are the ocean-going container and RoRo tonnage fleet replacements needed for our non-contiguous services, and perhaps for the initiation of coastwise feeder operations. Smaller yards should find ample supplemental employment in producing a wide variety of vessels, with perhaps the single most important subject matter being the vessels for expanding passenger and passenger/vehicle ferry services.

OPA '90 — The Oil Pollution Act of 1990

Crude Carriers & Product Tankers and Barges

OPA '90 requires the complete replacement of single hulled tank ves-

sels to be used in the U.S. petroleum crude and product carrier and related trades in five-year intervals at the end of 2005, 2010 and 2015. The current U.S. flag tanker fleet is comprised of 103 vessels. Sixty-seven of these are product tankers and 36 are crude carriers. Ten of these vessels are double hulled and of recent construction. The remaining 93

vessels will be phased out at the above-mentioned five-year intervals. The replacement of Alaska crude carrier tonnage by the major energy companies involved in North Slope production is underway. The replacement of product carriers, the greater number of which are owned by independent operators, has hardly begun.

Alaska Crude Carriers

General Dynamics, National Steel & Ship Building Company (NASSCO) has orders for four double-hulled 185,000 dwt tankers for British Petroleum's Alaska service with deliveries scheduled for 2003 through 2006. The purchaser holds options for two additional vessels. Northrop Grumman Ship Systems —

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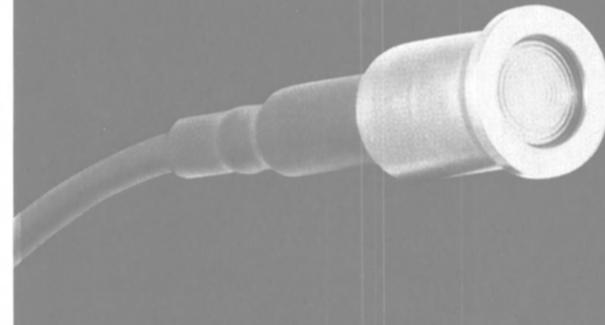


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U.S. Shipbuilding Market

Avondale, has a five vessel series of 125,000 dwt double hulled crude oil tankers underway for use by Phillips Petroleum with deliveries scheduled to commence during the last quarter of this year and run through 2006. Taken together these deliveries should fill a substantial portion of the OPA '90 Alas-

ka crude transportation needs in the absence of the opening and development of additional Alaskan acreage for petroleum production.

Oil Product Carriers

Apart from an initial four vessel group of OPA '90 product carrier rebuilds by

AHL Shipping Company at Avondale, and a five vessel series completed in 1999 by Newport News Shipbuilding & Dry Dock Company, very little of this construction has been placed under contract. The Jones Act product carrier fleet is currently fully employed. OPA '90 requirements will remove four vessels

from service in 2003, two vessels in 2004, two vessels in 2006, one vessel in 2007 and three vessels in 2008. There are no vessels under contract for current construction. The Kvaerner Philadelphia Shipyard, Inc. has letters of intent for two projects representing a total of six product carriers. However, each of these projects, one for Keystone Shipping Company and one for AHL, is apparently conditioned upon financing arrangements which include MarAd Title XI awards. And, MarAd is said to be unwilling to proceed with either project in the absence of energy company charters that would assure the vessels' long term employment. So it appears that these transactions are on hold.

There have been warnings from the Shipbuilders Council of America and others that current tanker construction is not proceeding at a pace which will be sufficient to meet OPA '90 replacement requirements, and of a coming product tanker construction crunch. There has also been speculation that energy company potential users are withholding charters which might support this domestic product tanker construction, with the expectation that these companies will be able to obtain waivers which will allow them to charter foreign built product tankers to meet their carriage needs in the coastwise trade. Some product carrier vessel needs could be met by double hulled barges. There is substantial construction of this sort. The vessel tonnage requirements might also be lessened to the extent that U.S. product needs are met by imports of foreign refined products on non-U.S. flag vessels. However, by almost any calculation one arrives at a figure of no fewer than 12 to 14 product tanker newbuildings being contracted for completion in the current decade.

Oil Supply and Infrastructure Support Vessels & Other

Oil and gas deep water drilling developments in the Gulf of Mexico appear likely to require some number of floating petroleum storage and operating vessel platforms (FPSOs). While these FPSOs can be of foreign construction, the shuttle vessels necessary for the transport of the crude petroleum to shore-side will require U.S. construction. There is talk of a need for 500,000 bbl capacity small tankers and/or articulated tug barge units for this service, perhaps two to four such shuttle vessels for each of perhaps four or five FPSOs. This could produce orders for perhaps as many as 16 to 20 vessels.

It may be that these vessels can be financed based upon energy company charters and without MarAd Title XI guarantees. But if energy company charters cannot be obtained by Keystone and AHL for their current product

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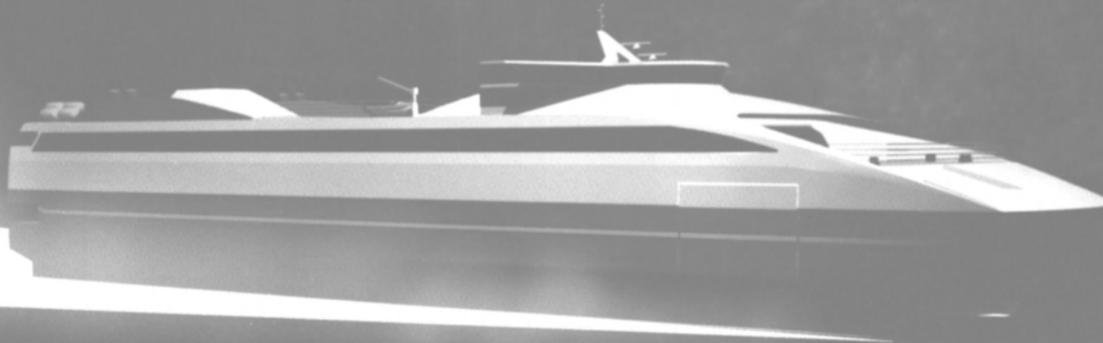


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The introduction of FPSOs in the Gulf of Mexico should spur a demand for U.S.-built shuttle tankers. Will ATBs, such as the one recently delivered to a Crowley subsidiary, fit the bill?

carrier transactions at Kvaerner, it is difficult to see why energy company charters should be forthcoming in this FPSOs setting. Perhaps these crude carrier shuttle vessels will be financed by the energy companies themselves in the same fashion as the Alaska tankers. The timing for the environmental approvals and shipyard work necessary to put the FPSOs themselves in place seems somewhat uncertain.

Any additional petroleum or gas start-up production in the Gulf of Mexico or Alaska will require support vessels or barges for the construction and start-up in addition to the tanker needs for the follow-on crude transport.

Oil Product Carriers for U.S. Navy Needs

There is a pressing need for fleet fuel supply vessels for the U.S. Navy and its Military Sealift Command. The existing fleets of U.S. Navy fuel supply vessels are nearing the ends of their useful lives. There is no apparent current plan for vessel replacement. Beyond this, there is no capacity to meet any expanded Navy needs which might result from any of a number of causes. The existing fuel supply fleet was created under "build and charter" programs which involved private sector operators, and private sector financing using the MarAd Title XI program.

A program to address these needs might have

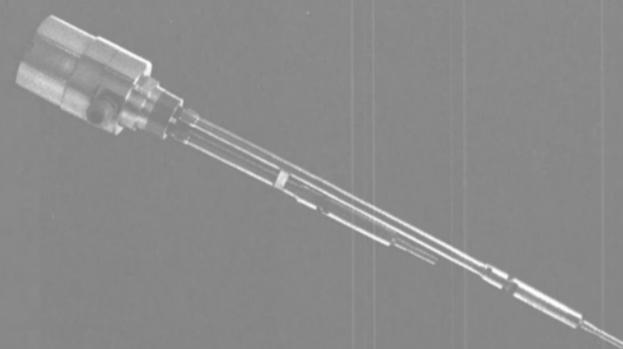
been a matter of priority for the new Secretary of the Navy and the new Maritime Administrator. However, given that the Navy is now reported to have even cut back on the funding of the routine maintenance of the Ready Reserve Force, which is managed for the Navy by the Maritime Administration (with the result that several ROS-5 ships, which are fully crewed and supposed to be ready to go on 5 days' notice, have had to be reclassified as ROS-10 and their crews sent home) auxiliary support vessels do not appear to be a likely priority. It has also been reported that when the Military Sealift Command recently needed a tanker in the Indian Ocean it was forced to resort to chartering one with an Iraqi crew. And, the question has been asked "Why was the USS COLE refueling at an Aden dockside location instead of at sea?"

The Military Sealift Command has stated that in a war emergency they would need 46 such vessels for fuel supply. Today, there are only a total of 48 product carriers in the Jones Act fleet. This number will drop to 36 in 2008. Perhaps 16 to 20 vessels are needed.

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U.S. Shipbuilding Market

carriers serving Alaska, Hawaii and Puerto Rico are aged. While none of these trades is experiencing rapid growth, the involved vessels are expensive to operate and increasingly expensive to maintain. Replacement plans are well underway by one of the major carriers for Alaska. Totem Ocean Trailer Express (TOTE) will be replacing three Sun Shipbuilding & Dry Dock Company built RoRo vessels with two newly commissioned 600 trailer vessels now being built at NASSCO.

Some years ago, the Matson Navigation Company, the predominant carrier in the Hawaiian trade, adopted a maintenance program designed to prolong the service lives of its vessels and so to postpone new construction. As the Hawaiian economy appeared to be returning to health in 2000, fleet replacements became a subject matter of discussion, only to be postponed by the damage to the Hawaiian tourism economy following September 11. Now it appears that Matson is prepared to move forward with Kvaerner with a four vessel contract (two firm and two under option) for the Kvaerner 35,000 dwt container vessel design. (See related story, page 38).

The fleet serving Puerto Rico is truly antique. Two of the five Lancer class container vessels used by Navieras de Puerto Rico were commissioned 1968, the others in 1969, 1970 and 1971. The two SUN-built RoRos used by Sea Star Line first entered service in 1974. The numbers for the required new vessel tonnage have appeared substantial. But, overtonnaging in this trade (less than break even rates and the resulting financial problems) have until now caused operators to postpone replacements. The recently announced Sea Star purchase of Navieras should alleviate some of the



Polar Discovery was christened at Northrop Grumman Ship Systems Avondale Shipyard in New Orleans, La. this past April. The vessel, which is valued at \$168 million, is one of five Endeavour Class vessels being constructed for Phillips Petroleum Co.'s Polar Tankers.

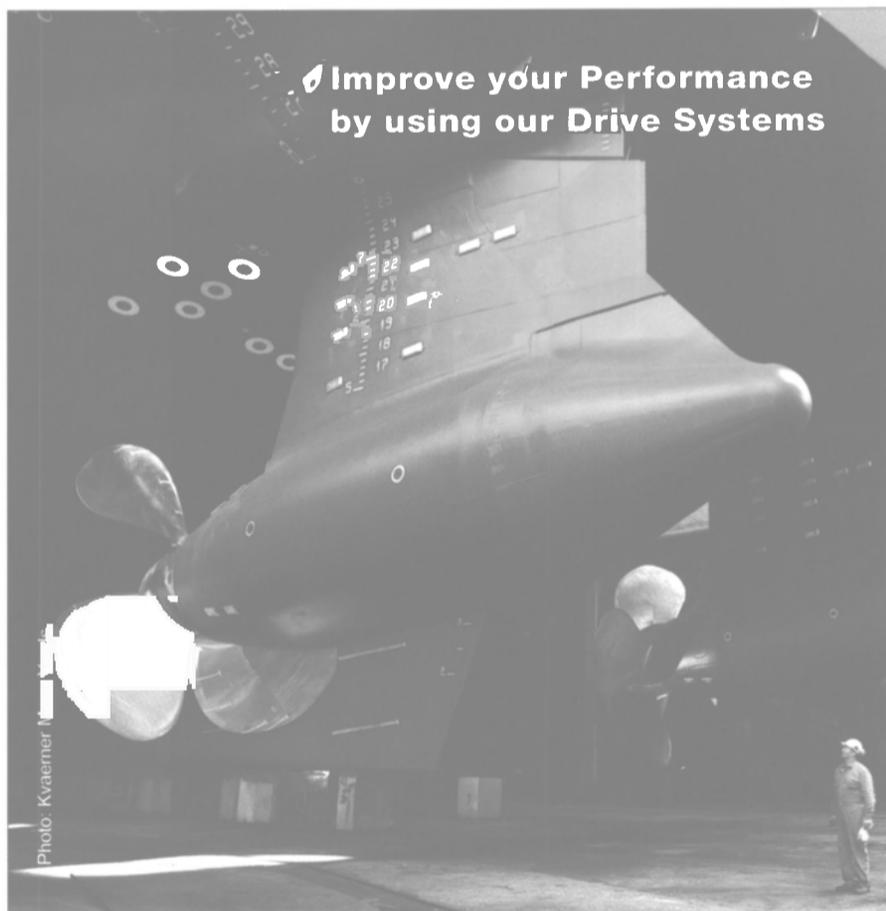
overtonnaging. However, once TOTE newbuildings for Alaska and MATSON newbuilding for Hawaii are complete, TOTE will have three SUN-built RoRo vessels, and Matson will have two SUN-built RoRo combination vessels, surplus to their needs. These could be

substituted for the Lancers and might be a satisfactory fit with the two SUN-built RoRos which Sea Star currently operates.

Perhaps CSX Lines LLC rumored sale situation offers the largest measure of vessel new buildings open to speculation. What if an ambitious, well financed purchaser were to come forward? This would certainly signal CSX fleet replacements in all three of the non-contiguous trades, Alaska, Hawaii and Puerto Rico, and probably force Sea Star to newbuildings for Puerto Rico rather than the substitution of existing SUN-built RoRos.

Coastwise Liner Trades

Recent highway gridlock on major sections of the U. S. interstate highway system, coupled with projections for the growth of U.S. container commerce over the next decade and beyond has focused attention on the need to augment existing and projected highway and rail facilities with a waterborne alternative. The problem has been a subject for increased study and discussion in the last three to four years. The Interstate 95 and Interstate 5, East Coast and West Coast, corridors present the most serious current and projected gridlock problems. On the East Coast, gridlock caused on-shore delays in container deliveries sometimes now exceed the number of days involved in the container's Atlantic crossing. The most immediate problem blocking this development is said to be a lack of adequate shore-side infrastructure. It seems likely that most of these movements will be by RoRo feeder barges or RoRo vessels, with distance dictating the choice between barge and vessel. Either design should be able to at



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least partially avoid expensive container handling facilities and make use of existing infrastructure and roadstead sites. There is a clearly existing transportation need. With the proper choice of equipment operators could accelerate this development. Perhaps the TOTE and Matson SUN-built RoRos will find a home here? It is difficult to assign a newbuildings figure for these trades in the presence of so many variables.

There are current domestic trades shipbuilding opportunities for fleet replacement and expanded needs for our OPA '90 and other coastwise and Gulf of Mexico energy related services; fleet replacements for the non-contiguous services; and vessels for expanding ferry needs in passenger and passenger/vehicle services in coastwise, Great Lakes and inland services. These opportunities are likely to continue and expand as they become more clearly defined during the course of the decade. What does this mean for U.S. shipbuilding? In reviewing the domestic transportation scene we can probably agree upon the areas of need, and upon the vessel design and shipyard construction solutions. The problem that remains is that of attracting the equity capital and long term debt financing necessary to fund these projects on a basis which is sufficiently economical to allow project success. In the end, U.S. shipbuilding opportunities during the current decade will be constrained, not by transportation needs, or vessel design or shipyard capacity, but by the lack of reasonably priced capital which is likely to be

dedicated to meeting national waterborne transportation needs.

This article is reprinted, in part, with permission of **MarineNews**. Mr. Cook discusses the vibrant opportunities in the Passenger and RoRo/Passenger Ferry segments in the June 10, 2002 edition of **MarineNews**. For a copy, call 212-477-6700 or e-mail: mren@marinelink.com.

About the Author

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

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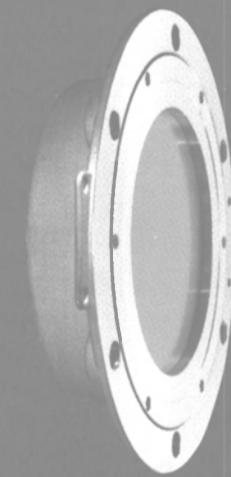
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Matson Signs \$220M Contract With Kvaerner Philadelphia

In a widely expected announcement, late last month Matson Navigation Company, Inc. signed a contract with Kvaerner Philadelphia Shipyard Inc. (KPSI) for two new containerships worth a cumulative \$220 million. The 2,600-TEU diesel-powered vessels will be deployed in the company's Hawaii service when construction is completed in late 2003 and in 2004, respectively.

"This significant investment in our Hawaii service underscores our long-term commitment to remaining the state's leading ocean carrier," said C. Bradley Mulholland, Matson president and CEO. The vessels are similar in size

and speed to Matson's flagship MV R.J. Pfeiffer, a 713.5-ft, 23-knot, 2,229-TEU containership, which is the fastest and biggest containership currently operating in the U.S. domestic offshore trades.

While the containership market has been in a severe downturn since the 2001 terrorist attacks in the U.S., these ships will operate in the protected Jones Act trade and will be equipped with features specifically designed to meet Hawaii's current and projected market requirements, particularly bigger container sizes for both refrigerated and dry containers. The two ship construction project has been underway since 1999 and is part of an overall plan to rebuild the former Philadelphia Naval Yard as a world class commercial ship-

yard.

"We are pleased to be working with Matson Navigation on its fleet renewal program," Ron McAlear, president and CEO of KPSI said, "and we are proud to have the historic name of Matson on the side of the first ships built at Kvaerner Philadelphia Shipyard. This contract confirms Matson's confidence in Kvaerner's ability to build high quality ships." Mulholland said, "Matson historically has modified and enhanced its fleet to meet the changing needs of our customers. Examples of this include the SSs Lurline and Matsonia mid-body replacements, which increased their capacity, and conversion of the SSs Maui and Kauai to open-top vessels. We have also purchased suitable Jones Act vessels as opportunities have arisen.

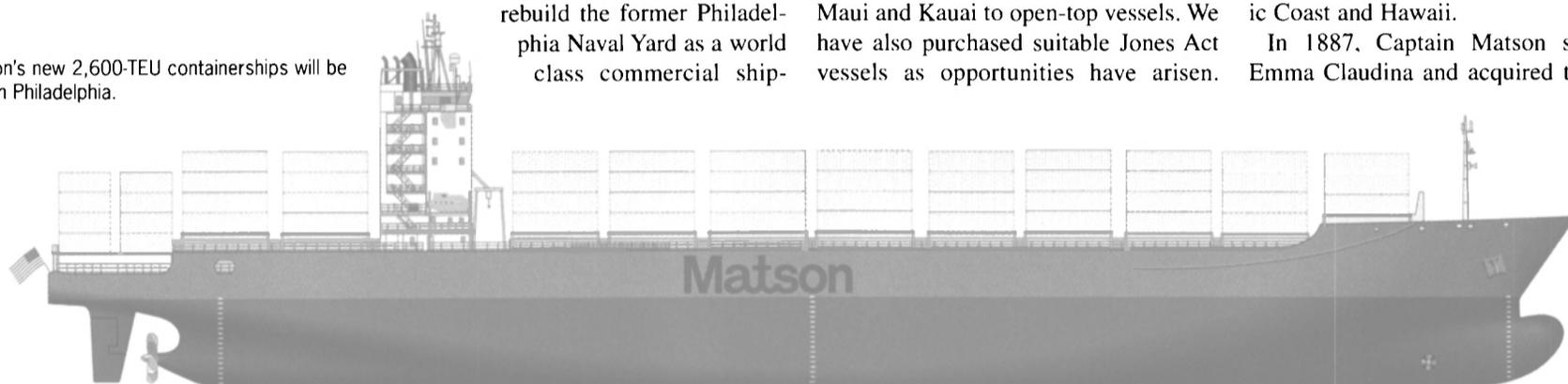
These measures have allowed Matson to maintain a high level of service while concurrently maximizing the overall value of these assets."

Serving Hawaii Since 1882

Matson Navigation Company's association with Hawaii began in 1882, when Captain William Matson sailed his three-masted schooner Emma Claudina from San Francisco to Hilo, Hawaii, carrying 300 tons of food, plantation supplies and general merchandise. That voyage launched a company with diverse operations, but one whose primary interest throughout, however, has been carrying freight between the Pacific Coast and Hawaii.

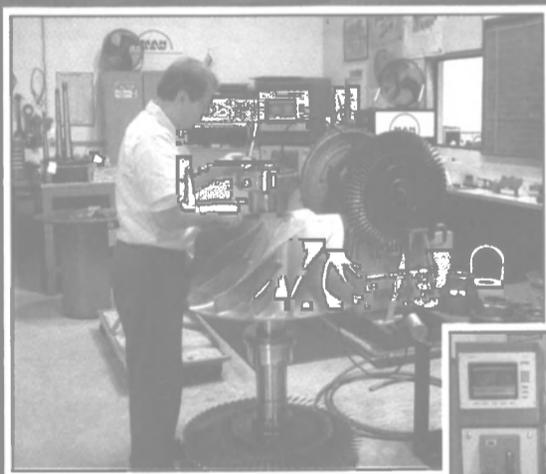
In 1887, Captain Matson sold the Emma Claudina and acquired the brig-

Matson's new 2,600-TEU containerships will be built in Philadelphia.



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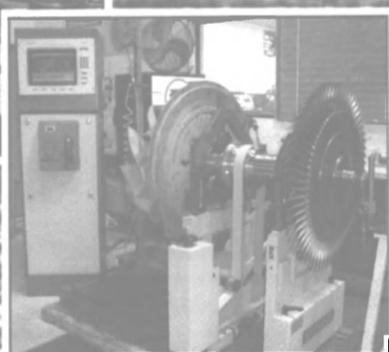
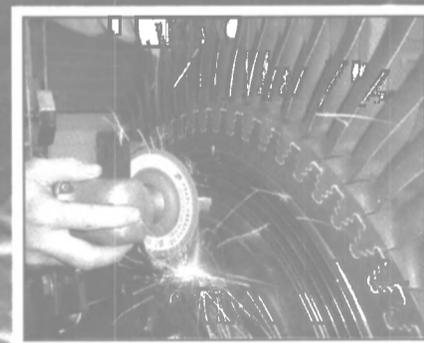
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Allen Doane, President and CEO,
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antine Lurline, which more than doubled the former vessel's carrying capacity. As the Matson fleet expanded, new vessels introduced some dramatic maritime innovations.

The bark Rhoderick Dhu was the first ship to have a cold storage plant and electric lights. The first Matson steamship, the Enterprise, was the first offshore ship in the Pacific to burn oil instead of coal. The most dramatic advance, arguably, was the introduction of containerization to the route.

In 1956, a research department was established and its first major assignment was to develop the most modern, efficient and economical means of transporting cargo to and from Hawaii. The result was Matson's freight containerization program, which revolutionized Pacific cargo carrying. In 1958, several C-3 freighters were adapted to carry containers on deck.

In July 1959, the S.S. Hawaiian Citizen was converted into an all-container ship. In that same year, the Company divested itself of all non-shipping assets, including the Matson hotels, which were sold to Sheraton Corporation.

When the Hawaiian Citizen entered service in April 1960, with a capacity for 436 24-ft. (7.3-m) containers, it was the first all-container carrier in the Pacific service. The fleet improvement program continued, with Matson freighters converted to combination container and bulk sugar or to container and automobile carriers.

Two jumboized C-4s, the SS Hawaiian Queen and SS Hawaiian Monarch, joined the fleet in late 1965 and early 1966. Each vessel was lengthened by adding a 110-ft. (33.5-m) mid-body section. In the fall of 1967, Matson launched the first fully containerized freight service between the Pacific Coast and the Far East.

A major ship construction program was undertaken in the late 1960s. When the Hawaiian Enterprise (now named Manukai) entered service in March 1970, it carried a record load of 1,165 containers and clipped more than a day from the regular 5.5-day run from the mainland to Hawaii. Also in 1970, in line with the decision to concentrate on its Pacific Coast-Hawaii freight service, the company sold its passenger vessels and suspended its Far East service.

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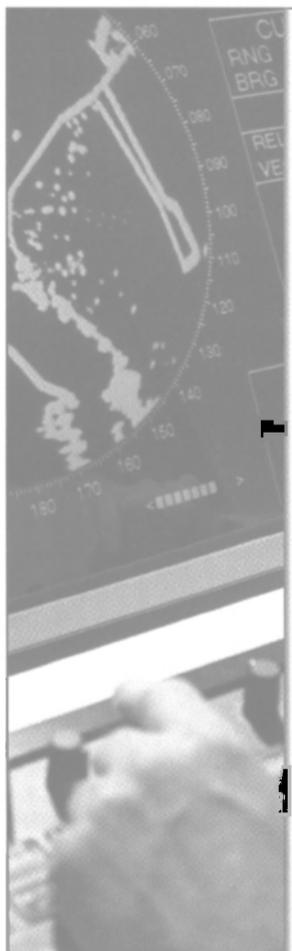
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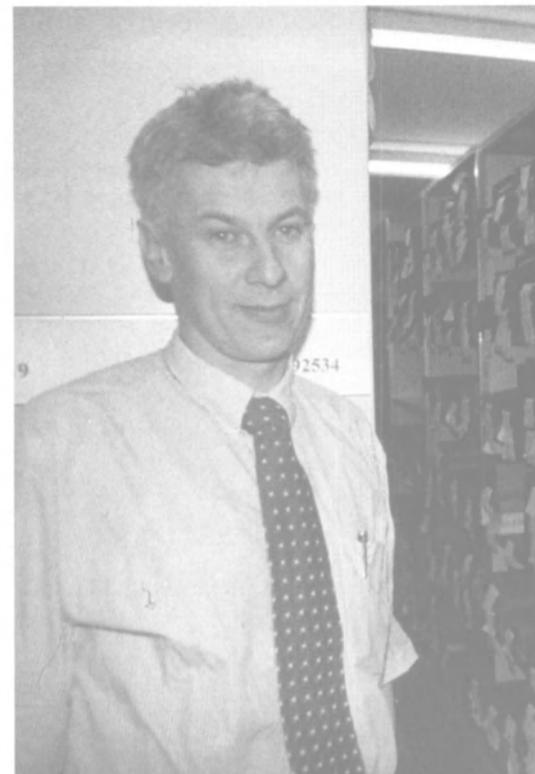
GL: Exporting German Precision

by Alan Haig-Brown,
contributing editor

Mechanical engineer **Till Braun** of Germanischer Lloyd is passionate about precision. "If I was building a boat, any boat, I would want to have a classifica-

tion society involved," he says.

Till, Project Manager for the society's Diesel Engines and Emissions Department, is charged with certifying that



Till Braun (left), and **Claus Hadler** (right), help to ensure that Germanischer Lloyd's legendary standards are kept.

engines meet the Rules for Diesel Engines of GL. The IMO air quality requirements, known as Marpol Annex VI, are also handled by this department headed by **Claus Hadler**. But as one of 700 employees at the Germanischer Lloyd head office in Hamburg, he can be part of one of the teams that are called together to oversee the construction of a particular vessel. "Fit" is an important concept in engineering and it is this idea that the firm claims in its statement "Precise, reliable and as regular as clockwork — how your ship should run." These are fine words but a classification society aims to deliver just that.

A vessel that is being built to class, will require all components to meet national and internationally established criterion. The first step in this process requires that the theoretical plan for the vessel be submitted to the head office in Hamburg. Here a team can be put together to examine each aspect of the proposed vessel within a range of expertise from structural to mechanical. The particular class requirements of the owner, such as inland, coastal, coastal 50 or coastal 200 or all seas, are considered in the total design of the vessel. While the society has offices throughout the world, it retains the coordinated approval process in Germany in order to guarantee consistency of standards for its clients.

The client base is as diverse as the marine world. From cargo vessels on Germany's inland rivers to ocean going tankers and mega yachts. Each type of vessel has its specialists at the head office, but Germanischer Lloyd claims world leadership in the classing of container ships with 31.2 percent by ton-



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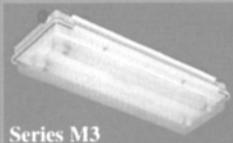
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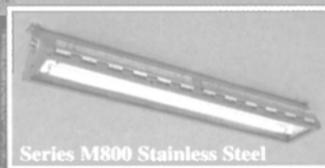


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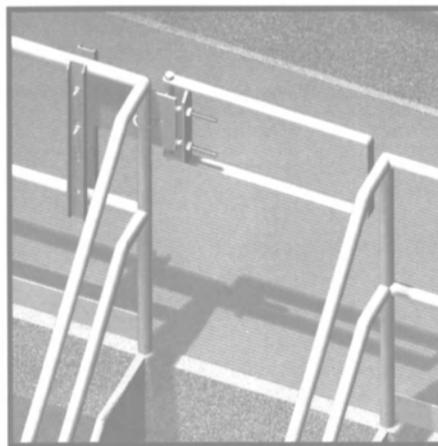


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nage (34.6 percent by number of ships) of the world fleet of existing vessels and fully 48.4 percent by tonnage (55.6 percent by number of ships) of new builds being classed with Germanischer Lloyd. The society also claims significant expertise in the passenger vessels and references such recent new builds as Europa, SY Sea Cloud II, Deutchland, AIDAvita, and Sun Bay. Each type of ship has particular challenges and the society has individuals specializing accordingly.

Tankers need consideration for their high risk cargo and understanding of double hull construction while bulkers experience brutal every day demands, stress and strain.

High speed vessels, both work and pleasure are a specialty of society naval architect Karsten Fach, Head of Plan Approval High Speed Craft, Inland Waterways Vessels, Yachts and Boats. The relation and balance between lightweight materials and wave forces can be crucial in this these craft.

When a vessel is being built to class, Germanischer Lloyd works with three equal sets of documentation. One for the submitting yard or equipment supplier (such as the engine manufacturer), one for the local GL inspection office in charge of the component or ship's certification, and a third to be stored in the company archives so long as the ship is in operation.

The archives, located under the floor of the head office's grand foyer near the Hamburg water front, are themselves a statement of quality control. There are documents for over 5,100 active vessels stored in the vault. Each set of documents is color coded and stored on movable shelving that allows maximum use of space. The fortress-like area is fire proofed and, because the Elbe River across the street has been known to

flood, it is protected by watertight doors.

A current slogan of the society is "Operating 24/7". It is their assurance to clients that the centralized control of German quality will be maintained throughout the world as well as in any of the more than 140 inspection offices

around the world.

The society has more than 1800 people world wide. Of that number over 1000 are engineers. Till Braun points out that the cost of having a vessel built to class is typically 0.5 percent to 1 percent of the vessel's total cost. "For that

amount it is worth having even the smallest fishing boat built to class," he maintains, "That way the owners can comfortably go on holidays while their boat is being built under supervision and according to the highest level shipbuilding standards — with Class GL."

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Wartsila's Acquires Engine Business

Wartsila entered into an agreement to acquire the engine repair and reconditioning business from Metalock Singapore Ltd., at the beginning of the year. This deal has now received the requisite approval of the company's shareholders and authorities. The business will be

consolidated in Wartsila effective May 20, 2002.

ExxonMobil Signs Agreement

ExxonMobil Marine Fuels (EMMF) signed a supply agreement with NT Marine of Estonia, the biggest marine fuels trader in the region extending from

Tallin in Estonia to St. Petersburg in Russia. The agreement initially covers St Petersburg and all the main ports in Estonia, including Tallin, Muuga, and Paldiski. It may be extended next year to cover other ports, depending on industry developments in the region. EMMF will be supplying a full range of marine fuels products. And existing EMMF customers will be given priority in terms of

fuel purchases in the region transacted through NT Marine, which is able to offer an in-line blending barge service to fuel purchasers.

NNS Gets USS Vella Gulf Contract

Newport News Shipbuilding and Dry Dock Co. is being awarded a \$8,352,108 fixed-price contract for the Drydocking Selected Restricted Availability (DSRA) of USS Vella Gulf (CG-72). Work will be performed in Newport News and is to be completed by August 2002. Contract funds in the amount of \$8,352,108 will expire at the end of the current fiscal year. This contract was competitively procured via the Internet, with four proposals solicited and two offers received.

FGL Sold to United Heavy Machinery

United Heavy B.V., a division of United Heavy Machinery, has purchased the Naval Architecture and Marine Engineering business unit Friede & Goldman Ltd. (FGL) from Friede Goldman Halter, Inc. for a sum of \$15 million.

Navigator of the Seas To Be Delivered Early

Kvaerner Masa-Yards and Royal Caribbean Cruises have agreed on an earlier delivery date for the cruise ship Navigator of the Seas. The delivery of the cruise ship Navigator of the Seas, now under construction at Kvaerner Masa-Yards' Turku shipyard, will take place six weeks early, on November 18, 2002. "The earlier delivery date of Navigator of the Seas suits us perfectly," says **Jorma Eloranta**, president and CEO of Kvaerner Masa-Yards Inc. We are pleased to be able to meet our client's wish for an earlier delivery of the ship and with the positive development of the cruise market."

Rolls-Royce Wins \$32M Indian Naval Contract

Rolls-Royce business Syncrolift Inc., has won a \$32 million order to provide a ship lifting system at a new Indian naval base. The shiplift, the first of its kind in India, is scheduled to go into service at the Karwar base, south of Goa, in the state of Karnataka, in late 2004. The lift, with a capacity of almost 10,000 tons, is capable of handling all Indian Navy vessels up to and including the Delhi destroyer class.

JRC Adds Staff

Japan Radio Company, Ltd., added three new members to the staff in North America. **Buddy Morgan** is national sales manager in light marine and commercial fishing, **Dennis Hogan** is high



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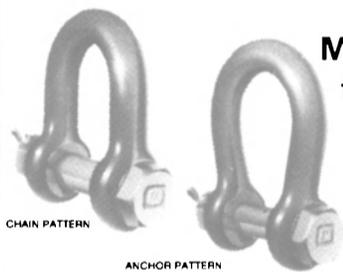
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seas sales manager and **Patricia Beth Barker** is public relations and marketing coordinator.

Tidewater Selects New Model GM-EMDs



Stewart & Stevenson Services, Inc. shipped the first four of 20 marine models of General Motor's totally new EMD 16-265H diesel engines and generators to Yantai Raffles Shipyard PTE, Ltd. in China for installation in the M/V John P. LaBorde. It is the first of five new 282-ft., diesel-electric anchor handling/tug supply boats (AHTS) under construction for Tidewater Marine, Inc., New Orleans, La. The four EMD generator sets in each vessel will produce a total of 24,000 hp required for the boats' diesel-electric propulsion, dynamic positioning, winching, towing and other systems as well as hotel loads. The generator sets utilize generators manufactured by the Baylor Division of National Oilwell, LP of Houston, Texas.

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CSO Seawell Docks at A&P Southampton

A&P Southampton have welcomed a slightly unusual vessel to its dry-dock. The ship repair, maintenance and conversion company successfully completed a refit of Coflexip Stena Offshore's CSO Seawell, an offshore support vessel at their King George V dry-dock. The Seawell arrived in Southampton during March for a dry dock and repair period lasting just over five weeks and involved various routine repairs including steelwork, pipework replacement and modifications, repairs to the Azimuth thrusters, shipside valves, steam systems, sewage systems and painting.

Brostrom Takes Two

Brostrom has signed a contract to purchase two 14,300 dwt product tankers. The vessels were built in 1999 in China with double hull and ice class 1A. The first of the two vessels have been delivered, with the second to be delivered before the end of this month. Both vessels will fly the Swedish flag. The vessels are renamed Bro Jupiter and Bro Juno and will join Brostrom's European fleet in order to serve the growing cargo volumes in the contract portfolio Brostrom has with major companies in the oil and chemical industry.



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Market Reports

Shipbuilding

World Shipbuilding to Fall Slightly

Last year was an active one for the international shipbuilding market. Although the order intake was significantly reduced from the order boom of the previous year, 46 million dwt, or 31.3 million compensated gross tons (cgt) of new ships were ordered. Part of this can be explained by the order mix of tanker tonnage. While large tankers were ordered last year, the average size this year declined from 130,000 dwt to 91,000 dwt, resulting in a higher cgt figure. Total delivered from yards building tonnage larger than 30,000 dwt increased from 24.7 million cgt in 200 to 27.6 million cgt in 2001. At the beginning of the year, very few slots were reported to be available in Japan and Korea for 2003 delivery. During the year several slots which had previously been committed became available. As a result, a large proportion of the tonnage ordered during the latter part of the year secured delivery slots within 2003.

In spite of a reasonably balanced supply and demand situation, prices tended to slide over the year. This could be attributed to diminishing demand towards the end of the year and a depreciation of Korean Won and Japanese Yen. The Won fell approximately 14 percent, and the Yen 13 percent against the Dollar.

Korean shipbuilders continue to dominate the world shipbuilding market, delivering 9.6 million cgt in 2001, with container vessels accounting for 42 percent of that total. Tankers and bulkers amounted to 28 percent and 21 percent, respectively. Of all new orders in 2001 awarded to yards capable of building 30,000 dwt and above, 38 percent went to Korean shipbuilders in terms of cgt, a decline from 46 percent the previous year. German owners were most active in ordering new tonnage in Korea, representing 43 percent.

The demand for new ships is expected to decline in 2002. In the tanker segment, much of the 88 million dwt needed for replacement within 2007 in accordance with IMO regulations is already

World Shipbuilding Orderbook

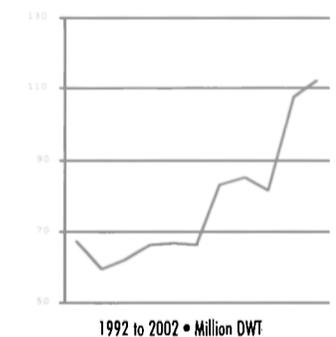
(30,000 dwt) in cgt

January 1, 2002	
Cruise and other	18%
LPG	2
LNG	14
Tankers	31
Container	24
Bulker	11

January 1, 2001	
Cruise and other	17%
LPG	2
LNG	7
Tankers	28
Container	27
Bulker	19

Source: R.S. Platou, The Platou Report 2002

World Shipbuilding Orderbook



1992 to 2002 • Million DWT

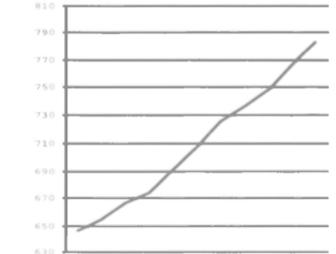
Year	Total
1992	67
1993	59.5
1994	62.1
1995	66
1996	66.9
1997	66.1
1998	83
1999	85
2000	81.2
2001	107.8

World Fleet Development

Million dwt

Year	Tankers	Bulk	Carriers	Combi	Carriers	Others	Total
1992	255.4	214.8	31.4		143.5	645.1	
1993	261.8	215	31.3		146.7	654.8	
1994	266.9	219	28.7		151.3	665.9	
1995	265	225.5	25.9		157.2	673.6	
1996	263.2	242.2	20.7		164.5	690.6	
1997	267.2	252.1	17.3		171.8	708.4	
1998	268.7	263.3	16.9		177.4	726.3	
1999	273.6	263.3	16.1		183.3	736.3	
2000	281.2	267.4	15.2		185.9	749.7	
2001	284.1	276.3	14.6		191.3	766.3	

Total



Subsidies Top Shipyard Exec Meeting

At a recent meeting of top European shipbuilding executives it must have seemed like déjà vu times three, as Korean shipbuilding subsidies and their disastrous effect on ship pricing in general, and the European shipbuilding community specifically, topped the agenda. At the AWES and CESA annual meetings held in Nyborg, Denmark on May 16-17, shipyards and their associations from 15 European Countries discussed the situation in shipbuilding and related policies. The dispute is anything but new, with Europeans alleging subsidies and the South Koreans denying them. During its 57th General Assembly, AWES, the Association of European Shipbuilders and Shiprepairers also welcomed as new AWES member the Association of Croatian Shipbuilders and Shiprepairers. **Niels Ørskov Christensen** of Denmark handed the AWES Chairmanship to **Patrick Boissier** of France. As new Vice Chairman of AWES, **Frederico Spranger** of Portugal was elected, while **Vito Busalacchi** of Italy, representing the Shiprepairers, was confirmed as second vice Chairman.

included in the 62 million dwt large orderbook. The world shipbuilding capacity was at the end of the year 2001 fully booked throughout 2003. From 2004 onwards the industry should, however, have more than sufficient capacity to build the remaining 26 million dwt required under the phase out plan. The container market is not going to provide any relief either, as it is expected to suffer a bit in 2002 as well, with 700,000-teu due for delivery during the year. The LNG market, on the other hand, is expected to proceed at a quickened pace, as there are still LNG projects, which have not yet covered their shipping needs. The number of new orders is, however, not expected to reach the record high level set in 2001. Another segment that shows promise is the bulk market, fueled by anticipated improvement in the freight market. R.S. Platou expects ordering activity to increase somewhat from the previous year's 8.4 million dwt level. Overall, R.S. Platou estimates that the shipbuilding capacity will grow by two percent on average per annum over the coming years, expressed in cgt. China has ambitious plans for expansion, and is expected to increase its building capacity significantly.

Source: The preceding was excerpted, in part, from *The Platou Report 2002*. R.S. Platou Shipbrokers A.S. is headquartered in Oslo, Norway, and can be contacted by: tel: +47 23 11 20 00; fax: +47 23 11 23 00; or on the Worldwide Web at www.platou.com.

TANKER REPORT

Tanker Market is Solid

The year 2001 must be described as a very healthy year for tanker owners. Although it is a fact that freight rates for all tanker types have fallen substantially and continuously through the year, the average rates for the year have been quite strong. For product tankers of various sizes, 2001 was even better than 2000. Rates for medium sized crude carriers were moderately weaker, while for VLCCs they dropped significantly. Despite declining freight rates for crude carriers, the profitability for all tanker was, for the second consecutive year, remarkably high.

Modern VLCCs started the year at an incredible \$70,000/day on the spot market. Almost immediately, however, the declining trend set in which was to last all through the year except for a brief upturn in September. As an average for the whole year, modern VLCCs obtained \$35,000/day, down from \$53,000/day in 2000. Old VLCCs reached \$20,000/day, compared with \$33,000/day in 2000. Medium sized tankers followed the same declining trend as VLCCs, with earnings at \$50-60,000/day at the beginning of the year and at \$20,000/day at the end of the year. However, the fall in average freight rates was far more moderate than for VLCCs. Both Suezmaxes and Aframaxes obtained, according to Platou calculations, \$32,000/day in 2001, down from \$40,000 and \$37,000, respec-

Average Freight Rates

Type	Single Voyage		
	1999	2000	2001
VLCC, modern	19.6	53.4	34.7
VLCC, old	11	33.1	19.1
Suezmax, modern	16	40.3	31.9
Aframax, modern	13.2	36.7	31.6
LR Product modern	12.7	31.7	40.6
MR Product modern	8.4	16	18.4

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Market Reports

tively in 2000.

The peak year for product carriers was 2001, not 2000. Aframax clean carriers (LR2) last year obtained the highest to result for any type of tanker, \$41,000/day, which was \$9,000 above the 2000 level. Panamax clean carriers (LR1) reached \$32,000, up \$6,000 from

the year before, while the MR type rose from \$16,000/day in 2000 to \$18,500/day in 2001.

The active tanker fleet increased by .9 percent from 2000 to 2001, calculated on an annual average basis. The active VLCC fleet increased by .5 percent, while the rest of the tanker fleet grew by

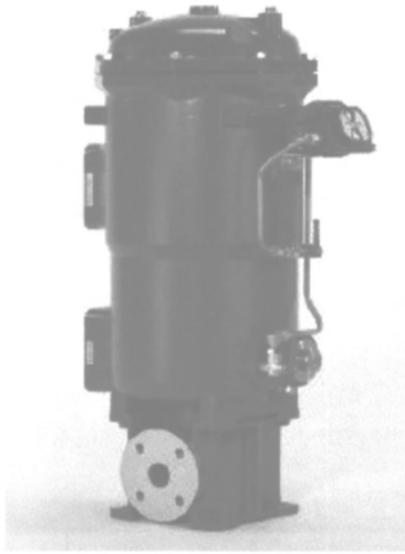
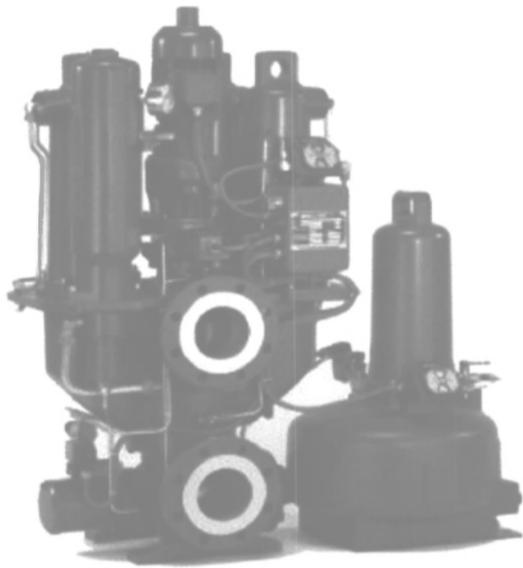
one percent. Deliveries of new tankers reached 13 million dwt in 2001 (of which, 26 were VLCCs), a relatively low figure compared with deliveries of 21 million dwt per year in the previous two years. Approximately 15 million dwt were sold for scrapping in 2001, and four million dwt were sold for con-

version.

A decrease of two percent or more in tanker tonnage, combined with only a modest increase in the active tanker fleet means that there should be a further two to three percentage points drop in utilization rate.

Source: The preceding was excerpted, in part, from The Platou Report 2002. The segment on The Tanker Market was authored by Erik M. Andersen, R.S. Platou Economic Research a.s. R.S. Platou Shipbrokers A.S. is headquartered in Oslo, Norway, and can be contacted by: tel: +47 23 11 20 00; fax: +47 23 11 23 00; or on the Worldwide Web at www.platou.com.)

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Bergesen Releases 1Q Results

The Bergesen group generated first-quarter operating profit of \$25.6 million, substantially down on the \$104.3 million recorded last year. These figures include capital gains on the sale of vessels of \$ 10.4 million in 2002 and \$7.2 million in 2001.

Freight income on a T/C basis totalled \$114.5 million, compared with \$196.9 million in 2001.

The company's gas fleet generated first-quarter operating profit of \$5.9 million, compared with \$47.7 million last year. Earnings were sharply down on last year for the VLGCs, LGCs and MGCs and again weak for the Handy-gas and Igloo vessels.

Bergesen's VLGCs (over 70,000 cbm) generated average T/C income of \$409,800/month, compared with \$837,300/month last year. Charter cover for Bergesen's VLGC pool for the rest of 2002 stood at 21 percent at the end of the period.

At the end of the first quarter Bergesen finalized the agreement with Nigeria LNG Ltd. on the employment of four LNG carriers for a minimum of 20.5 years from delivery. At the same time Bergesen entered into an agreement with Daewoo Shipbuilding and Marine Engineering Co. Ltd. in South Korea on the construction of these vessels, all of 140,500 cbm. In May, Bergesen entered into a preliminary agreement with Sonatrach for employment of one LNG-carrier of 138,000 cbm for minimum 20 years from delivery. The vessel was ordered at Daewoo in June 2001. This means that Bergesen now has a series of seven large LNG newbuilds under construction at Daewoo. Provided final agreement is concluded with Sonatrach, all seven vessels are employed for at least 20 years from delivery. The first vessel is due to be delivered in the first quarter of 2003.

Bergesen's VLCC fleet generated first-quarter operating profit of \$11.9 million, compared with \$49.7 million last year. Average T/C income was \$17,200/day, compared with

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\$44,200/day last year. Charter cover for Bergesen's VLCC fleet for the rest of 2002 stood at 37 percent at the end of the period. The VLCC market continued to deteriorate, slumping to a historic low. The average spot rate was around \$16,600/day for modern vessels and \$4,700/day for older turbine tonnage. The rate differences between old and new tonnage are primarily caused by variations in fuel consumption. The high fuel cost have further widened the gap.

Bergesen's dry bulk fleet generated first-quarter operating profit of \$2.9 million, the same as last year. Average T/C income was \$20,300/day, compared with \$22,000/day last year. Charter cover for 2002 is over 90 percent.

The market for large dry bulkers picked up during the first quarter thanks to high imports of iron ore into China and Japan and growth in shipments of coal from Australia and South Africa. Rising industrial output means that the world's steel industry seems to be moving in the right direction after a difficult year in 2001. However, the introduction of customs tariffs on steel imports into the USA has increased uncertainty.

The company is buoyed by the fact that economic indicators suggest a gradual recovery in the U.S. economy.

OMI Announces 1Q Results

OMI Corporation for its first quarter ended March 31, 2002 reported net income of \$377,000 for the first quarter 2002 compared to net income of \$28,378,000 for the first quarter 2001

"We are pleased to record a profit for the first quarter in view of the weakest rate environment for larger crude carriers since the mid - 1980's," said **Craig H. Stevenson, Jr.**, Chairman and CEO. "While we expected a weak first quarter, substantially warmer than normal weather in the northern hemisphere as well as low natural gas prices, and thus lack of natural gas for oil substitution, resulted in an additional reduction of about 0.9 million bpd in oil demand compared to the same period a year ago."

Scrapping activity has recently picked up and is presently at a 30,000,000 dwt annualized rate. While the Suezmax and product markets have modestly improved to start the second quarter, we are uncertain whether the improvement will remain throughout the quarter

During the first quarter, OMI entered into the following transactions to improve its financial position and strengthen its balance sheet:

- In March 2002, the company entered into a \$78 million reducing revolving liquidity facility secured by first mortgages on two vessels, an investment and second mortgages of vessels in its \$310 million facility. During March 2002, the

company drew down \$65 million on this facility.

- In March 2002, OMI's term loan agreement in the original amount of \$310 million was amended to reduce the three remaining 2002 quarterly payments from \$10 million to \$6,250,000 and increased the balloon payment by \$11,250,000.
- In April 2002, the 15 remaining quar-

terly payments (including the three in 2002) were reduced to \$6,051,000 as a result of the sale of a vessel. The balloon payment due at maturity in October 2005 is \$91,683,000.

- In March 2002, the company exercised its option to reacquire the Columbia by June 30, 2002. OMI agreed to simultaneously sell the vessel, after it is reacquired in June, to an unrelated party

and time charter it back for a period of eight years.

- In February 2002, OMI contracted to sell a 1988 built product carrier. The vessel was delivered April 4, 2002.

- In January and March 2002, OMI took delivery of three 2002 built product carriers (two 47,000 dwt and one 37,000 dwt). Each vessel began a three year time charter upon delivery.

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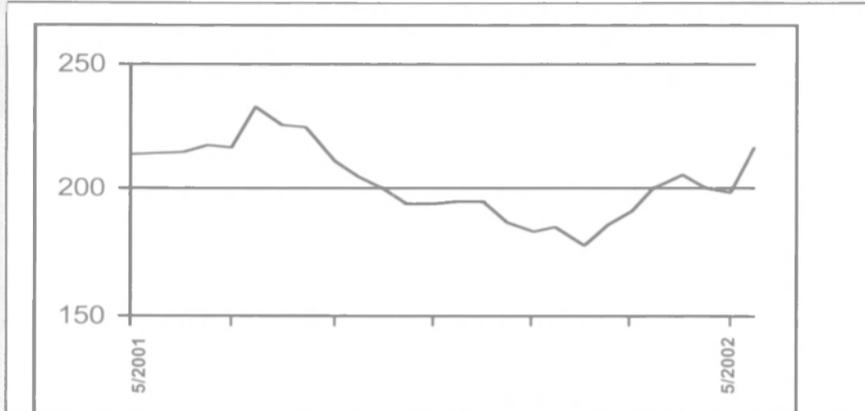
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Fleet Valuation

The index fleet valuation is representative of the resale market for Bulk Carriers and Tankers as a whole. The Index Fleet consists of 15 vessels — nine Bulk Carriers and six tankers — of various sizes and ages. Fluctuations in the value of the world fleet are mirrored in the index fleet.



Current Market Value	\$198.60
One month ago	\$206.10
Six months ago	\$193.70

Ship sales is compiled by Shipping Intelligence, Inc., a New York maritime consulting firm, which tracks sales prices of secondhand bulk carriers and tankers. For further information, please contact Sidney P. Levine, president, Shipping Intelligence, 25 W. 43rd St., New York, NY 10036, tel: (212) 997-0966; fax: (212) 997-1105, e-mail: SPL@PANIX.COM

Recent Ship Sales

Date Reported	Vessel Name	Vessel Type	DWT	Year Built	Sale Price (Millions)
3/15/2002	Tropical Trader	Bulker	15,248	1989	\$2.30
3/15/2002	Eternity	Bulker	22,201	1993	\$7.10
3/1/2002	Daabo Gemma	Bulker	23,515	1984	\$4.00
3/15/2002	Zircon	Bulker	23,853	1980	\$1.55
3/15/2002	Tsakaloff	Bulker	24,735	1982	\$2.50
3/15/2002	Darin Naree	Bulker	27,088	1977	\$1.00
3/8/2002	Goldeneye	Bulker	28,360	1986	\$5.00
3/1/2002	P.C. Explorer	Bulker	28,467	1992	\$7.75
3/22/2002	Silver Wing	Bulker	28,470	1992	\$7.70
3/28/2002	Aptmariner	Bulker	31,200	1979	\$1.00
3/1/2002	Leaderman	Bulker	34,227	1979	\$1.50
3/8/2002	Lima	Bulker	39,201	1980	\$2.07
3/15/2002	Ayia Markella	Bulker	39,225	1984	\$4.70
3/8/2002	Jin Feng	Bulker	39,697	1984	\$4.65
3/15/2002	Cape Kandilli	Bulker	41,051	1976	\$1.50
3/8/2002	Elli	Bulker	42,183	1987	\$7.35
3/28/2002	Star Antares	Bulker	42,208	1984	\$5
3/22/2002	Lepta Venus	Bulker	43,536	1992	\$9.75
3/1/2002	Sea Trident	Bulker	43,575	1983	\$4.30
3/28/2002	Clio Horizon	Bulker	45,000	1994	\$11.45
3/1/2002	Ashiya Star	Bulker	45,228	1994	\$11.20
3/28/2002	Pretty Ruby	Bulker	47,075	1997	\$14.10
3/15/2002	Transworld-3	Bulker	48,100	2001	\$14.50
3/22/2002	Nord Cecile	Bulker	50,913	2000	\$16.50
3/15/2002	Fatima	Bulker	53,022	1985	\$4.80
3/15/2002	Maria	Bulker	61,451	1981	\$3.85
3/22/2002	Marine Ranger	Bulker	63,940	1984	\$5.80
3/1/2002	Anna	Bulker	65,077	1981	\$3.20
3/1/2002	Amstel	Bulker	68,600	1988	\$7.75
3/1/2002	Ocean Chery	Bulker	69,090	1994	\$12,000
3/15/2002	Big Ocean	Bulker	73,454	2000	\$18.50
3/8/2002	Global Guardian	Bulker	73,726	1999	\$17.50
3/8/2002	Corona Challenge	Bulker	73,762	1997	\$14.75
3/1/2002	Amstelwal	Bulker	135,000	1981	\$3.50
3/1/2002	Cape Kosmos	Bulker	146,351	1986	\$8.75
3/28/2002	Lanka Manel	Bulker	149,000	1984	\$7.30
3/28/2002	Pan Adangbay	Bulker	149,349	1990	\$17.50
3/1/2002	World Action	Bulker	150,790	1994	\$21.00
3/15/2002	Iver Splendor	Tanker	29,002	2001	\$4.25
3/1/2002	Siena	Tanker	37,224	1975	\$2.00
3/1/2002	Jag Pankhi	Tanker	44,999	1985	\$7.75
3/8/2002	Sky	Tanker	154,934	1976	\$8.30
3/15/2002	Antares	Tanker	159,600	2002	\$50.00
3/15/2002	Tokiwa	Tanker	243,850	1991	\$24.50
4/5/2002	Seniority	Bulker	5,163	1991	\$2.10
4/12/2002	Proussa	Bulker	18,750	1979	\$1.15
4/12/2002	Ken Yo	Bulker	23,588	1995	\$8.00
4/19/2002	Manamaria	Bulker	23,928	1978	\$1.45
4/19/2002	Giorgis	Bulker	25,660	1985	\$4.85
4/12/2002	Southeast Alaska	Bulker	27,610	1986	\$5.35
4/5/2002	Ocean Palm	Bulker	28,415	1997	\$11.55
4/26/2002	Sapai	Bulker	28,860	1989	\$6.50
4/26/2002	Ljubljana	Bulker	32,680	1981	\$3.10
4/5/2002	Jade Orient	Bulker	34,503	1977	\$1.20
4/12/2002	Corn Racer	Bulker	35,089	1981	\$2.65
4/26/2002	Blue Lady	Bulker	35,974	1976	\$1.30
4/19/2002	Maria K	Bulker	36,233	1977	\$1.35
4/26/2002	Star Michalis	Bulker	37,574	1985	\$5.80
4/12/2002	Zhao Shan	Bulker	37,685	1977	\$1.50
4/26/2002	World Themis	Bulker	38,931	1977	\$1.50
4/19/2002	Lucija	Bulker	40,501	1978	\$2
4/12/2002	Maria	Bulker	40,891	1984	\$5.30
4/19/2002	World Prosper	Bulker	43,598	1994	\$11.85
4/5/2002	Floral Lake	Bulker	46,640	1995	\$12.50
4/19/2002	Pretty Source	Bulker	47,116	1998	\$14.75
4/26/2002	Kouryo	Bulker	60,793	1981	\$3.40
4/19/2002	Trizina	Bulker	64,444	1984	\$5.75
4/12/2002	Menites	Bulker	64,897	1981	\$3.65
4/12/2002	Delphic Pride	Bulker	65,125	1984	\$5.50
4/19/2002	World Raven	Bulker	72,394	1996	\$15.50
4/19/2002	Abiden Pak	Bulker	74,044	1995	\$14.25
4/19/2002	Vasco da Gama	Bulker	151,380	1990	\$16.75
4/5/2002	Spring Grace	Tanker	5,280	1980	\$1.45
4/5/2002	Hikari Maru II	Tanker	5,512	1990	3
4/12/2002	Eagle Aries	Tanker	29,000	1985	\$5.00
4/26/2002	Amer Energy	Tanker	30,990	1979	\$2.85
4/12/2002	Silvia	Tanker	35,000	2000	\$26.00
4/12/2002	Sea Nimrod	Tanker	64,900	1978	\$2.20
4/19/2002	Melor	Tanker	87,768	1986	\$12.00
4/12/2002	Marifu Maru	Tanker	101,839	1979	\$3.60
4/12/2002	Maersk Visual	Tanker	110,361	1988	\$18.00
4/12/2002	Ancona	Tanker	267,000	1978	\$5.80



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MAN B&W Turbocharger Technology Unveiled



This past May marked the unveiling of an ocean-going product deep in the heart of Bavaria, specifically at the lake at Ammersee near Munich, where MAN B&W presented its newest engine series — the TCA (Turbocharger Axial). Encompassing two years of research and development, the first production turbocharger, the TCA77, has entered into service with an MAN B&W 7S50MC-C two-stroke diesel engine.

With the TCA77 being first production turbocharger form this series, the new turbocharger development combines a radial-flow compressor wheel with axial-flow turbine blading.

In addition, frame sizes ranging from the TCA33 — all the way up to the TCA99 — are currently in development. So this broad range can be covered, the new turbocharger is of modular design — meaning that air is sucked in either via an air intake silencer, a 90-degree intake casing or an intake manifold. The exhaust gas from the combustion process then flows into the turbine via either an axial- or a radial flow casing. The new TCA series also features the proven separate-casing-base concept from the NA series, thus making it adaptable to the turbocharging requirements of the application in question.

The intake air is compressed by the compressor wheel, which is driven by the turbine. Both the compressor wheel and the turbine can then be adjusted to engine requirements by selecting from a range of meridians and blading configurations.

Diffusers and nozzle rings, which are finely-shaped in their mass-flow areas allow the turbochargers to be fine-tuned to the engine. To achieve maximum variability, an optional nozzle ring capable of adjustment during operation will be available in the near future.

All TCA turbochargers also come equipped with a minimum of external connections. The TCAs are also equipped with hot casing components with a new temperature and noise-reducing casing with a sturdy sheet-metal cover. This casing significantly lowers the risk of engine-room personnel becoming injured by coming into contact with excessively hot surfaces in

installations where the turbocharger is accessible. None of the TCA turbocharger bearing casings is water-cooled — not even in the largest frame sizes — the TCA88 and TCA99. The heat

brought in by the compressor and the turbine is dissipated in the lube oil flung off the shaft of the rotating assembly. The oil mist thus generated can drop down the walls of the generously-

dimensioned interior of the bearing casing, thereby evenly absorbing the heat, which is to be dissipated.

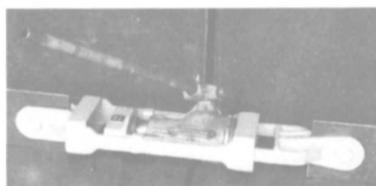
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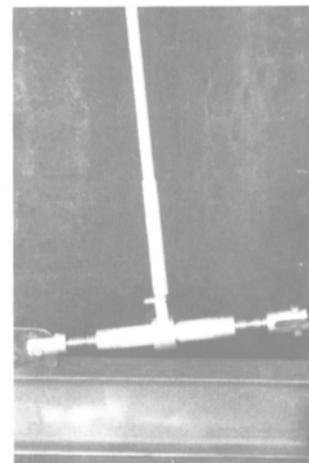
The Bulb-Align a tool for aligning Holland Bulb Profile Stiffeners when joining panel sections.



The Pul-Ton is a tool that converts the pushing force of a jack into a pulling force for joining large hull sections. Up to 25 ton capacity per jack.



The Bulb-Mov-R is a gripper for handling Holland Bulb Profile Stiffeners. 1.5, 3 and 5 ton models.



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Answering the Call from Above



R/V Maurice Ewing

Built	1983
Length	232 ft. (70.2 m)
Beam	46.3 ft. (14.1 m)
Maximum Draft	17.3 ft. (5.3 m)
Gross Tonnage	1978
Scientific Personnel	28
Cruising Speed	10-11 knots
Full Speed	13.5 knots
Endurance	50-60 days
Range	15,000 nm
Crew Size	22
Gyro compass	Sperry
Inmarsat A	JRC
Inmarsat C	Thrane & Thrane
Inmarsat Fleet F77	Thrane & Thrane
GPS	Ashtech
Direction finder	Simrad Taiyu
Doppler speed log	Furuno
Radar	Furuno
Collision avoidance	Sperry
DGPS receiver	Trimble
Echosounder	Furuno

Selecting a "Technology-of-the-Year" for the June 2002 Yearbook edition of *Maritime Reporter & Engineering News* was no small task, and a decidedly unscientific one, at that. There were no editorial boards, voting slips, gala dinners or plaques. Simply put, the editors of *MR/EN* arrived on Satellite Communications technology as the centerpiece of its largest edition based on observation, discussion and analysis of the companies that have develop, supply, test and purchase the products and services that fall under its broad category. Words alone cannot summarize the technological revolution that has swept the world during the past decades. Consider for a moment a world without the Internet, e-mail or seamless, high-capacity communication links. Consumers of information expect perpetual evolution toward better, faster and cheaper.

The marine business is often depicted as conservative sometimes deservedly so. But it is less conservative than outside observers and inside experts think, rather judicious in its approach to investment. There are, in essence, two ways to place new equipment and services onboard a ship: [1] Legislative mandate, or [2] Irrefutable proof that it can provide operational efficiencies and cost savings. When vessel owners find something they like, something that works, they stick with it, as attested to by the continuing popularity of Inmarsat A, the original satellite communication solution employed by mariners, introduced to the market more than 20 years ago and still widely used today.

But technologies, particularly in the area of computerization and communication, have a relatively short shelf life, as increased speed, reliability and capability, coupled with reduced costs, effectively creates an atmosphere of constant change. That next-generation leap is here today, in the form of Inmarsat's new Fleet F77 product.

But this article is about far more than a new product from Inmarsat, which was described in great detail in the March 2002 edition of *Maritime Reporter & Engineering News* ("Fleet F77 Extends Inmarsat's Offerings", pg. 46, March 2002). In all walks of the marine business — commercial shallow and deep draft, research, as well as military and government — the emphasis on information and communication capabilities is paramount.

Inmarsat Put to the Test

The introduction of Inmarsat's Fleet F77, Mobile ISDN and Mobile Packet Data services for the maritime community might initially be passed off by the uninitiated as simply another way for the satcom companies to make money. But the Fleet F77 product is revolutionary in many respects, and will serve as the inaugural member of a burgeoning family of satellite communication products for the future, according to **Robert Johnson**, Inmarsat's Director of Maritime Services. Fleet F77 went commercially "live" on March 28.

In order to work out as many glitches as possible

Science Spaces

Room	Size (sq. ft.)
Instrument Lab	1,400
Analytical Lab	225
CTD Sampling Lab	380
Vehicle Staging Room	320
Dry Lab	550
Science Office	90
Scientific Storage	5,000

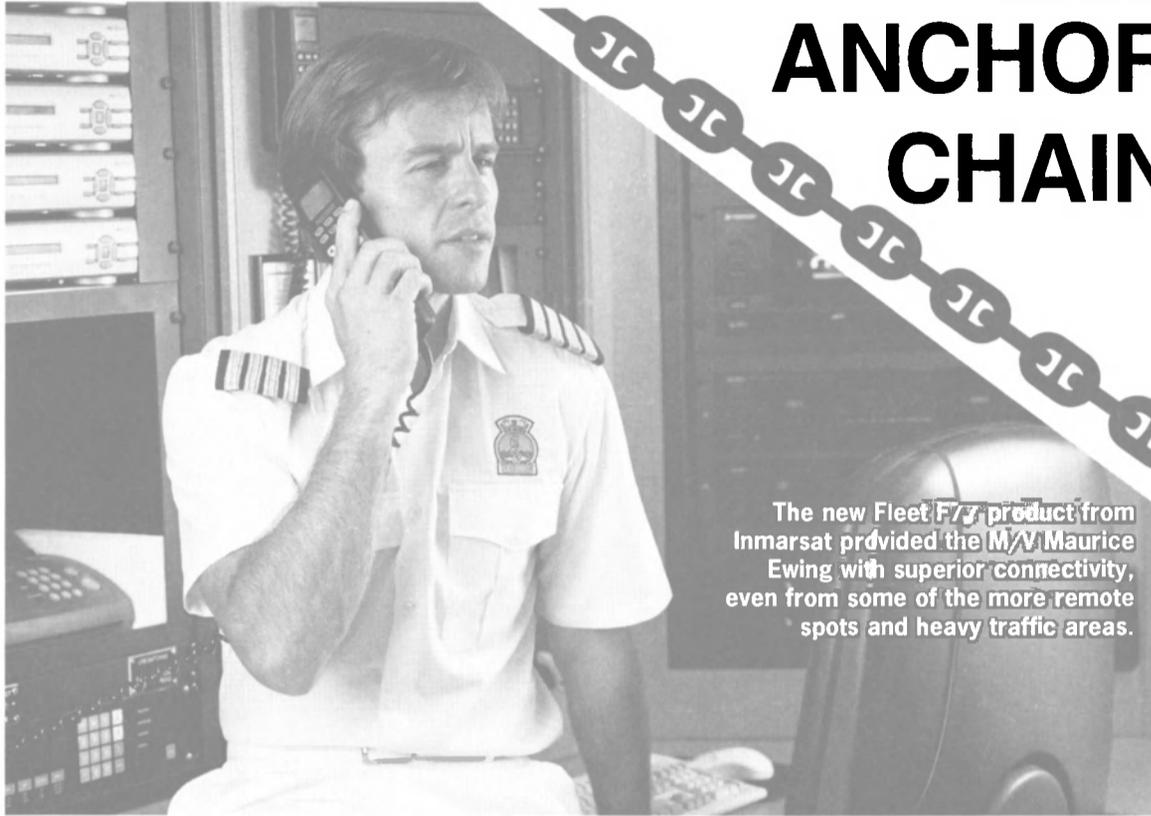
prior to commercial launch, Inmarsat recruited the services of three vessels, two containerships and the Research Vessel Maurice Ewing.

Johnson said that two containerships were selected because of the nature of their trading patterns allowed for the system to be tested in many different weather conditions and satcom environs. The Ewing is unique in that, as a research vessel, it too often finds itself in remote and otherwise communication challenging positions.

Onboard R/V Maurice Ewing

R/V Maurice Ewing is a Research Vessel operated by Columbia University's Lamont-Doherty Earth Observatory (LDEO), traversing the globe to conduct scientific experiments in conjunction with researchers from across the country and around the globe. LDEO prides itself as being on the leading edge of seismological research since Maurice Ewing founded the Observatory in 1949. When *MR/EN* recently visited with the LDEO shoreside team at its facility just north of New

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York City, the vessel was coming into Guam, having recently completed a survey of the Marianas Trench — the deepest point known on earth — and preparing to head out to Dutch Harbor, Alaska.

Almost as interesting as the Fleet F77 test aboard R/V Maurice Ewing is the story on the vessel itself. The R/V Maurice Ewing is a 230-ft.(70.1-m), 1,978-gt research vessel which is owned by the National Science Foundation (NSF) and operated by LDEO. The acquisition of the vessel, which was originally designed for use by Petro Canada as a seismic ship, illustrated a high degree of business savvy and luck by the staff of LDEO.

"Back in the mid-1980's, we needed a new vessel to replace the R/V Conrad built in 1962," said **Paul Ljunggren**, Marine Superintendent, LDEO. "This ship was up for sale." What followed was an entrepreneurial endeavor that is not so common in the halls of academia, and resulted in the R/V Maurice Ewing being the only large research vessel owned by the NSF.

The Trustees of Columbia University were convinced to submit a bid for purchase of the vessel for little more than \$6 million. Having won the bid, a proposal was submitted to the NSF for refit of the vessel in order to ensure the ship had the full range of capabilities necessary to support general oceanographic research. After completion of the modifications at a

New Orleans shipyard the NSF assumed title of the R/V Maurice Ewing and reimbursed Columbia for the costs of acquisition.

The modifications included hull mounted 3.5 and 12 khz transducers and a Hydrosweep swath bottom mapping system. The Hydrosweep DS that was installed in 1989-90 during the conversion was capable of a producing 59 beams over a 90 degree swath and at that time was a revolutionary improvement over the state of the art 16 beam/ 45 degree swath system. Over the last year, the original Hydrosweep DS was upgraded to a DS-2 which is capable of producing 140 beams over a 120 degree swath.

In addition over the side sampling capabilities were added which included 15 MT SWL starboard and stern A-frames serving four winches carrying 10,000 m of 9/16-in. 3 x 19,0.68-in. coaxial cable, 0.322 in. CTD wire, or +/-in. 3 x 19 wire.

Particularly unique to the academic research vessel are the Maurice Ewing's extensive geophysical capabilities which include a Syntrak 480-24 seismic recording system with a 6 km hydrophone streamer cable and a 2,000 psi, 20 air gun 8,300 cubic inch tuned sound source array as well as a portable high resolution sys-

Telenor Hooks Up With LDEO

For more than a decade, Telenor Satellite Services, Inc. (formerly COMSAT Mobile Communications) has provided Inmarsat voice and data services to the UNOLS (University-National Oceanographic Laboratory System) ships, which are operated by major institutions including; Lamont-Doherty Earth Observatory, Scripps Institution of Oceanography, Harbor Branch Oceanographic Institution, University of Hawaii, and others. Telenor Satellite Services meets the UNOLS ships' requirements for extremely reliable voice, fax, and data requirements for ship's business as well as special communication capabilities for crew and visiting scientists. Tailored services, such as electronic billing and low cost shore-to-ship calling capabilities are streamlined solutions for these research customers. Telenor found **Dale Chayes** of Lamont-Doherty and Chair of the Research Vessel Technical Enhancement Committee of UNOLS, very receptive to its invitation for early 2002 tests aboard research vessel Maurice Ewing. Chayes and others aboard the EWING made months-long use of the new mobile packet data (MPDS) and other communication capabilities that Fleet F-77 offers; and their feedback was invaluable. Chayes' calm demeanor, excellent technological skills, and seasoned at-sea experience made him an ideal contact person for the communications sea trials. These highly successful test efforts led directly to the certification of this newest global mobile satellite communications technology.

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Increased productivity and efficiency, at sea and in port, is the aim of new and improved communications capabilities



tem with 2 GI guns and an ITI streamer cable.

"The replacement cost for the vessel today is \$75 million, so it represents quite a good deal in the end," said **John B. Diebold**, Research Scientist, Marine Science Coordinator R/V Maurice Ewing. The ship is classed by the American Bureau of Shipping (ABS) as A-1 Ice Class C0 and Coast Guard inspected; certificated to carry a total of 50 personnel of which approximately 20 are the ship's crew. With a cruising speed of 11 knots and an endurance of up to 60 days the Maurice Ewing has operated from the Arctic to the Antarctic in all the

world's oceans.

Without question, the Ewing team interviewed regard increased and improved communication capabilities as a cornerstone allowing them to accomplish their research in a more efficient and beneficial manner.

"In science, the ability to communicate and send data is critical," said Diebold. "With the complexity of hardware and software onboard, it (Fleet F77) allows much better support in real time. For example, shoreside computer support can install patches to software anytime."

Diebold also noted that on a personal

UNOLS Research Vessel Fleet

www.unols.org

The small yet high-value fleet of Research Vessels in the U.S. is growing old fast, with a major replenishment effort due in 15 years or so. Most non-commercial research vessels are coordinated through University-National Oceanographic Laboratory System (UNOLS). Following is a snapshot of the fleet.

Operating Institution	Ship	Owner	Length (ft.)
LARGE / GLOBAL			
Scripps Institution of Oceanography	MELVILLE	Navy	279
Woods Hole Oceanographic Institution	KNORR	Navy	279
University of Washington	THOMAS G. THOMPSON	Navy	274
Scripps Institution of Oceanography	ROGER REVELE	Navy	274
Woods Hole Oceanographic Institution	ATLANTIS	Navy	274
Lamont-Doherty Earth Observatory	MAURICE EWING	NSF	239
NOAA*	RONALD H. BROWN*	NOAA	274
INTERMEDIATE / OCEAN			
Harbor Branch Oceanographic Institution	SEWARD JOHNSON	HBOI	204
University of Hawaii	R/V KILO MOANA (AGOR 26 under construction)	Navy	185
Oregon State University	WECOMA	NSF	185
University of Rhode Island	ENDEAVOR	NSF	184
Texas A&M University	GYRE	TAMU	182
Woods Hole Oceanographic Institution	OCEANUS	NSF	177
Scripps Institution of Oceanography	NEW HORIZON	SIO	170
Harbor Branch Oceanographic Institution	SEWARD JOHNSON II (ex. EDWIN LUNK)	HBOI	168
REGIONAL			
Mass Landing Marine Laboratories	POINT SUR	NSF	135
Duke University/UNC	CAPE HATTERAS	NSF	135
University of Alaska	ALPHA HELIX	NSF	133
Scripps Institution of Oceanography	ROBERT GORDON SPROUL	SIO	125
University of Delaware	CAPE HENLOPEN	UD	120
Bermuda Biological Station for Research	WEATHERBIRD II	BBSR	115
Louisiana Universities Marine Consortium	PELICAN	LUMCON	105
University of Texas	LONGHORN	UT	105
SMALL / LOCAL			
University of Miami	WALTON SMITH	UM	96
Smithsonian Tropical Research Institute	URRACA	Smithsonian	96
University of Minnesota - Duluth	BLUE HERON	UMD	86
University System of Georgia	SAVANNAH	UG	92
University of Washington	CLIFFORD A. BARNES	NSF	66
USCG ICEBREAKERS			
USCG	USCGC HEALY	USCG	420
USCG	USCGC POLAR STAR	USCG	399
USCG	USCGC POLAR SEA	USCG	399



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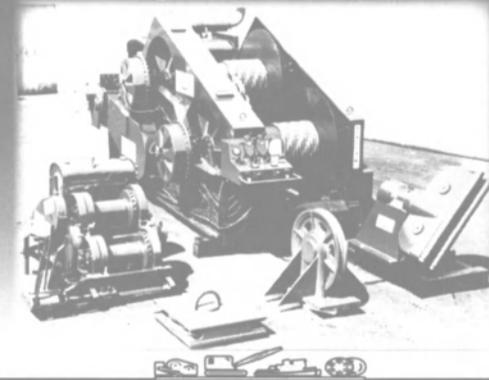
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Thrane & Thrane Offers Capsat Fleet77

Thrane & Thrane has started shipping Capsat Fleet77 products to its partners and distributors worldwide. "We have now been shipping Capsat Fleet77 systems to our distributors for a couple of weeks in order to enable them to demonstrate the product to the end users from the beginning of the service period" "We are pleased to be able to provide Capsat Fleet77 terminals to ship owners all over the world. Our Capsat Fleet77 systems have at this stage been tested onboard seven different ships, which have been sailing in all ocean regions. These ships range from large container carriers to small fishing vessels. We have been fortunate to do the testing during the winter period. This has given us the opportunity to test the equipment in extreme weather conditions, for instance during the heavy storms in the North Sea and North Atlantic in January," said **Kim Bille Gram**, Maritime Sales Manager, Thrane & Thrane.

During the test period it has been verified that all services are active in all ocean regions. The services, which have been tested, are Mini-M Voice, Audio 3.1 kHz, Speech, ISDN and MPDS.

Capsat Fleet77 is extensively smaller and lighter than the conventional terminals, meaning that installation and maintenance have become easier to do, less time consuming and cheaper. With its height of 85 cm, diameter of 84 cm and weight of 25 kg, Capsat Fleet77 is a major step forward for the maritime industry compared to competing products like Inmarsat A and B terminals. Capsat Fleet77 offers both voice and data traffic. Especially the data part has been improved significantly. Data communication between vessels and ashore can be done with either 64 kbps ISDN or 24x7 online access based on MPDS (Mobile Packet Data Service Protocol). MPDS is a revolution in maritime communication with its always-online possibility. It turns a vessel into a true office at sea changing ship management and vessel operation of the future. Where ISDN connections are charged by the minute MPDS access is paid by the quantity of data sent and received.

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level, the ability to communicate on a daily basis is a major benefit to crew and scientists. Having started his seagoing career in 1967, well before regular contact with ships at sea was cost effective or practical, he should know. Conversely, Captain **Mark Landow**, who leads Maurice Ewing for five

months per year, sometimes too much information from home can have the reverse effect, making shipboard crew and researchers concerned about situations they cannot care for immediately. "For some people it can increase homesickness, by knowing too much about what's going on" The ship, according

Ljunggren, has dramatically been able to increase its information transmissions while maintaining its costs in the 12 years the vessel has been with LDEO.

"Data rates have increased about five fold, but the cost for satellite time is roughly half" of what they used to be," said Ljunggren. We probably send 10

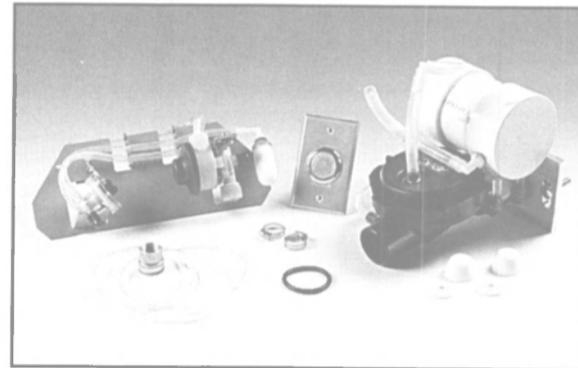
(Continued on page 56)

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Top 20 Merchant Fleets of the World

Self-Propelled Ocean-going Vessels 1,000 Gross Tons and Greater • As of January 1, 2002 (Tonnage in Thousands)

Flag of Registry	Tanker		Dry Bulk		Full Container		Other*		Total	
	Number	dwt	Number	dwt	Number	dwt	Number	dwt	Number	dwt
Panama	1,131	61,285	1,448	8,779	534	16,281	1,614	13,825	7,272	180,170
Liberia	581	42,930	343	21,240	292	9,647	293	4,673	1,509	78,490
Greece	283	28,556	280	16,067	43	1,866	101	679	707	47,168
Bahamas	247	28,206	157	9,336	70	1,893	516	5,493	990	44,928
Malta	332	20,164	432	18,437	58	1,070	497	4,527	1,319	44,198
Cyprus	162	7,179	452	20,999	119	2,700	489	4,809	1,222	35,687
Singapore	407	17,017	130	9,067	164	4,106	151	2,175	852	32,365
Norway (NIS)	315	17,728	86	7,138	5	66	245	3,548	651	28,480
China	271	3,829	325	10,876	102	1,761	755	6,014	1,453	22,480
Hong Kong	48	2,899	248	15,834	68	2,504	55	1,150	419	22,387
Marshall Islands	116	12,352	83	4,912	43	1,142	16	382	258	18,787
United States	130	7,529	17	707	89	3,195	207	3,537	443	14,968
Japan	244	7,068	154	5,449	21	627	184	951	603	14,095
India	101	5,190	113	4,502	7	143	77	435	298	10,271
Saint Vincent & The Grenadines	87	1,101	137	5,188	29	186	487	3,340	740	9,815
Italy	214	4,013	46	3,369	28	975	132	1,376	420	9,733
Isle of Man	88	6,637	24	1,612	19	425	74	613	205	9,288
Korea (South)	140	1,863	99	5,148	47	832	199	1,064	485	8,907
Turkey	99	1,486	147	5,609	26	281	269	1,480	541	8,856
Bermuda	20	3,896	28	3,699	16	459	33	351	97	8,405
Other Flags	2,107	50,473	982	34,718	946	25,431	6,322	33,736	10,357	144,359
Total All Flags	7,123	331,401	5,731	292,687	2,726	75,590	12,716	94,158	28,296	793,836

Note: For details on the entire U.S.-Flag fleet operating in both domestic and international commerce, see the latest issue of Cargo-Carrying U.S.-Flag Fleet by Area of Operation and "U.S.-Flag Fleet of Passenger Vessels, Tugs/Towboats and Other Work Boats".

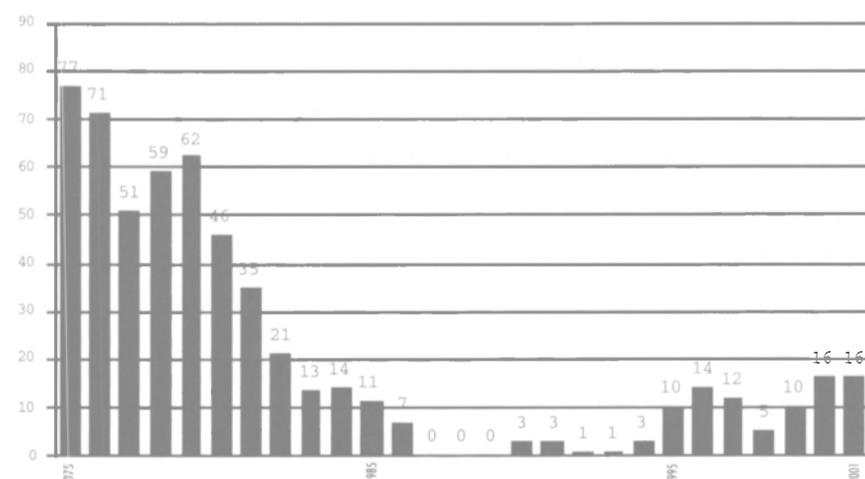
* Roll-on/Roll-off, passenger, breakbulk ships, partial containerships, refrigerated cargo, barge carriers, and specialized cargo ships.
(NIS) = Norway International Shipping Registry
Source: U.S. Maritime Administration/Lloyds Register/Fairplay

U.S. COMMERCIAL ORDERBOOK

(as of October 1, 2001)

SHIPYARD	#	TYPE	TONS	DATE	Del. DATE	Contract Price (In Millions)
Atlantic Marine, Jacksonville	1	Coastal				
		Cruise Ship	1,580	05/06/1999	01/31/2002	\$37.0
Bender Shipbuilding	2	Containership	8,500	07/17/2001	06/13/2003	\$69.0
Halter Marine, Pascagoula	2	Car/Truck Carrier	37,237	12/14/1999	06/24/2002	\$139.5
Kvaerner, Philadelphia	1	Containership	32,000	01/24/2000	05/23/2002	\$81.0
National Steel	2	RoRo	60,884	12/06/1999	04/03/2003	\$300
National Steel	4	Product Tanker	106,968	09/15/2000	06/30/2006	\$840.0
Northrup Grumman, Avondale	4	Crude Carrier	88,187	06/30/1997	05/31/2004	\$732.5
TOTAL	16 Ships					\$2.1 Billion

U.S. Shipbuilding Orderbook History (1975-2001)



Privately-Owned Self-Propelled Merchant Vessels with

Unrestricted Domestic Trading Privileges (Jones Act)
Vessels of 1,000 GRT and above, as of January 1, 2002
(Tonnage in Thousands)

Vessel Type	Ships	GRT	DWT
Tanker	97	3,605	6,333
Dry Bulk Carrier	7	107	184
Full Container	26	598	636
Roll-On/Roll-Off	13	426	240
Cruise/Passenger	1	20	7
Freighter	2	32	45
Total	146	4,788	7,445

GRT = Gross Registered Tons DWT = Deadweight Tons
Source: Maritime Administration, Office of Statistical & Economic Analysis

Navy Construction Vessels Delivered in 2001

October 1, 2001
(1,000 LDT and OVER)

SHIPYARD	HULL #	CLASS & NAME	LDT	DATE	Approx. Contract (In Millions)
Northrup Grumman, Avondale	T-AKR 303	MENDONCA	34,408	01/30/2001	\$206.4
Northrup Grumman, Ingalls	DDG 82	LASSEN	8,344	02/05/2001	\$369.4
National Steel	T-AKR 315	WATKINS	36,114	03/05/2001	\$227.0
Northrup Grumman, Ingalls	LHD 7	IWO JIMA	28,233	04/06/2001	\$795.4
Bath Iron Works	DDG 83	HOWARD	8,344	06/22/2001	\$348.0
Northrup Grumman, Avondale	T-AKR 304	PILILAAU	34,408	07/24/2001	\$211.1
National Steel	T-AKR 316	POMEROY	36,114	08/14/2001	\$195.0
Northrup Grumman, Ingalls	DDG 84	BULKELEY	8,344	08/18/2001	\$329.5
8 Ships			194,309		\$2,681.8

(Source: MarAd)



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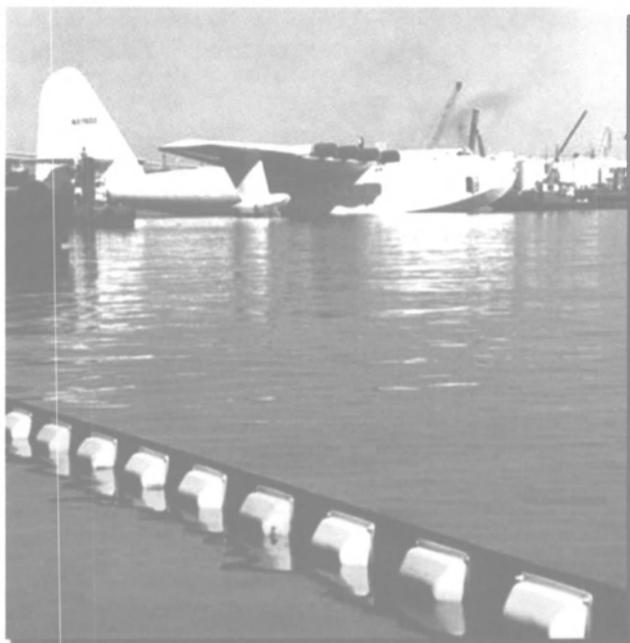
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Satellite Communications

(Continued from page 53)

times as much information today as we did 10 years ago, but our bills have stayed relatively stable, due in large part to periodic upgrades in ship earth stations (INMARSAT A -> INMARSAT B -> Inmarsat Fleet F77), substantially improved modems and streamlined protocols.

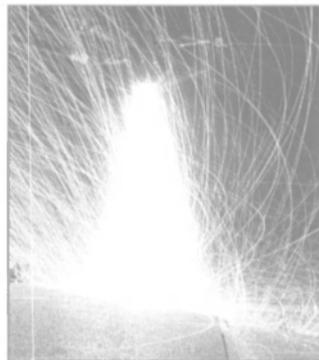
Aside from the collection and transmission of hard scientific data, LDEO has found many uses for the increased information capacity, using the services to handle all purchasing from the ship; to handle personnel, pay and travel issues, as well as logistical elements leading into a port call. We also transfer drafts of research papers and books authored by personnel who spend part of their working year at sea. "We've even had final exams sent out there," said Diebold, who noted that, otherwise, a student with an exam conflict might not be able to go aboard for research.

For its peaceful purpose, R/V Maurice Ewing has had its share of adventures in the past 12 months. Eighteen miles off Somalia in August 2001 the vessel was the target of a piracy attack. The ship was collecting data on the water column at a series of stations in the Gulf of Aden which had been occupied earlier in the year by a ship from Woods Hole. Oceanographic instruments were in the water when a small boat, that appeared to be towed by a fishing boat, broke away and headed for the Ewing. Though the ship was not boarded and no injuries occurred, having RPG's and AK-47 rounds shot in their direction gave scientists and crew alike real cause for concern. Then, on September 11, the vessel was just heading into Djibouti, in the Gulf of Aden, with Ljunggren and Diebold arriving by plane that day. "We debarked the science party, and the ship proceeded immediately to the Seychelles Islands, before continuing our operating schedule across the Indian Ocean to Australia."

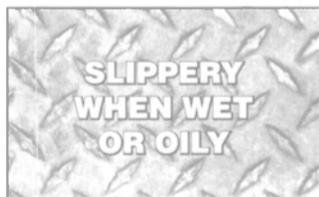
LDEO volunteered to have the new Inmarsat Fleet F77 product tested onboard its vessel, noting that academia is



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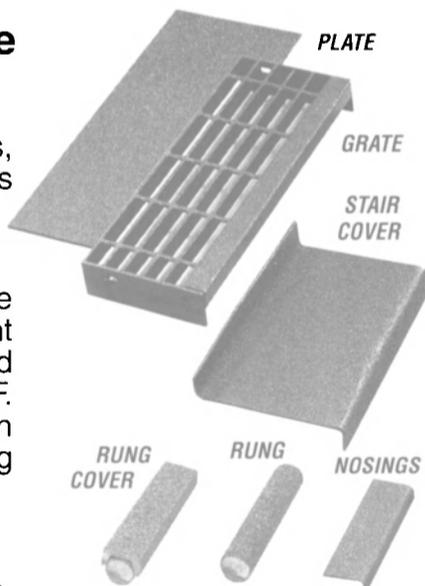
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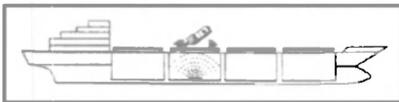
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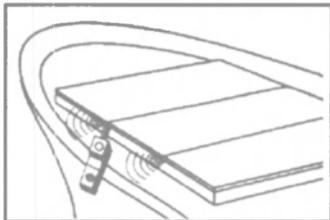
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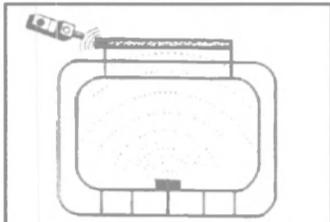


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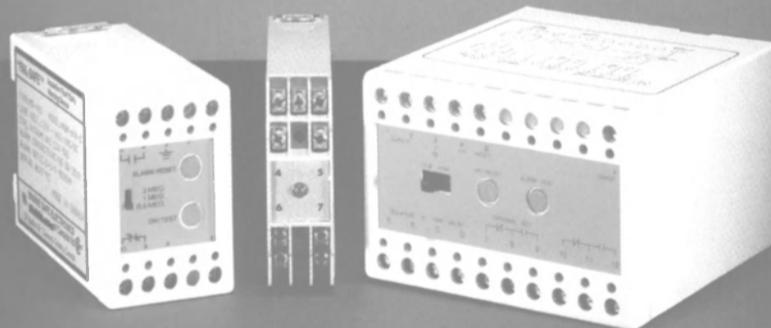
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always seeking to "take the next step," and it seemed natural given the ever increasing demands for information flow. In general, the LDEO team had nothing but rave reviews for the new Fleet F77 product, service and test experience. Of particular note was the lighter antenna as compared to the A and B products, which adds flexibility in placing the unit onboard the ship. They also noted the high professionalism of the INMARSAT team for Maritime Fleet Evaluations, which coordinated the successful set up the full system, all bells and whistles included, and was ready with a solution in the event a problem should occur. The Maritime Fleet Evaluations were conducted with a Thrane and Thrane Fleet F77 using the Santa Paula Land Earth Station in the Pacific Region, via Telenor Satellite Services, Inc. This project brought together INMARSAT, Telenor Satellite Services, Thrane and Thrane, and Columbia University.

"We don't need all of the extras, such as full-time access or web surfing," though we'll have to assess the cost (of full time connectivity) versus our current operating mode, said Diebold. A few major advantages noted by the shoreside team included the efficiency in sending information via the Mobile Packet Data solution, and the strength of signal regardless of location. "Fleet F77 allows for more frequent connection, and the connections seemed more robust and reliable," said Diebold. He explained that strong connectivity is of particular importance, particularly when sending larger batches of information. Previously the ship had problems with batch failure, or the loss of a link during the transmission of information. Not only did the process have to be re-run, but communication charges were incurred for the original, failed exercise. In particularly high traffic areas such as the Indian Ocean, where communications can be difficult due to the high volume, the Maurice Ewing team reported that "as a test, the engineer sent information on the Indian Ocean satellite from Guam ... which is quite a test ... and it worked well." In summation of the Inmarsat Fleet F77 experience, Ljunggren simply said "there are no downsides ... I think it is a big step ahead."

Collect & Conquer

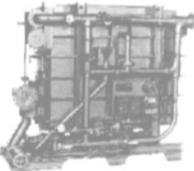
The advent of the information age is not the exclusive domain of commercial and scientific shipping, with the armed forces being a major impetus for change and improvement. As reported in the April 2002 edition of *MR/EN* ("NWDC: The Ultimate One-



The Navy's latest generation of fighting ships, such as the new DD(x) family, will rely even more heavily on the ability to receive, process and disseminate information.

Stop Shop", page 24, April 2002), the Naval Warfare Development Command (NWDC) in Newport, RI, is at the forefront of testing, among other things, how communication technologies - the collection, dissemination, analysis and use of information - will reshape the way the armed forces wage battle in the future. Specifically, NWDC is engaged currently in the evaluation of smaller, faster, cheaper ships that are not required to carry a full complement of technological gadgetry, rather "plugging in" to a network in order to help accomplish a mission. Termed the Expeditionary Sensor Grid, the system will allow vessels to penetrate and successfully complete its mission without carrying an enormous quantity of equipment and systems typically found on a Navy ship today. The Navy vessel of the future might not carry the full complement of equipment necessary to detect, for example, a cruise missile attack. However, it will be plugged into a system that is equally effective at detecting and thwarting an attack. As **Harold Hultgren**, the CNAN project manager at NWDC explained, the need for seamless sensing and communication is essential for success. "You get no precision effects without precision sensing." Concepts once theorized and currently tested may be reality sooner than later, as the Navy last month awarded the contract for the complete system design for the Navy's advanced, 21st century surface combatant, DD(X). Awarded to the Gold Team, headed by Northrop Grumman Corp., the \$265 million contract calls for the system design, engineering prototype development and testing of the DD(X) system. Raytheon Co. will serve

as the mission systems integrator. Central to the Gold Team proposed design is a Total Ship Computing Environment (TSCE) that is designed to reduce the number of crew (from more than 300 to around 100) and increase the ship's reliability on networked information. Specifically, the ship may be designed with a capability to access other ship's radar, and collect information from satellite and aircraft. It will also feature Integrated Undersea Warfare capabilities, with dual frequency sonar bow array, multi-function tow array and torpedo counter measures. While the final size and scope of the program is yet to be decided, an additional round of bidding to build the ships — anticipated to be \$60 billion plus — is currently slated for 2005.



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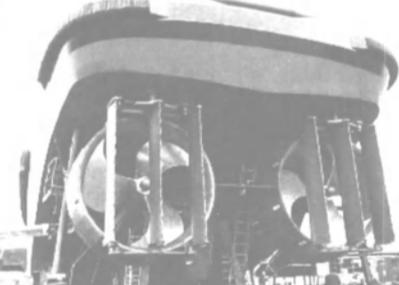
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Crisis Management and the Integration of Vessel Tracking Technologies

By David S. Nieri, Technical Advisor,
Simulation and Response Management

The implementation of Crisis Management Systems (CMS) designed to respond to situations in ports and waterways, and along our coasts, requires the availability of up-to-date information on the location of resources on-hand and those already deployed. The Crisis Management System (CMS) is a composite of information visualization tools, planning tools, decision-assist utilities, data storage and retrieval systems, communication networks, and personnel well versed in the integration of all components into an effective response.

Acronyms	
AIS	Automatic Identification System
ARPA	Automated Radar Plotting Aid
ASCII	American Standard Code for Information Interchange
CMS	Crisis Management System
DGPS	Differential GPS (Global Positioning System)
ECDIS	Electronic Chart Display and Information System
ETA	Estimated Time of Arrival
GIS	Geographic Information System
GPS	Global Positioning System
ICS	Incident Command System
ID	Identification
IMO	International Maritime Organization
MF/HF	Medium Frequency/High Frequency
NMEA	National Marine Electronics Association
PC	Personal Computer
PISCES	Pollution Incident Simulation, Control, and Evaluation System
R/T	Radiotelephone
SOLAS	Safety Of Life At Sea convention
VHF	Very High Frequency
VTS	Vessel Traffic Service

A Crisis Management System may be integrated with an existing vessel traffic management system or it may be established in the field as a stand-alone when incidents arise that require effectual command and control of response resources. The same AIS (Automated Identification System) technology that will soon form the backbone of a surveillance capability for harbors that implement VTS, can be integrated with elements of a CMS in order to provide accurate, timely tracking of vehicles and vessels involved in an incident response.

This GPS-based technology, which is currently in wide use, may be permanently mounted as ship's equipment or installed on an as-needed basis as portable carry-on units. AIS devices provide all of the information necessary to track and display the location of vessels involved in response to emergencies such as collisions and groundings, spill response operations, large-scale harbor events and festivals, and offshore emergencies such as ship fires and strandings, as well as search and rescue efforts in coastal waters. Vessels of all descriptions may be deployed to help control these incidents, and the ability to track resources for purposes of coordination and planning is a key part of the Crisis Management process. The information that AIS on-board devices provide (e.g., vessel ID, position) can be plotted in real-time on chart-based displays. This

information is critical to the visualization of 'current status' of resources that decision-makers rely on for planning, developing response strategies and managing incidents.

Focusing on the concept of the Crisis Management System (CMS) as a means of dealing with major events and incidents in the maritime environment, there is a great potential for integration of a Crisis Management System with a Vessel Traffic System (VTS) that incorporates an Automated Identification System (AIS) — where response to marine casualties and maritime events require deployment of a full-scale CMS. The capabilities of vehicle tracking systems as a component of both a VTS and a CMS will also be discussed in the context of the IMO recommendations for AIS, the current state of the technology, and previous experience using a portable opportunistic vessel tracking system.

Why a CMS?

The evolution of Crisis Management Systems (CMS) has been fed by numerous events that have taxed the resources of government and industry to respond to many incidents. The need to move the appropriate resources to the right location in an expeditious manner has often overwhelmed those first responders who try to manage an incident response. Key objectives of incident or

crisis management include:

- Establishing the Incident Command organization
- Notifying all appropriate agencies and first responder personnel
- Setting up an effective communications system
- Immediate deployment of on-hand resources to gain control of the incident
- Ensuring the safety of citizens and response personnel
- Setting up a system to order, check-in, deploy and track response resources and personnel
- Providing a means for developing response objectives, strategies, and tactics, to review them frequently, and to revise them as required
- Providing a means for visualizing the current status of the incident and the status of deployed resources
- Providing accurate, consistent and timely information to the media and other interested parties
- Tracking the financial costs of the actual response and the logistical support



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- A Crisis Management System (CMS) is designed to facilitate meeting these objectives by:
- Reducing data input/retrieval workload
- Providing a unique visualization capability to foster situational awareness and rapid assessment
- Automating routine and repeatable procedures
- Providing archived and computed information rapidly to assist with decision-making
- Facilitating communications and information sharing among the response organization management personnel
- Recording and archiving financial, administrative, and historical information about the event or incident

Transas Marine's CMS design is based on the principles of the Incident Command System (ICS) structure developed in the U.S. and used by many response organizations worldwide. It has been employed to respond to disasters and events of small and large scale where multiple agencies may have overlapping jurisdictions and where tens, hundreds and even thousands of resources are deployed to control the situation and mitigate damage. Examples where the Incident Command System may be initiated include major oil spills, ship collisions and fires, passenger ship evacuation, offshore search and rescue operations and large harbor festivals.

Vehicle Tracking Technology

The use of the Global Positioning System (GPS) for navigation and vehicle location tracking has been in widespread use for some time. In the context of this paper a vehicle can be a land vehicle, vessel or aircraft. Worldwide GPS coverage means that in virtually any locale the ability to navigate accurately and to know where vehicles are at all times is a realistic expectation. A GPS receiver can be integrated with VHF radiotelephone, MF/HF, or even satellite frequency communications to transmit short bursts of data at fixed intervals that contain a great deal of information. The basic information that is utilized in vehicle tracking includes:

- GPS time

- Vehicle identifier
- Vehicle position in latitude and longitude
- Instantaneous or computed speed
- Instantaneous heading or computed course

The information set can easily be expanded to provide additional data as is the case with modern vessel traffic management systems: vessel destination, cargo, ETA, as examples. Other features may be included to permit vehicles to relay data from stations on the net that are beyond the practical range of the base station, or where signal reception is degraded due to terrain or other blocking features. Should longer range communications be required or the terrain makes VHF communications impractical, then satellite radio frequencies can be utilized where such coverage exists.

AIS hardware is compact enough to be encased in a small, portable case together with its own battery power source, AIS module, VHF R/T, antennas, connectors and cabling. This makes it possible to quickly provide this capability to any vehicle on short notice.

Experience with the U.S. Coast Guard — Tracking Real and Simulated Resources

In 1998 a system was delivered to the U.S. Coast Guard to assist them in controlling large-scale oil spill response exercises. It consisted of a special purpose software application integrated with a prototype vehicle tracking system that operated on reserved Coast Guard radio frequencies in the VHF range. The PISCES (Pollution Incident Simulation, Control, and Evaluation System) product included software developed by Transas Marine to provide oil spill modeling and resource movement simulation. The display of the oil itself (spreading and movement with wind and tidal forces) and the positions of resources deployed in the spill response exercise are presented on an electronic nautical chart of the exercise area, and is updated continuously to give Exercise Control personnel an instantaneous status picture.

While such exercises simulate the deployment of

Happy 10th Anniversary



Above: Olga Rimski-Korsakova, Public Relations Manager, Transas Marine Ltd., at the helm of the fregat Shtandard, during the company's recent 10th anniversary celebration.



Right: Sales & Marketing Director Sven Rasmussen at the top of the mast helping to unroll the sail.



Left: Nick Lebedev, president of the Transas Group, and Alex Koukharenko, CEO. Gary Mullins, Head of McMurdo



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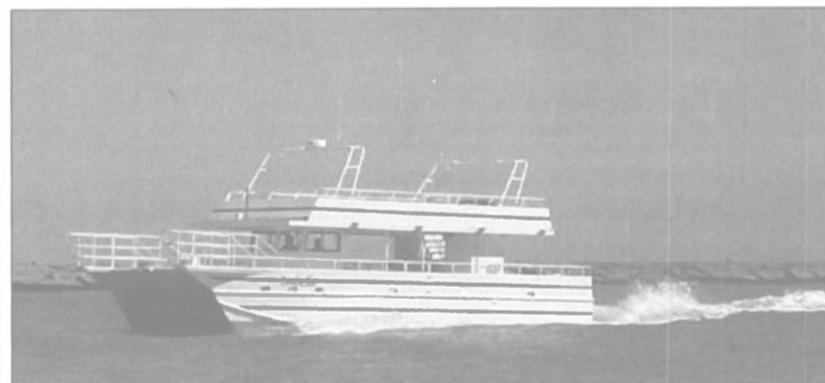
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most spill response resources, often the participating response organizations will deploy actual equipment as a means of testing their own readiness. The Coast Guard was interested in tracking real assets during these exercise deployments along with the simulated resources. In order to meet this objective, a vehicle tracking system was integrated with the PISCES software.

The tracking system was designed as self-contained, carry-aboard equipment that could be quickly installed on any vessels or vehicles that were deployed to participate in spill response exercises.

Another successful test of this system in a different configuration had the receiving Base Station situated approximately 70 miles from the Exercise Control location. Position data from the vessels was received locally at the Base Station and the data was transmitted by telephone line to the Exercise Con-

troller's workstation where the information was displayed. In this case a simple laptop computer with a phone modem was connected to the tracking unit Base Station to permit data transfer by land-line phone.

Many tracking system manufacturers provide map-based software with their tracking equipment for the display of vehicle positions. The Transas Marine PISCES software was selected because it was developed for this purpose specifically for the U.S. Coast Guard and provides a sophisticated and detailed display using vector-based nautical charts. In the future the PISCES application is intended to serve as a complete GIS tool. For this expanded role the software is currently being revised to include detailed land maps showing terrain and key cultural features in addition to the worldwide nautical chart portfolio that it currently employs. Additionally,

new math models and features are being added to the application to expand its use beyond oil spill response to include chemical spills, search and rescue, and management of offshore maritime casualty response, just to name a few of its capabilities.

In all of these potential uses, the importance of knowing where the major response assets are at any time is paramount for decision-makers. The enhanced PISCES software will be integrated with a future Crisis Management System as one of the many tools made available to decision-makers, and the vehicle tracking systems will therefore be an integral part of CMS as well.

Vessel Traffic Management and AIS Vessel Tracking

It was recognized early on that obtaining information on vessel location and intentions placed a heavy burden on VTS personnel who relied on VHF communications between the VTS Center or radar site and the ship's bridge to perform their duties. VTS procedures in major ports mandated numerous radio check-in points for vessels transiting the harbor to report to VTS personnel their location, destination and intentions. This system often required the users to switch VHF channels from one part of the waterway to another within very large ports. The communications workload that resulted motivated early system designers to look at the aviation industry for answers.

Commercial aircraft have employed transponders that could transmit their identity and other important information to ground-based controllers for a long while. The introduction of Automated Identification Systems (AIS) and their integration with vessel traffic management systems is an application of this technology to marine operations. The IMO has since recognized the benefits of AIS-equipped vessels and shore stations in the management of shipping both offshore and in ports and waterways. IMO has included the following functionality for shipboard AIS in Resolution MSC.74(69), Annex 3:

Automatically transmit and receive data describing a vessel's identity, type, position, course, speed, navigational status, and safety-related information.

Monitor and track vessels that are similarly equipped. Exchange data with shore-based facilities that are similarly equipped.

This automated data exchange is particularly practical for maritime applications. Shipboard transponders do not eliminate the need for bridge-to-bridge communications between vessels meeting or overtaking in narrow shipping channels. Vessels equipped with AIS transponders can be interrogated (or "polled") and/or may broadcast the information required by local Vessel

Traffic Service procedures at regular intervals automatically without requiring the officer of the watch or marine pilot to make additional radio transmissions.

As a consequence, the communications workload is reduced for both shipboard and VTS personnel, language difficulties are reduced or eliminated, and consistent information is received in a timely manner from vessels participating in the system.

Many AIS operate in three modes:

- **Autonomous:** In the Autonomous and continuous mode, the AIS-equipped vessel establishes a communications network with nearby ships and base stations that are similarly equipped and within VHF range. The positive identification of radar targets that can be achieved under such a network can enhance offshore collision avoidance.

- **Assigned:** The Assigned mode is a Broadcast mode in which individual AIS units can be assigned a specific transmission interval by the shore-based VTS operator.

- **Polled:** In the Interrogative or Polled mode, the VTS operator can interrogate an AIS-equipped vessel at any time without waiting for the next automatic Broadcast update.

The data received from vessels participating in a harbor AIS is integrated with the VTS radar display to provide an information overlay for each tracked target, and may also be saved in a database for archival purposes. An AIS-based VTS can be established where it is not feasible to develop a radar-based system. It is not surprising then that vessel traffic management systems for ports and coastal areas are incorporating AIS, and this technology can be expected to be mandatory on several classes of vessels in the near future.

The AIS module is similar to the vehicle tracking equipment developed for the U.S. Coast Guard's PISCES system and described previously. However, additional capabilities are now available with AIS that enhance its use for both traffic management and crisis management. The basic information of vessel ID, latitude, longitude, course and speed is transmitted to enable plotting the vessel's position on an electronic chart or providing an overlay of data on a radar display, but additional information may include: Vessel's destination; Draft; ETA; Hazardous cargo aboard; Vessel dimensions; Vessel needs and requirements; and Data exchange.

Data may also be transmitted digitally from the VTS center to vessels pertaining to berth assignments, pilot information, notice to mariners, weather forecasts, tide and current data, special instructions and requests from agents, etc. A shipboard AIS unit that is inter-

(Continued on page 87)

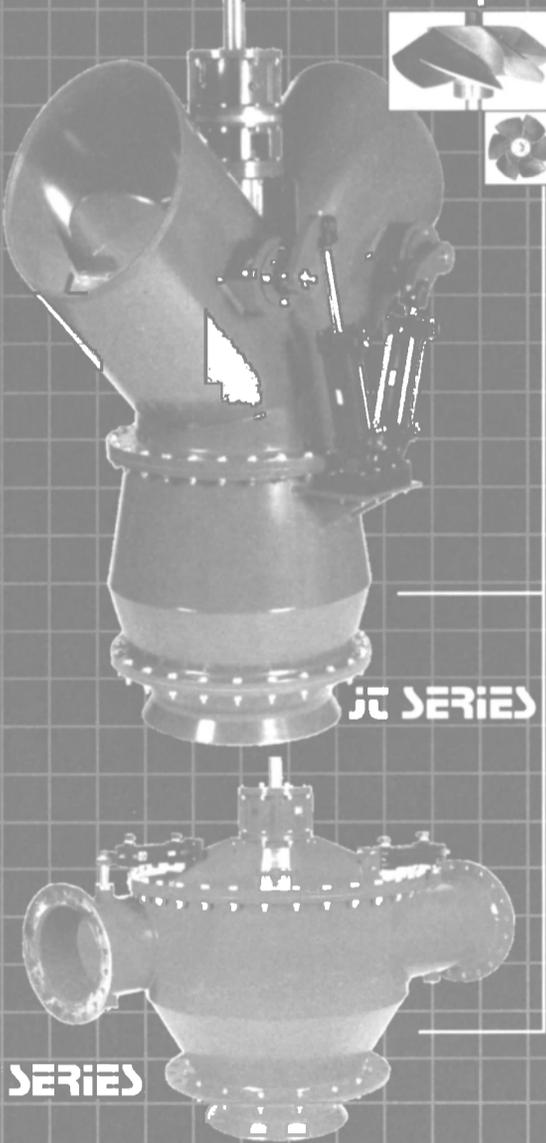


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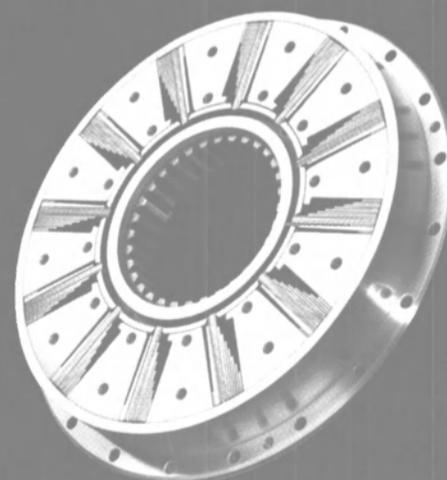
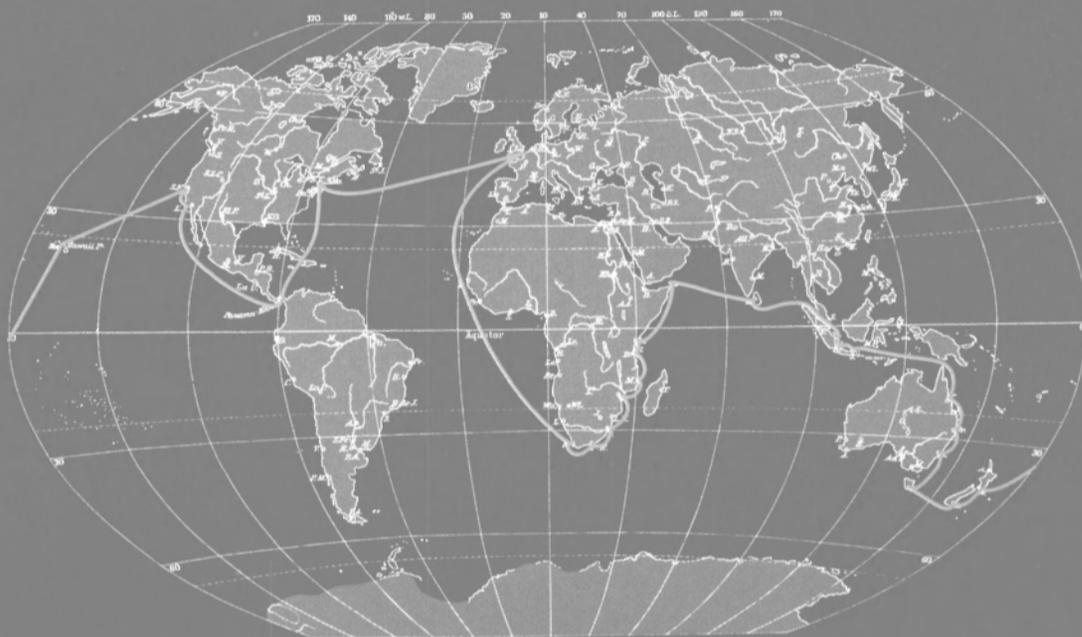
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Rear Admiral Pluta Redefines Maritime Security



A Coast Guard port security boat races to question a recreational vessel on the Hudson River in New York. Coast Guard vessels are deployed around Manhattan to ensure the safety of New York City's waterways. (USCG photo by PA2 Tom Spurduto).



Rear Admiral **Paul Pluta**, U.S. Coast Guard Assistant Commandant for Marine Safety, Security and Environmental Protection.

Rear Admiral (RADM) Paul Pluta, the man in charge of ensuring the security of the 361 ports and 95,000 miles of coastline in the U.S., had to quickly shift gears in the hours following September 11. Hired initially to beef up environmental protection and passenger vessel safety, Pluta quickly realized that his role as Assistant Commandant for Marine Safety, Security and Environmental Protection, U.S. Coast Guard, had dramatically changed.

By Regina P. Ciardiello, managing editor

September 11 began like any other for RADM **Paul Pluta**. Working in his office in Washington, D.C., where he was appointed to earlier that year by Coast Guard Admiral **James Loy**, RADM Pluta was examining the two major tasks at hand environmental protection and improved safety onboard passenger vessels. Specifically he was focusing on Loy's main concern at the time, which was additional resources for vessels in distress, as well as aquatic nuisance species in ballast water.

His agenda changed drastically however, when the terrorist attacks in New York City and in Washington, D.C. — mere steps from RADM Pluta's home base — occurred.

Pre-September 11, Pluta's main priorities also included port state control, ensuring that all foreign-flagged vessels are properly equipped and maintained. "We're looking out for unscrupulous operators who are not maintaining their vessels," Pluta said. "We want to know: Does everything work? Will the engine fail? We also want to ensure that the ship is complying with international standards."

While these matters still merit attention, post September 11 priorities large and small are wrapped in the cloak of security. "While our focus changed dramatically after September 11, to homeland security, that doesn't mean that the push for the programs has faltered," RADM Pluta said.

In financial terms however, the budget set aside for

homeland/maritime security, according to RADM Pluta, jumped proportionately after the attacks. These funds, which were allotted to the support of added personnel, planes and helicopters, were raised in response to America's need for port protection. "America needed this (the added funds)," Pluta said. "We didn't know when the next attack would be coming. We (USCG) had to protect our ports ... that's our job."

While things seem to be "back to normal," the USCG will surely not push port security to the side. Before the 11th, port security was not a top concern. "We can't be cavalier about our ports," Pluta said. "Everything is tied into security."

Rising Up

As a young man growing up in the New York City suburb of Carteret, N.J., Pluta from an early age knew that he wanted to be involved with some branch of the military, but the decision that loomed over him throughout high school was a tough one. Upon graduating, he weighed his options, singling out the U.S. Merchant Marine Academy in Kings Point, N.Y. and the U.S. Coast Guard Academy in New London, Conn. At the urging of his brother, who ironically was a recruiter for the U.S. Naval Academy in Annapolis, Md., Pluta decided to head to New England to attend the Coast Guard Academy in Connecticut, where he would spend four years in the classroom and at sea. Following graduation, he was selected to attend a graduate program at the University of Michigan, where he came out with a degree in Naval Architecture and Marine Engineering.

After graduating from U. of Michigan, RADM Pluta went south to New Orleans, La. taking a position as a plan reviewer for commercial vessels. From there he went to Washington, D.C. as a USCG staff engineer, and then off to Baltimore, Md. as a chief resident inspector at what was then known as Bethlehem Steel Shipyard.

While he enjoyed his time at the shipyard, the early 1990's — with an economic recession at home and a

war in the Persian Gulf abroad — brought about change in the maritime industry. In response, Pluta took a position in Wilmington, Del. as the Commanding Officer of Marine Safety. According to Pluta, while this was an exciting time, it was also a busy one, as he was supervising all the major U.S. Ports, including Sunny Point Military Ocean Terminal, which is the largest military explosive handling facility. He also oversaw the outloads of the U.S. Marine Corps and their supplies to and from Camp Le Jeune, N.C. during Operation Desert Storm.

When the Gulf War ended, RADM Pluta was transferred to Cleveland, Ohio where he served as Chief of Staff in the USCG Great Lakes District, part of which included the St. Lawrence Seaway. It was during this time, that Pluta was selected by the USCG to hold the distinction of flag rank as Admiral and returned to D.C. to serve within the office of Intelligence and Security, a position he would hold until he was transferred to New Orleans, this time as USCG District Officer. Working out of New Orleans RADM Pluta commanded activities on more than 10,000 miles of inland waterways in the Gulf of Mexico region for three years.

In May 2001, he was asked to return to Washington, D.C., this time at the request of USCG Admiral Loy, who appointed him to his current position as Assistant Commandant for Marine Safety & Environmental Protection.

A Five Year Plan

RADM Pluta knows that for the next three- to five-years he will spend more time and money on maritime security. While many hours and dollars will be spent evaluating and implementing new technology, the brunt of this focus will center on recruitment. Why people are not going after careers in the maritime industry is a question that RADM Pluta often ponders. Therefore, he is pushing to get more individuals involved in an industry where there is a growing need for talented people. "We need to turn up the recruiting



A Coast Guard rescue boat from Station New York patrols the harbor near Statue of Liberty. (USCG photo by PA2 Tom Spurduto).

machine, but it will take time," RADM Pluta said. "You can't train 5,000 new USCG personnel overnight."

Americans can also get ready to see more USCG boats on the water in and around harbors, inland waterways and power plants, as well as additional search and rescue personnel. "We're a response organization, we're getting better at awareness, and on September 11, we came through big time," Pluta said. "We need more USCG presence on the water."

The USCG is also keeping in tune with security onboard cruise ships via partnering and outreach with governing organizations such as Passenger Vessel Association, the International Council of Cruise Lines, American Waterways Operators and the National Cargo Bureau, which examines cargo ships and the products that they carry. A temporary rule was also enacted forcing vessels entering into a port to provide the USCG with 96 hours of notice — rather than the customary 24 hours — a rule that Pluta supports. "Twenty four hours is just not enough time for screening of passengers and crew," he said. "With this new rule, we have a better idea of what types of vessels are coming our way, and more importantly - what they're carrying."

While the new 96-hour rule provides more time for the USCG to further investigate vessels making their way in and out of our nation's ports, the organization still cannot possibly hop aboard and inspect every vessel that comes into every American port. In response, the USCG has established three levels or conditions, so that officers on patrol know what vessels pose the highest risk:

- **Condition One:** New normalcy, daily enhanced security;
- **Condition Two:** Heightened level of security;
- **Condition Three:** Highest level, officers need to be on alert that an attack is imminent.

"We don't want terrorists using vessels as weapons or targets," Pluta said. "Therefore we want to identify those

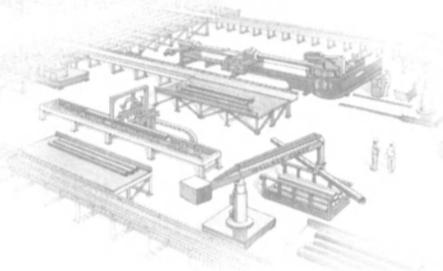
ships that first pose the highest risk and would therefore have sea marshals and Coast Guard personnel boarding them."

The Coast Guard has yet another team on its side — the Maritime Safety and Security Team (MS&ST) — established as a means of instilling special safety measures if terrorists should strike at

one of our nation's port. According to RADM Pluta, the MS&ST Team, similar to sea marshals, would board any vessel coming into port that posed a security/safety threat. The team would then thoroughly examine the vessel, until it was satisfied that it was safe to enter the specific port.

Another security measure that has been adapted since September 11 is a Port Security Committee, which consists of various government and private agencies that work together with the USCG to ensure that these new regulations are met.

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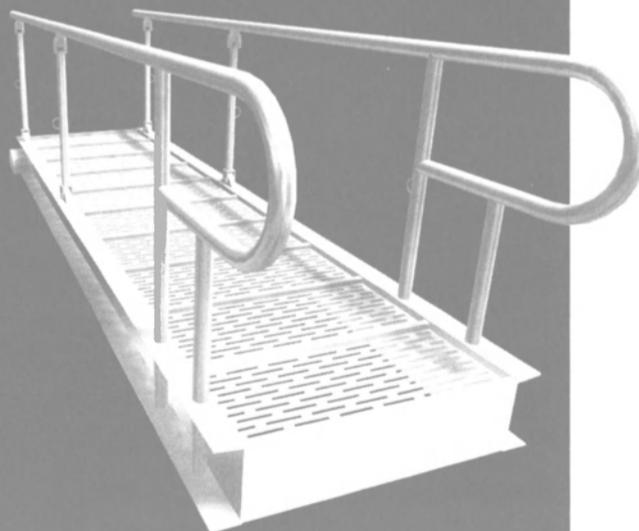
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A Modest Proposal

Port security is obviously not only a U.S. concern, and the matter is a top agenda item for the IMO. RADM Pluta, was present at the organization's summit that occurred from May 15-24 to propose a selection of improved safety and security rules and regulations that he feels must be implemented to maintain

seaport safety post September 11 — both domestically and internationally.

The following is a brief description of some of the regulations that RADM Pluta discussed at the IMO Meeting:

- **Automated Identification Systems (AIS):** These transponders must be installed on all ships to provide ease of

vessel detection when approaching ports.

- **Vessel and port security plans:** Ships and ports must have security officers in place to ensure that proper security measures are being followed.

- **Seafarer Identification:** A centralized ID system must be implemented for identification of crewmembers.

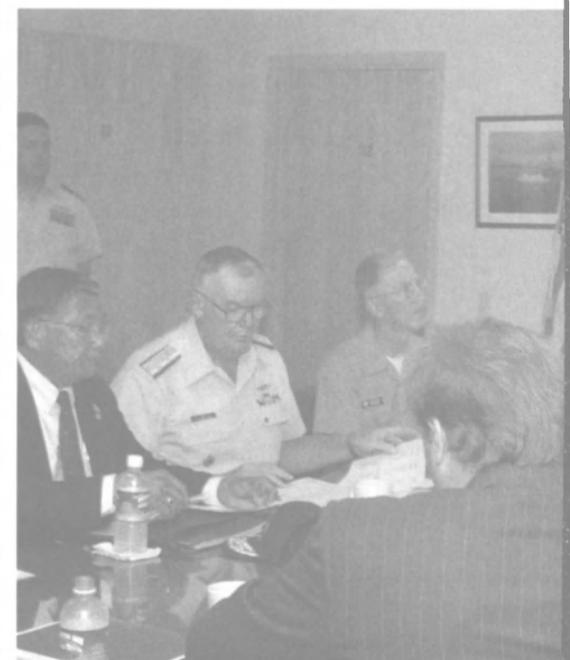
RADM Pluta feels that the AIS system is a technology he would like to see become mandatory on all vessels around the world, sooner than later. He received a favorable response to it from IMO's Secretary-General **Bill O'Neil** at the organization's Diplomatic Conference this past December.

RADM Pluta also holds high hopes for another security initiative that is currently in the works — an electronic seal for all containers transported on ships. There have been frequent reports of stowaways, hiding in containers trying to gain access to the U.S. illegally — or more threatening, there were recent reports that a suspected terrorist was picked up in Italy after he had been hiding in a container onboard a ship. "Almost no one knows what exactly is in these containers — weapons, terrorists, bombs," he said. "The electronic seal will therefore ensure and be able to detect whether or not the container has been tampered with."

Even though the events of September 11 have now faded a bit, RADM Pluta and his security team are not backing down. While security has relaxed from the immediate response to the terrorist attacks, the USCG does not plan to ease up its protective hand. "We will never return to the level of security we had before September 11. Simply put, security was very poor," RADM Pluta said. "As a result it made us (the American people) especially vulnerable to threats."

Moving forward, RADM Pluta's security plan for a "new normalcy," includes a major focus on products and people that are making their way through our

Secretary of Transportation **Norman Y. Mineta** and Coast Guard Commandant Adm. **James M. Loy** is given a briefing at Coast Guard Activities New York about the Coast Guard's response to the Sept. 11 tragedy. (USCG photo by PA2 **Tom Spurduto**)



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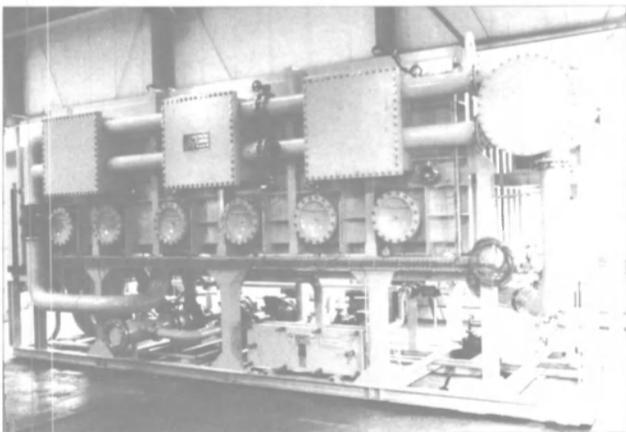
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nation's ports on a daily basis. "There will be no more surprise (terrorist) attacks if we work together to improve security," he said. "We can't ever let things go back to the way they were — the public deserves that much."

According to RADM Pluta, the following components for a successful strategic maritime security plan are as follows:

- Conduct more port security patrol;
- Provide more port vulnerability assessment;
- More Coast Guard personnel overseas;
- Continue to work with other countries to ensure safe ports'
- To always be aware of what is going on in the ports, regarding passengers, crew and cargo;
- VTS in ports and waterways;
- Deepwater Integrated System;
- Continual support from Congress and Bush Administration.

A Perfect World With No Budgets

If there were such a thing as a perfect world, the terms "fiscal" or "budget" would not be in the vocabulary of the U.S. Government. Alas, there is that thing called reality, which allows for a certain amount of monies set aside for each branch of the Armed Forces.

While the Coast Guard was granted an extra amount of money post-September 11, there have been various reports that the organization is cutting back on its budget — specifically its Sea Marshal security team — due to a lapse in finances.

According to news reports, the USCG needs a supplement of \$228 million just to keep the sea marshal force alive. In addition, the USCG has also put in a request to Congress for an additional \$750 million in fiscal year 2003, which commences this October 1.

While the USCG would not specifically report how many sea marshals are currently deployed on vessels, the orga-

nization has reportedly said that it did let go about half of the group in the area in which it commenced — the San Francisco Bay. "There's no such thing as a 'perfect world,' RADM Pluta said. "Any government agency is always going to be asking for added funds. The budget will always be an issue, we have to be

realistic in that we're never going to get all of the funding."

However, despite a lack of funding, RADM Pluta did say that the Bush Administration and the Congress have been overly supportive of the Coast Guard, which for the most part has always been under funded. Specifically

Secretary of Transportation **Norman Mineta**, who has continued to focus on not only the aviation side of transportation security, has put much effort in working to implement a strategic plan for maritime security as well.



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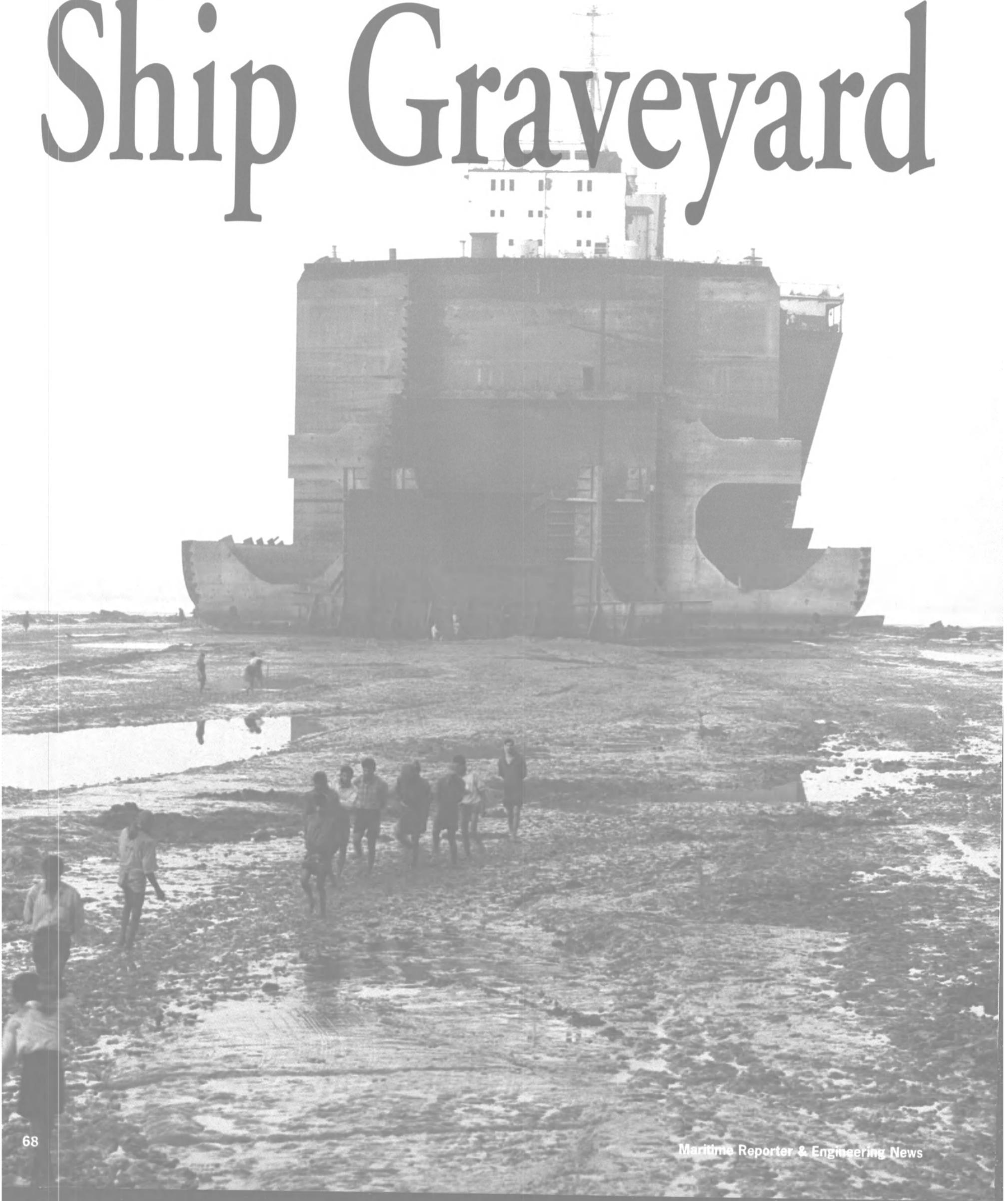
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Take a trip to a

Ship Graveyard





(All images by Edward Burtynsky, and are courtesy of the Charles Cowles Gallery, New York, N.Y.)

*Imagine earning \$1.25 a day to wade through knee-deep mucky waters on a beach in Bangladesh, to dismantle enormous ships with little more than hand tools. This practice is conducted every day by Bangladeshi laborers who work as ship breakers. These vessels, many of which are cast-off single hull tankers, are dismantled in mostly unhealthy, hazardous and sometimes deadly conditions. Toronto, Canada-based photographer **Edward Burtynsky** traveled to the beaches of Chittagong, Bangladesh in 2000 and 2001 to capture on film a process few have seen before.*

By Regina P. Ciardiello, managing editor

Photographer Edward Burtynsky gains his inspiration, his drive, simply by following the unnatural progression of the world's environment. Rather than focus on traditional beauties presented by Mother Nature, Burtynsky likes to focus on what some would consider a blight on nature, such as open pit mines, quarries and, of course, the ship breaking process. "One of my driving forces is to engage the viewer with places that have been created to propel our progress such as landscape," Burtynsky said. "We're disconnected from sources of our materials, as opposed to 100 years ago when we were much more closely linked to land."

The early 1980's brought Burtynsky to the pit mines of Vancouver, B.C.; Butte, Mont.; and Salt

Lake City, Utah. It was through his photos of these copper mines that he discovered his passion for industrial landscape photography. A few years later, Burtynsky shot photos of granite quarries in Vermont and marble quarries in Italy, a series, which he says "put me on the map." "What was intriguing to me about this series was that it demonstrated how the stone was being removed," Burtynsky said. "It depicted a "cubed" landscape, which was interesting to look at."

Burtynsky, who received a bachelor's degree in Fine Arts from Ryerson University in Toronto, Canada, currently divides his time between Toronto Image Works — the business that he established in the late 1980's — and his personal projects —



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such as his trip to the Bangladesh ship breaking operations. With his business firmly in place — more than 30 employees providing the visual art community with a place to produce photographs, process film and to learn more about the photography field — Burtynsky has the opportunity to research his industrial landscape photography passion.

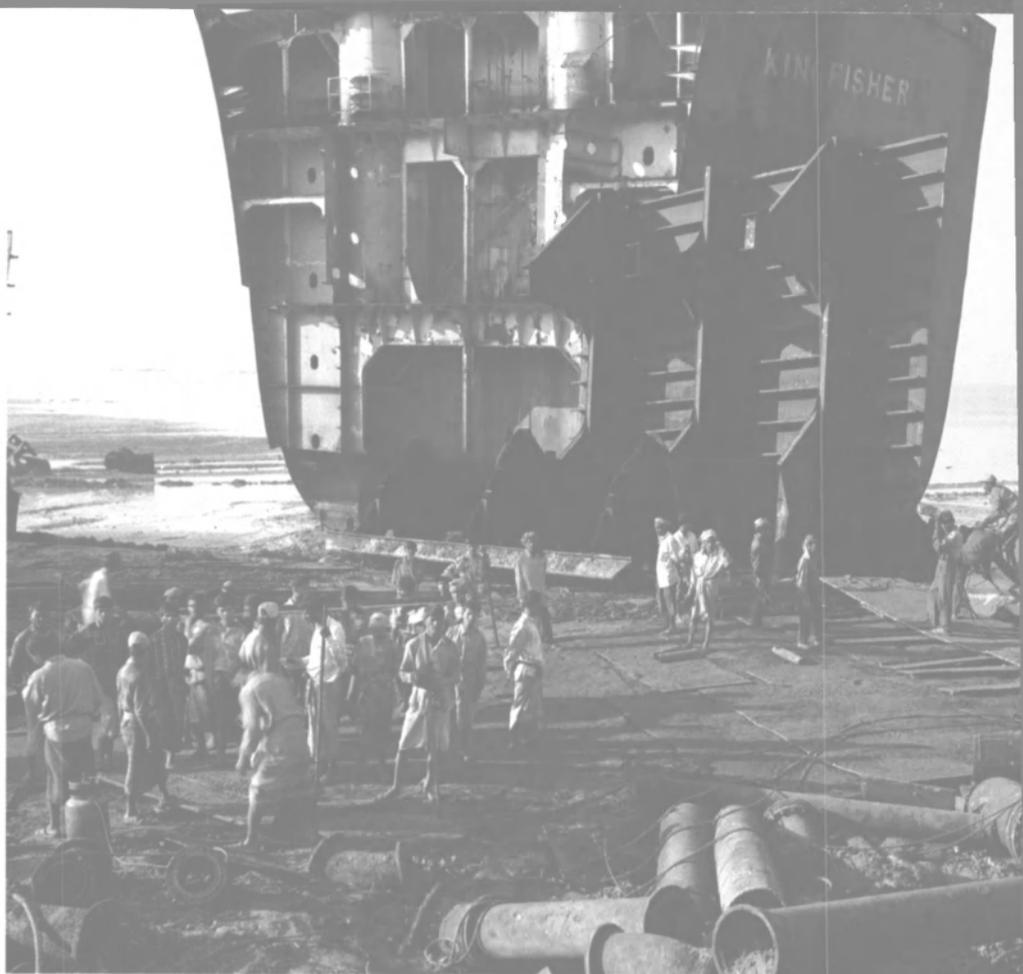
A Revelation

Burtynsky's interest in the ship breaking process was sparked by the Valdez oil spill. He was listening to a Canadian radio program that discussed the Valdez oil spill, as concerning the eventual phase-out of single hull tankers. Burtynsky thought 'what is going to become of these single hull vessels?' "I heard that the glut of single hull tankers had to be decommissioned; So naturally I thought where would they be taken apart?" Burtynsky said.

Fast forward to the beaches of Alang in Northern India's Gujarat state, which is reportedly home to the world's biggest ship breaking operation. Upon his arrival

in 2000, Burtynsky soon realized that his presence was not welcome. Apparently, the facilities had recently come under fire from environmental organizations, which claimed that the pollution and working were a threat to both the environment and the workers. The Indian Government, according to Burtynsky, was therefore not allowing any media personnel, out of fear from added negative publicity. "To them (the Indian government) any member of the media or artist was considered a risk," Burtynsky said.

Instead, he retreated back to shoot some more photos of quarries that same year, and decided to make his way to the second largest ship breaking operation — the beaches of Bangladesh. When he arrived in March 2000 on the first of two trips to these facilities, Burtynsky spent two weeks — on both occasions, observing these conditions, the people and their surroundings. He discovered, via two translators, that Bangladeshi residents don't consider it unfair or unjust to be paid \$1.25 for a day's work, or to traipse



through 3-ft. deep mucky waters to beach a ship during high tide. Conditions are always hazardous, and sometimes deadly.

Many of the laborers at first were apprehensive about Burtynsky's presence. Most thought he was a spy, investigating the ship breaking process for use in the Western World. "They (the laborers) were afraid of me at first," Burtynsky said. "They were fearful of their jobs and thought that their process would be 'exposed.'" They were afraid that since this technique wasn't used in America, that we would somehow want to adapt this process, which of course is unthinkable. Western logic simply does not function there."

On his second journey to Bangladesh in March 2001, Burtynsky often found more than 50 laborers crowded around his tripod, wanting a closer look at what he was doing. Many times, the foreman of the ship breaking yard would have to disperse the workers.

With more than 40 facilities stocked with approximately 25,000 laborers, ship breaking could be considered a "big business" in Bangladesh. While ship breaking operation owners bid fairly on vessels to bring them into their yards, there have also been, according to Burtynsky, incidences of corruption within the customs agencies. Traditionally, a decommissioned vessel to be broken is sold from between \$500,000 to one million dollars. There is an additional fee to release the ship, plus customs taxes that the shipyard owner must pay as well — a fee, which oftentimes is adjusted to the customs officer's liking. "When the yard owner would cut a deal with a Bangladeshi Customs Officer, he would pay a negotiable fee to release the ship," Burtynsky said. "If the price wasn't to the officer's liking, then he would not release the ship," Burtynsky said.

A Dangerous Business

Through first-hand observations, Burtynsky found both danger and hard labor the norm of the ship breaking process.

After the vessel is beached at high tide, it is slowly dismantled, piece by piece, by approximately 100 laborers who drag the pieces off the ship via heavy duty cables and winches. Large chunks of ship are reeled onto land, where the laborers load them onto trucks for transportation to re-rolling mills. These mills transform the hunks of steel into rebar, which is used in the construction industry.

Despite the health and safety risks, Bangladeshi residents continue to fill the yards — simply because they have no choice. "That's all they have there — low wages in bad conditions," Burtynsky said. "You basically have a country that is equal to the size of the state of Wisconsin, which is populated with more than 130 million people. The only

saving grace there is that the flood plains are fertile, which makes the county a favorable source for growing crops."

Burtynsky continued: "It's too easy for us to say it's wrong, but you are talking about a country that has no iron ore mines and cannot afford to import iron either," he said. "If anything this is giving them a chance to participate in getting what they need to transfer into a

more contemporary market driven economy. We often forget that while we in the Western World are so technologically advanced, they are just at the beginning of their own industrial revolution. Sure, there are things that are wrong about it (the ship breaking process), such as better parameters and dangerous conditions, but no one else is willing to take on that kind of work."

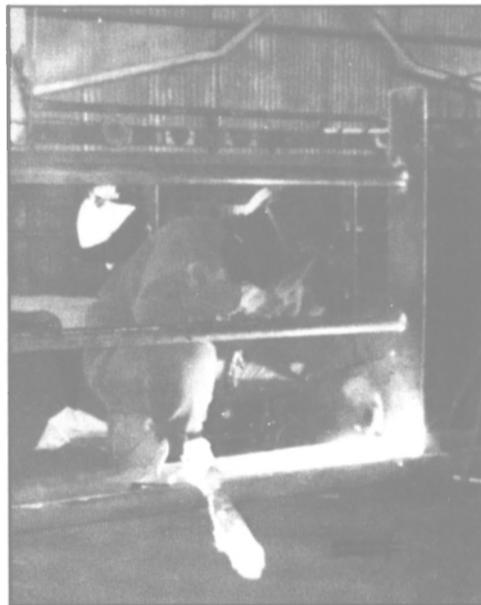
Edward Burtynsky's next photo series will focus on the Yangtze River Three Gorges Dam project in China. If anyone is familiar with shipping and activities in that area, as well as any other interesting photographic opportunities within the shipbuilding industry, please contact him at: kmachtinger@torontoimageworks.com.

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Intertanko's Sustainable Challenge

Environmental Sustainable Development. It's a concept that has sparked a multitude of papers, essays and analysis, yet the notion of sustainable development has still to be fully recognized by the maritime world. Or has it?

Invasive species, harmful anti-fouling paints and the dismantling of ships on the beaches of developing countries are just a part of a long list of environmental concerns that the maritime world is faced with. What is not illustrated by such a list is the interaction of each of the areas of concern when it comes to resolving their environmental impacts.

One issue cannot be resolved without the consideration of the potential implication to all the other issues. In addition, the long term benefits and impacts of currently proposed solutions must be taken into account if a permanent elimination of environmental damage is to be realized.

At the sharp end of implementing the solutions to these environmental concerns are the ship owners.

INTERTANKO's members have been among the first to realize the need for an integrated approach to all environmental issues, although it has not been a simple and straight forward process.

Environment, Development and the Shipping Industry

High on INTERTANKO's Environmental Agenda is the prevention of the transfer of harmful aquatic organisms via ship's ballast water. The solution in terms of on-board treatment still evades us, but this has not deterred INTERTANKO from pressing forward in the search for answers. Through its Environmental Committee, INTERTANKO is working simultaneously to find both regulatory and technical solutions and is actively participating in two projects addressing these aspects of the issue, namely GloBallast (The Global Ballast Water Management Program) and (MARTOB) On Board Treatment of Ballast Water. In regulatory terms the only effective solution is an international one as this problem is one owing to both the global envi-

ronmental impact and the world wide nature of shipping. INTERTANKO is also concentrating efforts in the IMO for the completion of a ballast water Convention by 2003. However there is a vast number of matters to be resolved before a workable Convention can be tabled for ratification.

In highlighting the need to approach these issues with the notion of sustainability in mind, and to ensure that one solution does not become a future problem, some aspects of the ballast water Convention as proposed will need re-consideration. Take for example the fact that the majority of treatment solutions will consume energy over and above that required under normal ballast operations. Coupled with the popular proposal to enforce mandatory treatment of ballast water in all circumstances we see a conflict of concerns. On the one hand there is the precautionary approach to minimizing the risk of invasive species while on the other hand there is the unnecessary expenditure of energy, which may cause undue atmospheric pollution. It has fallen upon INTERTANKO and its contemporaries to fight the cause for a more broad based approach to these issues. In this case it is the inclusion of exemptions from carrying out ballast treatment when circumstances mean that the risk of transferring organisms is negligible.

It has taken 10 years at the IMO to bring to fruition the ban on tin-based anti-fouling paints used on ships' hulls with much of the work being carried out in a room next to the one used to develop the ballast water Convention. Ironically, one of the concerns raised by INTERTANKO during the development of the Convention on the Control of Harmful Anti-fouling Systems (AFS) was the lack of effective alternatives to tin-based anti-fouling. Regardless of this aspect and the potential to actually increase the likelihood of transferring invasive species across the world, only on the outside as opposed to inside the ships hull, the legislation was developed alongside the ballast water Convention that was aiming to eliminate this problem.

Once the AFS Convention comes into force it is likely that the banning of the currently used alternatives will get underway and so a gradual shift to less environmentally damaging anti-fouling systems is foreseeable. With this in mind INTERTANKO's Environmental Committee is ensuring information on the advances in non-toxic anti-fouling systems is disseminated to INTERTANKO's members. In the long-term this is the ultimate, and indeed environmentally sustainable solution to the problem. A move in this direction is encouraged by INTERTANKO and with positive results for non-toxic paints in the high-speed craft sector it is now only a matter of time before the technology can be advanced to a level by which the remainder of the shipping industry can benefit.

Not only does the antifouling system on a ship have a finite life but the ship itself also has a limited life span. In the most commonly used breaking yards one of the concerns during the recycling of ships today is the input of these toxic paints into the coastal environment. The move towards low-toxicity and even non-toxic anti-fouling will also see this



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problem resolved in the long term.

Ship recycling however is one of the best examples of sustainable development within the shipping industry. The fact that more than 95 percent of a ship is re-used and/or recycled is the very embodiment of the sustainable development concept. However, to achieve

environmental sustainability we need to take this one step further, or at least take on board the approach being made by the shipping sector in promoting the use of non-toxic substances on ships right from the new building stage. The use of a hazardous materials inventory and the continual progression towards less toxic

substances on-board, as per the Industry Code of Practice on Ship Recycling, will remove both environmental and social problems currently associated with the ship recycling industry. As the issue, which is most in line with sustainability, it is this problem that can, if properly approached, be the ultimate

example of shipping-embraced sustainable development.

Communicating Sustainability

Sustainable development is a well known concept in the modern world and to most people a house-hold phrase. In INTERTANKO it is a reality and an accepted way of thinking. The challenge for INTERTANKO is to convince the regulators and other stakeholders of the significance of the industry's achievements by using the sustainable development terminology. If it can be accepted that the solutions and theories coming from the owners is in line with sustainable development then it is an effective way in which to aid legislators, politicians and indeed the public to appreciate the value of such pro-activity and forward thinking.

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Spain).

Clipper Skagen arrived for a scheduled dry docking and upgrading and remained at the yard for 14 days, during which it underwent hull shrouded-grit blast preparation and painting work, including the removal and re-application of coatings all in accordance with the latest environmental regulations.

The vessel also underwent overhaul and renewal of sea valves and sea water pipe work, installation of new CO2 room, renewal of fresh water generator pipe work, renewal of sea water spray lines, overhaul of deepwell cargo pump flameproof motors, overhaul of main engine ancillary equipment and other numerous repairs.

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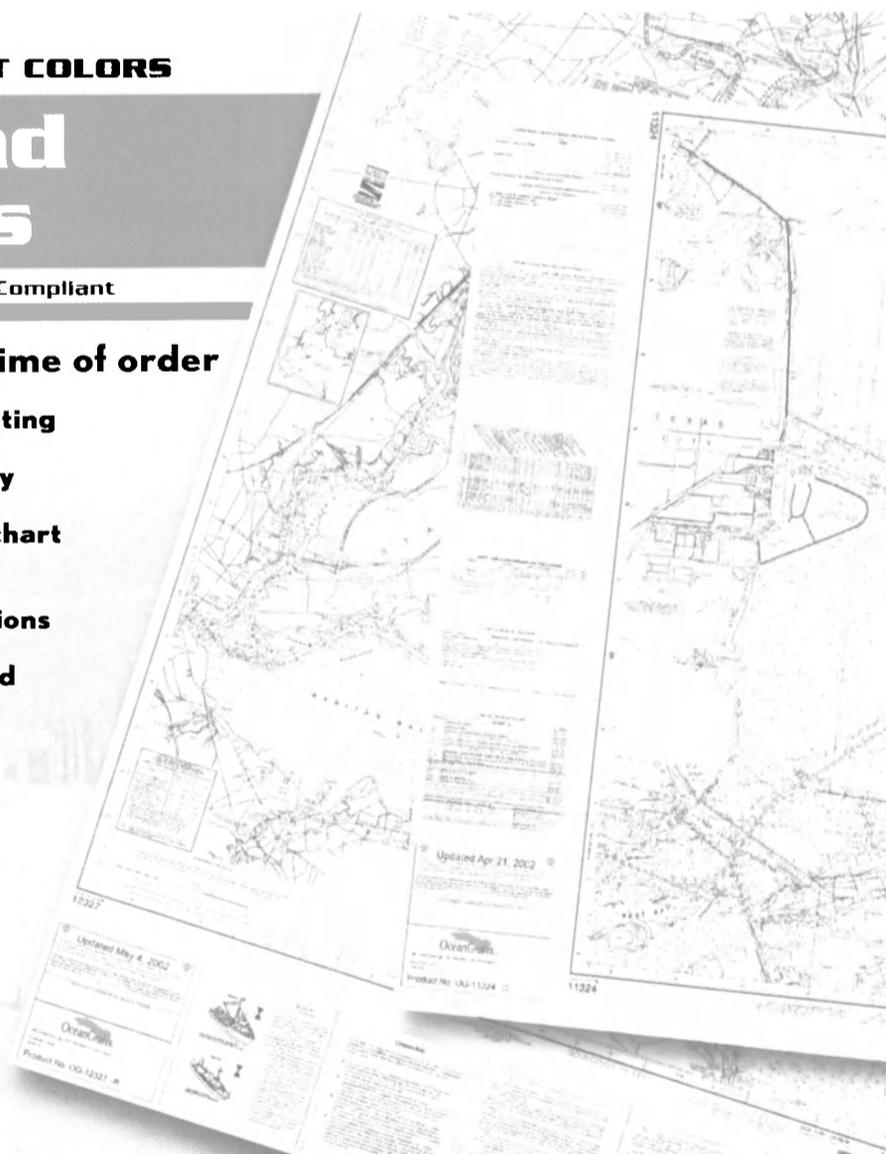
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German Barging: Over the Divide

Story and Photos by Alan Haig-Brown

Roswitha Engert-Zoller and her husband, Capt. Albrecht Zoller, dream of riding a working towboat on the Mississippi River. But their life cruising through picturesque European villages aboard their family owned and operated power barge would be the envy of most North American mariners. The opportunities for owner-operator vessels are the norm on Europe's inland waterways, rather than the exception as on America's rivers.

Rivers and canals have been important to the commerce of Europe since the Middle Ages. Horse drawn barges carried farm products to local markets while others helped to carry the riches of the Mediterranean and beyond to the burgers of Northern Europe. With the advent of the internal combustion engine, barges took on their own power and grew in size, but the tradition of family ownership survived the increased capital costs. Deepening and widening made some canals more attractive while some smaller waterways fell into disuse. Over the Easter weekend last March, the Zoller family was completing a voyage from Linz, Austria to Fürth (near Nuremberg) in Germany. Their ship, Johannes Von Nepomuk is 345 ft. (105 m) with a 31-ft. (9.5-m) beam. In addition, they were pushing a 230 x 34-ft. (70 x 10-m) barge. The 2,400-ton cargo of chemical fertilizer was distributed with 1,400 tons in the ship and 1,000 tons in the barge. All was in covered holds loaded to take the vessels down to the maximum allowed draft of 9 ft. (2.72 m) -

slightly less than the Mississippi inland system's maintained depth of 9.5 ft. (2.8 m)

The Johannes Von Nepomuk crossed into Germany at Passau home of the ZF gear factory. They cruised

through the Bavarian countryside past the region's onion domed churches, manicured fields and managed forests. Each night they moored or if no suitable moorage was available, they anchored in the stream. This allows them to operate with Albrecht doing virtually all of the helm's work. When cargos are more time sensitive they will bring on their relief captain allowing the vessel to run 24 hours/day. But with the long weekend expected to cause a delay in off loading the first of the cargo at Fürth, a more leisurely pace made sense. Typically Albrecht spends eight or nine months on board each year with the relief captain doing the balance. For two- to three-months of the year, both captains are onboard and a third captain is available for 24-hour days as the cargo demands. In addition there is a mate and a deckhand in the core crew working six weeks on and off in rotation. The vessel also employs two alternating apprentices whose wages are subsidized by government to assure a good future supply of qualified boatmen.

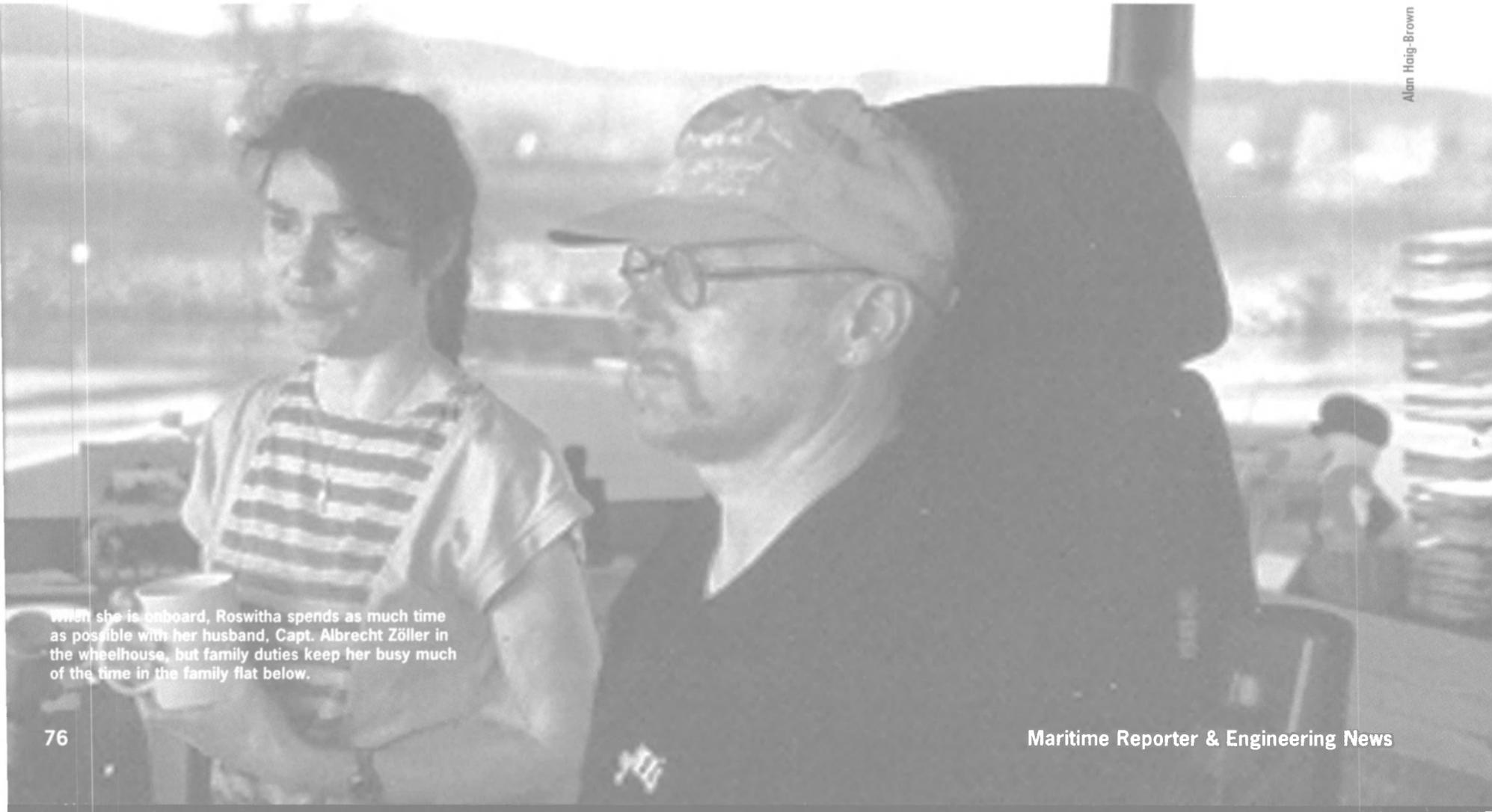
The 2,850 km of the Danube or (Donau in German), from the source in Germany to the Black Sea have been a military and commercial transportation corridor for centuries. On today's maps, the lower 1,075-km marks the border between Romania and part of Serbia. A shorter section is entirely in Serbia after flowing out of Hungary, Slovakia and Austria. The Zoller family has never been down river past Budapest in Hungary and looks forward to a time when the war damaged bridges of Serbia are fully cleared to make the passage safer and more practical. Although it is open to limited access, some vessels are currently making the passage.

On Good Friday, after passing into Bavaria, darkness brings the Johannes Von Nepomuk to the lock at Geisling, 2,353 km. from the Black Sea. After passing

through the lock, Albrecht moors to the concrete side where Rosewitha's sister Barbara waits with her car. The crane on the ship picks her car up and parks it on the afterdeck beside the Zoller family car. A traditional Bavarian Good Friday dinner of herring salad is served in the combined galley, living and dining room at the stern of the ship. Bavarian beer and French wine warm the extended family, which now includes the family's three sons, Magnus 10; Fabian 14; Tobias 16; and their aunt, Barbara and her two-year-old daughter, Fiona. Although Germany has three boarding homes for the children of ship's crew, the boys' mother stays ashore with them for school times. Also present at dinner that night were **Stefan the Hungarian deckhand**, and **Roland Fuchs**, the apprentice sailor. In keeping with the practice on a number of inland ships, a father and son who were paying guests, were spending the last night of a one-week visit onboard.

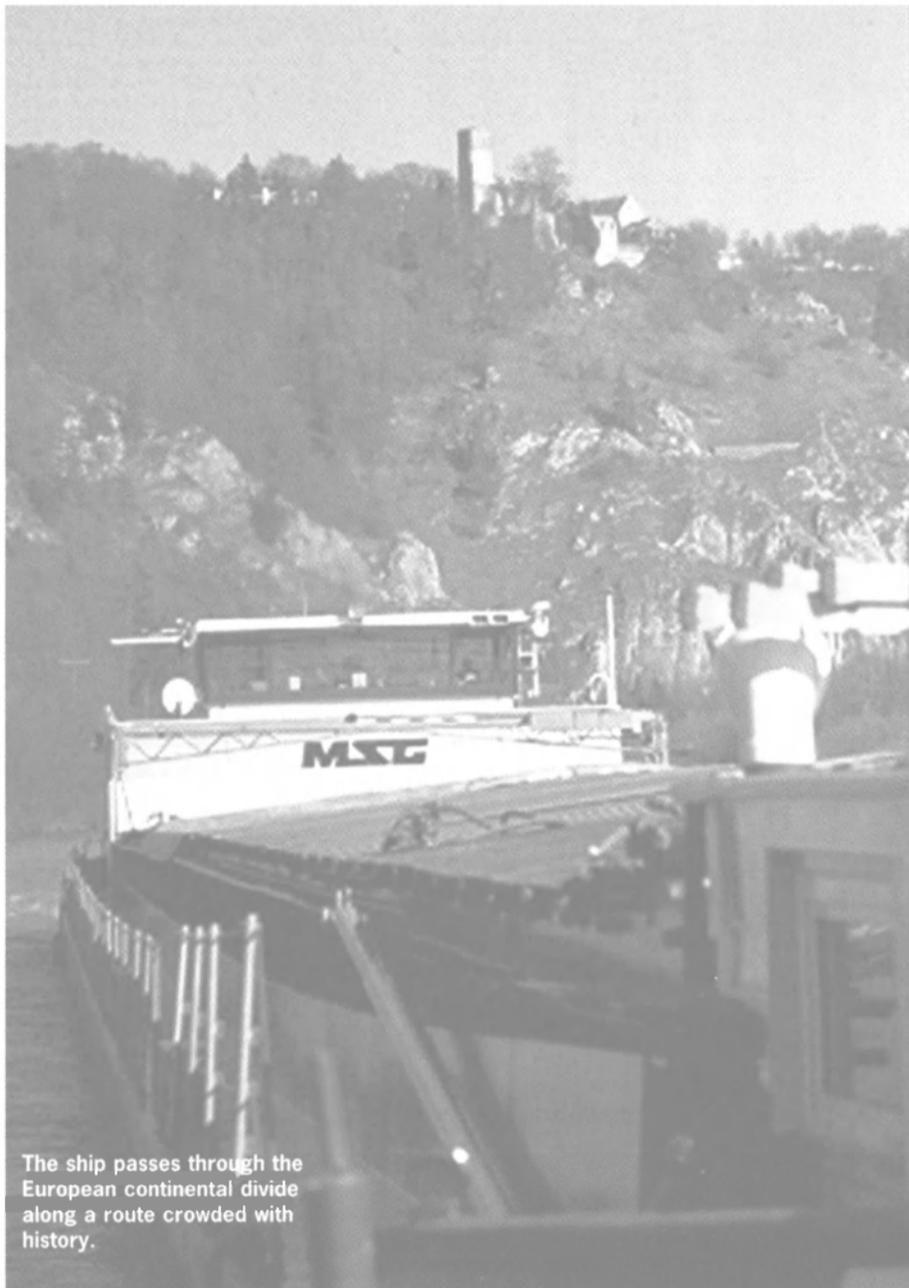
Talk turns to the history of the Nepomuk. Built in 1960 with an 800-hp engine, the ship was lengthened in 1980 and repowered with the 1,600-hp Cummins in 1999 when the barge was added. The Zollers bought it in 1993 from Albrecht's father who had owned it since 1977. They renamed the vessel for the patron saint of those who work around water. The namesake was a priest, who, refusing to tell a wealthy man what his wife had said in the confessional, was thrown into the river. Later five stars arose from the river to honor the priest's integrity. Amidst a carved wooden statue of Nepomuk, which watches over the family as they eat, Good Friday celebration or not, this is a working ship and everyone turns in at 10:00 p.m. for a 6:00 a.m. departure on up river toward Regensburg.

In the morning, after calling a taxi to pick-up the guests, the combined 575 ft. (175.2-m) of vessels



When she is onboard, Roswitha spends as much time as possible with her husband, Capt. Albrecht Zoller in the wheelhouse, but family duties keep her busy much of the time in the family flat below.

Alan Haig-Brown



Alan Haig-Brown

The ship passes through the European continental divide along a route crowded with history.

moves into the river stream with the aide of bow thrusters on both the ship and the barge. The ship's thruster is a conventional tunnel thruster powered by a 300 hp engine; the thruster at the head end of the barge is powered by a 530-hp Cummins KTA 19. Manufactured by a Netherlands-based firm, the Verhaar Omega Thruster employs a horizontal propeller and a rotating drum, which can rotate 360 degrees. This makes them useful not only for port and starboard movement but also for assistance in backing down when entering a lock. At least one Mississippi operator has considered Omega thrusters for extra safety on oil barges, but they are much more common on Europe's inland waterways. Combined with the 16-cylinder, 1,600 hp Cummins KTA50 main engine on the ship, giving the Johannes Von Nepomuk and its barge remarkable maneuverability in spite of the great length. The Cummins main turns a highly-skewed five-blade 1.6-m propeller through a ZF 5.2:1 gear manufactured at the company's Pasau factory.

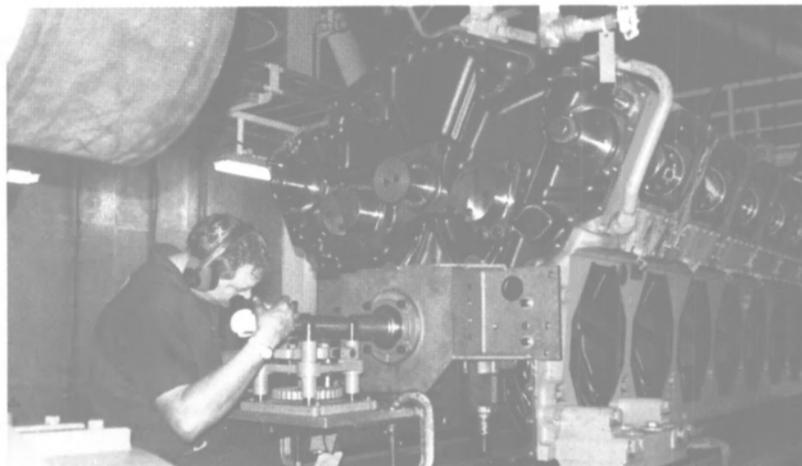
A challenge for owner operators of workboats the world over is the balancing of business arrangements with onboard operations. Freight has to be scheduled so as to avoid return trips with no paying cargo. The Zollers avoid this through their participation in the MSG group of owner-operators.

In 1916, Albrecht Zoller's grandfather was one of six founding partners of this collective of German-owned river ships. Today Albrecht is the vice president of the organization's supervision, with **Heinz Hofmann** serving as the company's manager. With a current membership of 65 blue and white painted ships, the cooperative employs a manager to arrange cargos. As cargo rates vary, the collective minimizes risk by collecting all receivables and averaging the rates to all participants. A reduced rate is paid when a ship must travel light between ports. MSG also invests in cargo handling facilities and pays a small amount to each member when ice blocks operations forcing down time. With all of these commitments covered, a dividend is paid to members at year's end. The organization represents a model for "How to keep the family business in business."

Just above Regensburg the hills crowd the river more tightly. Last year's Mai Bough, tall slender evergreens with all but the topmost branches removed, in the passing villages remind a North American visitor of English May Poles. The Zoller family tells

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Capt. Albrecht Zoller puts in long days at his command station equipped for navigation and comfort.

Alan Hoig-Brown

Bavarian folk history in a manner that exhibits the depth of their roots in this part of the country even though their travels take them from Rotterdam in the northwest to Budapest in the southeast. The breadth of their operational region was much expanded in 1992 when the final link in the Trans-European Waterway was completed with the opening of the Rhine-Main-Danube Canal. First envisioned in 793 by King Carl the Great, the canal was made passable in the 19th century. But it was small in size and entailed a great many

incremental locks to lift ships from the Main, a northern flowing tributary of the Rhine, up over the continental divide to the southerly flowing Danube. It was not until 1992, that the final stretch of the canal linking the two systems was made passable to the large modern powered barges of today.

The canal is maintained to a depth of four meters and a navigational width of approximately 102 to 135 ft. (31 to 41 m). From Kelheim — 2,411-km. from the Black Sea on the upper Danube — five locks lift ves-

sels 222 ft. (67.8 m) to the European continental divide. Then 10 more locks lower ships 574 ft. (175.1 m) to the Main River at Bamberg for a total of 15 locks in the 173-km passage. The first three of these northern locks lower and raise ships a dramatic 80 ft. (24.6-m) each. From the pilot house of the Johannes Von Nepomuk as the ship sits in the full lock, it appears as though the vessel is to be launched into the tree tops of the Bavarian forests. Ice in the canal typically leads to three- or four-week closures each winter, but the canal is continuing to change the manner of water borne transportation for Europe by opening the whole 3,500 km waterway from the North Sea port of Rotterdam to the Romanian Black Sea port of Sulina. Cargo volumes through the canal have increased steadily since 1992 reaching approximately six million tons last year. In the merging of cultures and terminology from the two river systems, the licensed commander of a vessel on the Rhine continues to be called "Schiffsführer" while the equivalent position on the Danube is a "Kapitan."

The big wheelhouse of the Nepomuk provides great visibility and is a favorite space for family visiting. The captain and father sits in his elevated pilot's chair, smoking one of the two dozen pipes arranged in racks on the walls, and points out features along the canal from fresh beaver cuttings to the remains of ancient locks. In fair weather a skylight can be opened in the top of the wheelhouse. The electronics onboard the ship would dazzle the users of those ancient locks beyond belief. Dominant is a large flat screen computer monitor combining electronic charts and the image from the Swiss radar. Developed by Innovative Navigation specifically for European waterways, the developers maintain that, "The RADARpilot 720 is the first

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Alan Hoig-Brown

Mooring in the locks keeps the deck crew busy especially in the Main-Danube canal.

certified integrated navigation system which unites common navigational instruments as the radar and the rate of turn indicator. Due to the combination of GPS and a powerful chart drawing engine the navigator has direct access to all necessary information. Therefore navigation with a maximum of safety is possible every time, even in difficult conditions like fog or at night."

This data can be stored and burned to a CD for the record in the event of an accident. When following the sinuous form of the river, the rectangular screen is kept in the vertical position, but when he enters a lock and has the ship stopped, it is swung to the horizontal, a button is touched and an electronic log book pops up, the captain lays a wireless keyboard on his knees and makes an entry. In the larger locks or on long straight stretches in the canal the screen and computer can also be used for checking e-mail through the ship's mobile cellular phone.

Steering of the ship is via a single jog stick mounted at the operator's left side. Throttle and bow thrusters are to the right. Two small video monitors show the view forward from the port and starboard rear quarters of the front barge. A third monitor reports the image from a bow-mounted camera that can be rotated and zoomed to show the deck crew working or used to look around corners for approaching traffic.

Cruising up the canal with Bavarian yodel and accordion music playing on the radio, the sun slanting down from the rocky bluffs and treed slopes marking the divide between the North Sea Drainage and that of the Black Sea makes for a mellow feeling on the bridge. Add to that the knowledge that ahead lies the Main River to the Rhine and astern lies the Danube flowing to the Black Sea and it is clear that this is the mariners version of the "top of Europe."

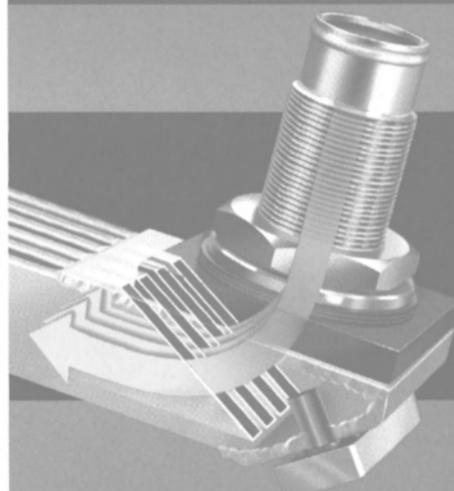
The closest North American equivalent would be the link between the Illinois River and Lake Superior that con-

nects the Mississippi with the Saint Lawrence system. But it doesn't carry anything like the weight of history nor the volume of traffic. From a contemporary perspective the Donau-Main canal is even more about potential than about history. In the port of Nürnberg, half way through the canal, containers from ports

around the world are stacked high. Just as in America the public awareness of environmental issues around highway construction and the inefficiencies of automotive transport are refocusing attention to the inland waterways. Literature prepared by the Wasser- und Schifffahrt-verwaltung des Bundes shows that

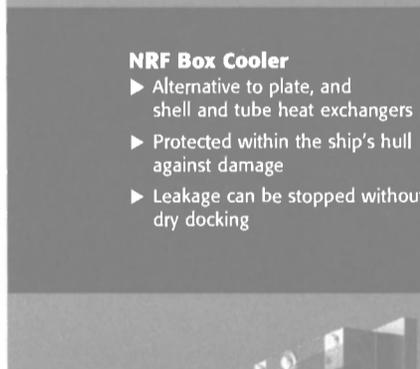
one river tank ship, with out a secondary barge, can carry the equivalent of 42 rail tank-cars or 82 tank-trucks. With the clearing of obstructions and bottlenecks on the Danube and some deepening, dramatic increases in inland waterway shipping can be expected.

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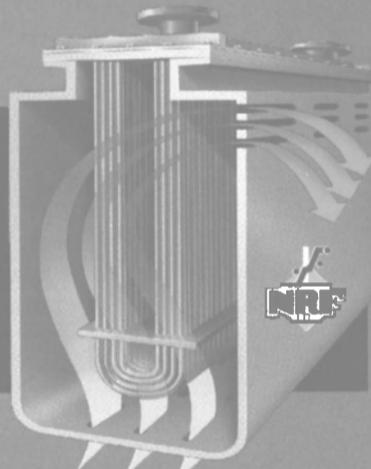
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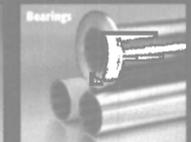
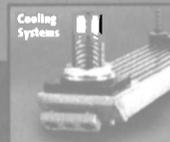
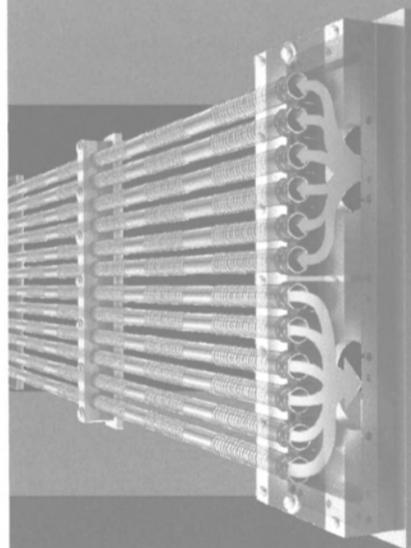
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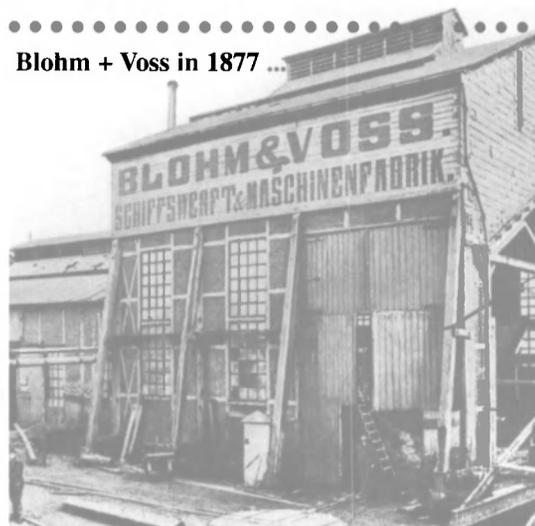
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Blohm+Voss: 125 Years Young

More than 125 years ago, on April 5, 1877, two young and ambitious engineers, **Hermann Blohm** and **Ernst Voss** joined together to what has since evolved into one of Germany's most

advanced and largest shipyards - Blohm + Voss Schiffswerft und Maschinenfabrik (shipyard and machine factor) on Steinwarder Island, situated on the River Elbe.

Originally formed to build steam ships, the company began to develop into one of the largest closed shipyard site and dock capacity by the beginning of the 20th Century.



Blohm + Voss in 1877 ...

Throughout its developmental stages, Blohm + Voss profited richly from a favorable economic environment, as well. At the time, the industrialization of the united German Reich was occurring, thus causing the need for a large amount of cargo and passenger ships were suddenly needed. And when Germany began to develop into a major European power, warships became in demand at the yard.



Blohm + Voss Shipyard at the beginning of the 20th Century.

Opposite Beginnings

Hailing from polar opposite backgrounds, Hermann Blohm and Ernst Voss could not have been more different. Blohm was born into an established Lubeck business family, while Voss was the son of a blacksmith in Fockbeck, near Rendsburg. It was however, their mutual interest in shipbuilding and mechanical engineering that brought the two men together. Following sound training and having worked for German and English firms, both had already tried to start a shipyard with other partners — but did not get very far. Instead, the two joined forces in their own shipbuilding venture — which did not come easily. It was with hard work and strong determination that drove both Blohm + Voss to their successes.

The Senate of the Hanseatic City Hamburg reluctantly leased the two men a 15,000 sq. m. marshy site on Steinwarder Island on the River Elbe so that the groundwork could be laid for their shipbuilding enterprise. After overcoming an abundance of obstacles, the

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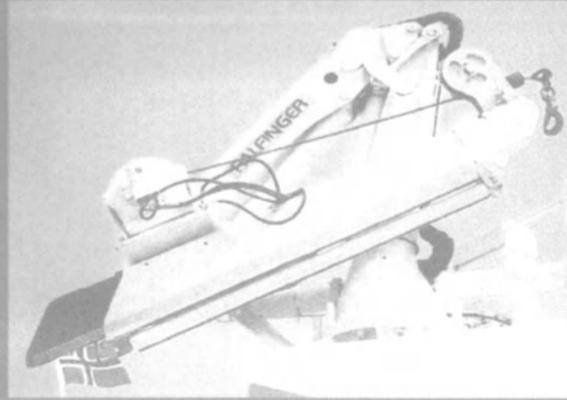


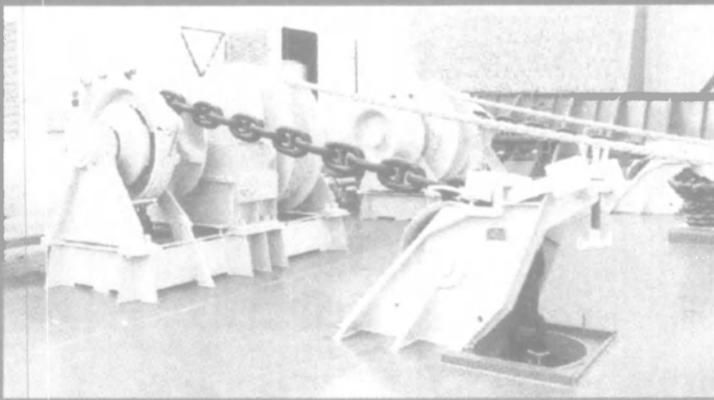
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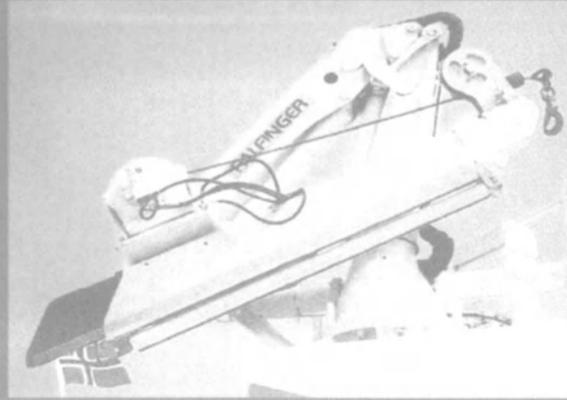
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original shipyard was created — only after the site was dried out via a complicated method. With machines in place and workers hired, the shipyard opened, only to be greeted with zero orders.

Shipping firms in Hamburg were wary of the two young engineers, as well as the workers that they employed. It was general knowledge that it was not an easy task (or demand) for those who had knowledge of iron ships, which had not been run in several years. In addition, the Hamburg firms traditionally ventured to their "regulars" (shipyards located in the U.K.) when they wanted something built. Their reasoning was one that involved staying loyal to the yards they had been working with for many years. The firms in Hamburg just were not about to take that kind of risk — trusting two young strangers to build their vessels.

Instead of closing down its doors before they could even be open, Herman Blohm took matters into his own hands by playing door-to-door salesman, so to speak, by building its own vessel that would be funded completely by the yard. Since the mechanical engineering arm of the yard was not completed, Blohm + Voss' premier vessel was a sailing ship known as the barque National, which the yard managed to sell as Flora to a Hamburg shipping company known as Amsnick.

A Steady Pace

Once things began to pick up, a dockyard was created in 1882 to serve the growing need for docking capacities in Hamburger Harbor. Known as Dock I, the dock was designed and built by the yard, thus laying the cornerstone for an additional branch of business, which rapidly expanded throughout the next several years.

The high point of Navy shipbuilding before the Great War, in which the structures of Europe were permanently damaged, was formed by the battle cruisers, which put Blohm + Voss on the map as a leading shipyard in this sector. Beginning with Von der Tann, which was delivered in 1910 as the Imperial Navy's answer to the British Navy's invincible

class, the vessel had a displacement of 21,000 tons; its main weapons consisting of eight 28 cm canons. Von der Tann was followed by Motke in 1911; Goeben in 1912; Seydlitz in 1913; and Derfflinger in 1914 — all of which held displacement of 31,200 and 30.5-m canons.

During World War I, Blohm+Voss found itself making many fundamental

changes, which finally led to its commencement of large scale building of submarines at the insistence of the Imperial Navy Office — even though the yard was designed specifically for building large vessels — as reiterated by Hermann Blohm. But, since current events led to the added demand for submarine construction, there was really not much else to do. A production

process to fit the needs of this type of construction was then implemented at the yard — permitting a respectable amount of submarine construction of the UB and UC type. Apart from a few scattered torpedo boats, the only conventional floating ship to built at the yard during this era was the small cruiser, Coln that was delivered in 1918.

The time between the two World Wars



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Herbert Von Nitzsch, chairman, Blohm + Voss

brought much unrest to the yard, as it was a popular target for communists in the period following the armistice, peace negotiations and Treaty of Versailles. Conditions at the yard went from bad to worse as it was affected by inflation and worldwide economic crisis. The yard was now managed by Hermann Blohm's sons Rudolf and Walther — who joined the firm as shareholders during the war.

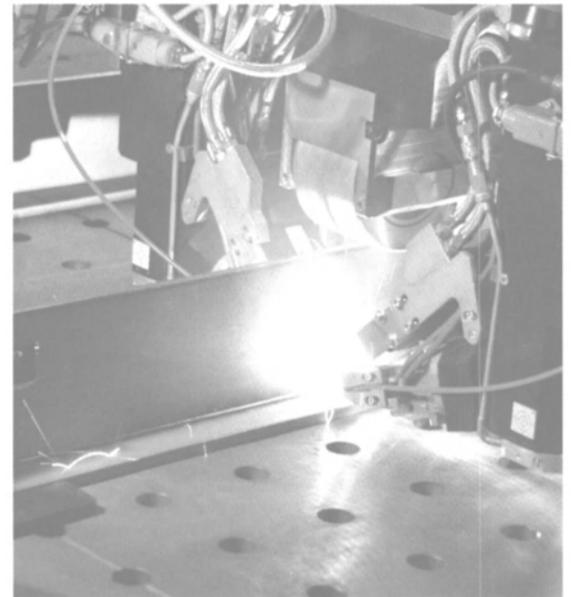
WWII And Beyond

Following the outbreak of WWII in September 1939, Blohm + Voss once again became a yard that was exclusively dedicated to manufacturing submarines. In fact, two submarines built in 1943-1944 with Walter propulsion were the forerunners of a new submarine age — initially leading up to the large electric boats — type XXI, which were leaving the shipyard on a daily basis in greater numbers. Considering the increase of bombing raids from mid 1943, which then became almost daily: Blohm+Voss built 171 units of the Type VII C alone. And even after hundreds of fire and explosive bomb hits, 17 Type XXI boats were still handed over to the navy at the beginning of 1945.

It was also at this time that Blohm+Voss was destroyed when almost 1,200 high-explosive bombs struck the yard. Following the handing over of Hamburg to British forces, the yard is cleared out and by December 31, all work was ordered to cease, thus closing the shipyard. The slipway and frame structures of the yard are blown up in 1946, followed by complete dismantling of the shipyard two years later. Every piece of machinery and equipment — including the pots in the works canteen — are distributed among the 15 nations of the victorious allies. In 1949, the directors and owners of Blohm+Voss stand trial for non-compliance with the dismantling regulations. At the same time the other West German yards begin to build new ships in accordance with the Potsdam Agreement.

The 1950's brought about positive change for the shipyard, when in 1953, permission was granted for ship repair and the construction of coasters — eventually extended to seagoing ships and industrial turbines. In 1955, two floating docks were returned to the shipyard and the establishment of Blohm+Voss AG commences with Phoenix-Rheinrohr AG acquiring 50 percent of the share capital of \$9.4 million. One year later, Blohm+Voss constructs a trio of passenger vessels for Hurtigrouten Bergen-Kirkenses, thus signifying its re-entry into the export business.

The collapse of the adjacent Schlieker Shipyard



Blohm+Voss is the first shipyard worldwide to employ a laser welding and cutting plant.

offered Blohm+Voss opportunities — specifically within navy shipbuilding. The yard was contracted to pick up where Schlieker left off in the construction of tenders for the German navy, resulting in the yard's designation as the project shipyard for vessels of this type.

In 1967, the yard constructed Polar Ecuador for Hamburg Süd, and also introduced the Pioneer multi carrier system — a uniform type ship consisting of almost exclusively of flat, rectangular surfaces. Overall, the company had a large range of products, which expanded further by a large number of other activities both in shipbuilding and mechanical engineering.

Evolving into the containership and cargo ship business was the plan in the 1970s with the yard delivering a second-generation containership Sydney Express for Hapag's Europe-Australia service. In 1971, Blohm + Voss delivered a trio of cargo ships of 164,000 dwt each, followed by another pair of containerships one year later. The German navy also continued to be an important customer for the yard — primarily for repairs and conversions — eventually branching out to the realization of the frigate program. Blohm+Voss delivered two mainly equipped units of Type F 122 to general contractor Bremer Vulkan. In the following series F 123 and F 124, Blohm+Voss was already established as the leading yard in German frigate consortium and went on to build the first ship of each series.

Blohm+Voss again proved its technological prowess in the creation of the hovercraft catamaran MEKAT, which was presented to the public in 1989. While numerous civil and military variants were developed, this type of ship did not catch on, and apart from the prototype built for trials and presentations, no other ships of this kind were created.

On the other hand, the development of fast single hull ships was promising. The first success for Blohm + Voss in this area was with an order for two fast 24,000 BRZ cruiser ships by a Greek shipping company. This order was also considered yet another innovation on the yard's part, as it signified its re-entry into the realm that it had so highly occupied before the war — the passenger shipbuilding business. The order was followed by a contract from Royal Olympic Cruise Lines, which called on the yard to build Olympic Voyager, which has had a successful run since 2000, followed by the vessel's sistership Olympia Explorer, which was launched recently.

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The image shows three screenshots of the software. The top screenshot is a search results table with columns for Company Name, Vessel Name, Address, City, State, Zip, Country, Title, First Name, Last Name, Phone, FAX, E-Mail, Official Number, Call Sign, Gross Tons, Net Tons, and Length. The middle screenshot shows a detailed profile for 'A & K FISHING' with fields for Company Name, Vessel Name, Address, City, State, Zip, Country, Title, First Name, Last Name, Phone, FAX, E-Mail, Official Number, Call Sign, Gross Tons, Net Tons, and Length. The bottom screenshot shows a grid of address labels for various companies like 'BERNARD H. CRAMMOND', 'CHARLES J. PELLEGRINI', 'CHATEAU CHARTERS INC', etc.

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*System Requirements: Windows/PC Platform, 32 MB Ram, 30 MB of available hard disk space.

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New Ship Contracts by Ferliship

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(Prices are in U.S. Dollars) (NOTE: Contracts are for February to April, 2002)

OWNER OPERATOR	COUNTRY SO	SHIPYARD	COUNTRY SB	TYPE	No	TEU	DWT	DEUV	PRICE M S
JAYA HOLDINGS	SINGAPORE	JAYA SHIPBUILDING	SINGAPORE	AHTS	2		0	02	-
SECUNDA MARINE SERVICES	CANADA	SIMEK	NORWAY	AHTS	1		0	03	-
UNKNOWN	UNKNOWN	ZHEJIANG	CHINA	BULK CARRIER	2		51,000	4-Mar	-
NORDEN AS	DENMARK	TAMANO SHIPYARD	JAPAN	BULK CARRIER	2		55,000	5-Apr	-
NORDEN AS	DENMARK	mitsui	JAPAN	BULK CARRIER	2		55,000	4-Mar	-
CLIO MARINE	JAPAN	mitsui	JAPAN	BULK CARRIER	1		50,000	603	17
NOMIKOS (LONDON)	UK	JIANGYANG	CHINA	BULK CARRIER	3		51,000	3	54
BERTLING	GERMANY	JIANGDU SHIPYARD	CHINA	BULK CARRIER	2		36,000	4-Mar	36
HSIN CHIEN	TAIWAN	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER	2		32,000	3	-
MING TAI	TAIWAN	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER	1		32,000	3	-
GOLDEN UNION	GREECE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	BULK CARRIER	2		172,000	3	71
SOUTH AFRICAN MARINE	GREECE	SAMHO NEW SHIPYARD	KOREA	BULK CARRIER	2		172,000	4	-
ENTERPRISE SHIPPING & TRADING	GREECE	SAMHO NEW SHIPYARD	KOREA	BULK CARRIER	2		172,000	4	75
SINCERE NAVIGATION	TAIWAN	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	BULK CARRIER	2		170,000	4	-
mitsubishi corp.	JAPAN	SANOYAS CORP.	JAPAN	BULK CARRIER	2		76,000	3	35
UNKNOWN	UNKNOWN	mitsui	JAPAN	BULK CARRIER	2		55,000	3	-
UNKNOWN	UNKNOWN	KAWASAKI H.I.	JAPAN	BULK CARRIER	1		50,326	3	-
HANJIN SHIPPING CO.	KOREA	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER	4		33,000	3	64
LASCO SHIPPING CO.	US	HAKODATE DOCK	JAPAN	BULK CARRIER	2		32,000		27
mitsui O.S.K. LINES (MOL)	JAPAN	KANDA SHIPBUILDING CO.	JAPAN	BULK CARRIER	3		32,000	3	40.5
IMC SHIPPING	SINGAPORE	HAKODATE DOCK	JAPAN	BULK CARRIER	1		31,800	4	15
HANJIN SHIPPING CO.	KOREA	HAKODATE DOCK	JAPAN	BULK CARRIER	2		31,800	4	30
HARREN & PARTNERS SCHIFFS	GERMANY	SHANGHAI SHIPYARD	CHINA	BULK CARRIER	1		22,500	3	16
U-MING MARINE TRANSPORT CORP.	TAIWAN	CHINA SHIPBUILDING CORP.	TAIWAN	BULK CARRIER	2		176,000	04	69
BOCIMAR	BELGIUM	SHANGHAI WAIGAOQIAO	CHINA	BULK CARRIER	2		175,000	04	68
UNKNOWN	GREECE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	BULK CARRIER	2		170,000	04	71
MARMARAS NAVIGATION	GREECE	SAMHO NEW SHIPYARD	KOREA	BULK CARRIER	2		170,000	04	71
mitsui O.S.K. LINES (MOL)	JAPAN	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER	1		81,000	03	-
MARUBENI CORP	JAPAN	SANOYAS CORP.	JAPAN	BULK CARRIER	3		75,000	04	-
JAPANESE INTERESTS	JAPAN	NAMURA ZOSENSHO	JAPAN	BULK CARRIER	1		74,000	02	-
TSCHUDI & EITZEN	NORWAY	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER	2		53,500	04	36
UNKNOWN	JAPAN	IWAGI	JAPAN	BULK CARRIER	2		53,400	03	-
VAN OMMEREN	NETHERLANDS	TSUNEISHI	JAPAN	BULK CARRIER	2		52,000	04	-
NISSHO IWA CORP.	JAPAN	KANDA SHIPBUILDING CO.	JAPAN	BULK CARRIER	1		50,000	04	18.5
SINCERE NAVIGATION	TAIWAN	KANDA SHIPBUILDING CO.	JAPAN	BULK CARRIER	2		32,000	03	27
PACIFIC BASIN BULK SHIPPING	HONG KONG	KAWASAKI H.I.	JAPAN	BULK CARRIER	1		32,000	04	13.5
JAPANESE INTERESTS	JAPAN	SHIN KURUSHIMA	JAPAN	BULK CARRIER	2		32,000	03	-
PACIFIC BASIN BULK SHIPPING	HONG KONG	HAKODATE DOCK	JAPAN	BULK CARRIER	1		32,000	04	-
ZHUHAI NEW CENTURY	CHINA	JIANGSU YANGZUIJIANG	CHINA	BULK CARRIER	1		10,000	02	-
NARASAKI STAX	JAPAN	KANREI SHIPBUILDING	JAPAN	BULK CARRIER / CEMENT CARRIER	1		8,960	2	-
SEIHO KAIUN	JAPAN	KYOKUYO ZOSEN	JAPAN	BULK CARRIER / CEMENT CARRIER	1		7,500	3	-
mitsui O.S.K. LINES (MOL)	JAPAN	NAMURA ZOSENSHO	JAPAN	BULK CARRIER / ORE CARRIER	1		176,000	3	36
UNKNOWN	JAPAN	IMABARI SHIPBUILDING	JAPAN	BULK CARRIER / ORE CARRIER	2		76,000	03	-
SANKO KISEN	JAPAN	TSUNEISHI	JAPAN	BULK CARRIER / ORE CARRIER	1		52,200	04	-
FIRST MARINE SERVICE	JAPAN	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER / ORE CARRIER	1		36,000	04	-
ORIENT LINE	-	HAKODATE DOCK	JAPAN	BULK CARRIER / ORE CARRIER	1		31,600	03	-
JAPANESE INTERESTS	JAPAN	TSUNEISHI	JAPAN	BULK CARRIER ORE CARRIER	2		52,235	4-Mar	-
USUI KAIUN	JAPAN	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER ORE CARRIER	2		52,000	3	-
KAWASAKI KISEN KAISA (K-LINE)	JAPAN	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER ORE CARRIER	1		50,800	3	-
SHINKO MARITIME	JAPAN	OSHIMA SHIPBUILDING	JAPAN	BULK CARRIER ORE CARRIER	1		46,000	2	-
MERANTI MARITIME	INDONESIA	PT PAL (PERSERO)	INDONESIA	BULK CARRIER ORE STRENGTHENED	2		45,000	3	36
ITOCHU CORP.	JAPAN	NAMURA ZOSENSHO	JAPAN	BULK CARRIER ORE STRENGTHENED	1		74,000	2	-
JAPANESE INTERESTS	JAPAN	MURAKAMI HIDE	JAPAN	BULK CARRIER ORE STRENGTHENED	1		6,750	2	-
BRAVE MARITIME	GREECE	JIANGYANG	CHINA	BULK CARRIER ORE STRENGTHENED	4		74,500	3	80
JAPANESE INTERESTS	JAPAN	WATANABE	JAPAN	CHEMICAL TANKER	1		25,000	403	-
TOKO KAIUN	JAPAN	WATANABE	JAPAN	CHEMICAL TANKER	1		20,500	3	25.5
YAMAMARU	JAPAN	WATANABE	JAPAN	CHEMICAL TANKER	1		19,500	3	20.5
ITOCHU CORP.	JAPAN	SHIN KURUSHIMA	JAPAN	CHEMICAL TANKER	1		19,100	3	-
PETROMARINE	FRANCE	NIESTERN SANDER	NETHERLANDS	CHEMICAL TANKER	1		14,800	3	19.4
JAPANESE INTERESTS	JAPAN	MIYOSHI	JAPAN	CHEMICAL TANKER	1		12,000	2	-
JAPANESE INRERESTS	JAPAN	ASAKAWA SHIPBUILDING	JAPAN	CHEMICAL TANKER	1		14,200	2	-
TATSUMI MARINE	JAPAN	ASAKAWA SHIPBUILDING	JAPAN	CHEMICAL TANKER	2		11,700	3	30
ODFJEL	NORWAY	KITANIHON	JAPAN	CHEMICAL TANKER	2		25,000	3	57
WW MARPETROL	SPAIN	FACTORIAS VULCANO	SPAIN	CHEMICAL TANKER	1		17,000	03	-
DAISHIN SENPAKU	JAPAN	FUKUOKA SHIPBUILDING	JAPAN	CHEMICAL TANKER	1		12,300	03	-
WEBBE NACHFOLGER	-	DAMEN GALATZ	ROMANIA	CHEMICAL TANKER	2		8,150	04	-
NORDDEUTSCHE VERMOGEN	GERMANY	SHIN KOCHI JUKO	JAPAN	CONTAINER	1	3,100		3	-
NORDDEUTSCHE VERMOGEN	GERMANY	SHANGHAI SHIPYARD	CHINA	CONTAINER	1	3,100		3	-
PACIFIC CARRIERS	SINGAPORE	JIANGSU YANGZUIJIANG	CHINA	CONTAINER	2	700		3-Feb	-
PACIFIC CARRIERS	SINGAPORE	JIANGSU YANGZUIJIANG	CHINA	CONTAINER	1	450		2	-
PACIFIC CARRIERS	SINGAPORE	JIANG JIANG	KOREA	CONTAINER	1	600		2	-
PACIFIC CARRIERS	SINGAPORE	JIANG JIANG	KOREA	CONTAINER	1	450		2	-
mitsui & CO.	JAPAN	HAKATA ZOSEN	JAPAN	CONTAINER	1		10,000	2	-
CHINESE INTERESTS	CHINA	GUANGZHOU	CHINA	CONTAINER	1		2,000	2	-
ALIANCA NAVEGACAO	BRAZIL	EISA SHIPYARD	BRAZIL	CONTAINER	2	3,800		4	120
BUILDER'S ACCOUNT	US	KVAERNER PHILADELPHIA	US	CONTAINER	1	2,600		3	-
SHOEI KAIUN	JAPAN	IMABARI SHIPBUILDING	JAPAN	CONTAINER	3	1,400		3	-
PACIFIC CARRIERS	SINGAPORE	NEW CENTURY	-	CONTAINER	1	700		2	-
HERMAN BUSS AG.	GERMANY	ZHOUSHAN	CHINA	CONTAINER	2	660		3	24
SHOEI KAIUN	JAPAN	IMABARI SHIPBUILDING	JAPAN	CONTAINER	2		0	04	104
CUNARD	UK	FINCANTIERI	ITALY	CRUISE SHIP	1			5	400
BORA BORA CRUISES	TAHITI	AUSTAL SHIPS	AUSTRALIA	CRUISE SHIP	2			3	-
TIRRENIA SOC. NAV.	ITALY	FINCANTIERI	ITALY	FAST FERRY	3			3	262.5
UNKNOWN	UNKNOWN	STOCZ POLNOCNA	POLAND	FISHING	1		0	3	-

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OWNER OPERATOR	COUNTRY SO	SHIPYARD	COUNTRY SB	TYPE	No	TEU	DWT	DELIV	PRICE M \$
K HALSTENSEN	NORWAY	HELLESOY	NORWAY	FISHING	1		0	03	-
STATOIL NORGE	NORWAY	AKER GROUP.	NORWAY	FLOATING PRODUCTION UNIT	1		0	5	560
CHINA NAT OFFSHORE	CHINA	SHANGHAI WAIGAOQIAO	CHINA	FPSO	1		0	3	-
HUSKY ENERGY	GERMANY	SAMSUNG	KOREA	FPSO	1		200,000	05	140
BP SHIPPING	UK	DAEWOO	KOREA	FPSO	1		0	04	500
SHINWA SHOJI	JAPAN	SHITANOE ZOSEN	JAPAN	GENERAL CARGO	1		1,600	2	-
FUJITRANS CORP.	JAPAN	MITSUBISHI H.I.	JAPAN	GENERAL CARGO	1		6,950	3	-
ARMAWA SHIPPING & TRADING	NETHERLANDS	DAMEN SHIPYARDS	NETHERLANDS	GENERAL CARGO	1		3,850	2	-
UNKNOWN	UNKNOWN	BODEWES VOLHARDING	NETHERLANDS	GENERAL CARGO	2		7,700	2	-
UNDISCLOSED INTERESTS	-	BODEWES VOLHARDING	NETHERLANDS	GENERAL CARGO	2		4,200	4	-
VIETNAMESE OWNER	VIETNAM	HA LONG SHIPYARD	VIETNAM	GENERAL CARGO	1		1,984	2	-
UNKNOWN	UNKNOWN	WATANABE	JAPAN	GENERAL CARGO	1		12,500	03	-
DOWA LINE	JAPAN	SHIN KURUSHIMA	JAPAN	GENERAL CARGO	1		9,000	03	-
BRIESE SCHIFFAHRG GMBH.	GERMANY	XINGANG SHIPYARD	CHINA	GENERAL CARGO	1		4,900	04	-
UNKNOWN	UNKNOWN	BARKMEIJER STROOBOS	NETHERLANDS	GENERAL CARGO	1		3,200	03	-
ROHAV	NORWAY	AAS MV	NORWAY	LIVE FISH CARRIER	1		1,200	02	-
TOKYO ELECTRIC POWER	JAPAN	MITSUBISHI H.I.	JAPAN	LNG	1		70,000	6	180
NIPPON YUSEN KAISA (NYK)	JAPAN	MITSUBISHI H.I.	JAPAN	LNG	1		0	6	170
GAZ DE FRANCE	FRANCE	CHANTIERS DE L'ATLANTIQUE	FRANCE	LNG	1		0	4	134
BERGESEN	NORWAY	DAEWOO	KOREA	LNG	4			5	640
MITSUBI O.S.K. LINES (MOL)	JAPAN	KAWASAKI H.I.	JAPAN	LNG	1		75,000	05	-
NIPPON YUSEN KAISA (NYK)	JAPAN	MITSUBISHI H.I.	JAPAN	LPG	1		0		-
DOHA MARINE SERVICE	QATAR	DAEWOO	KOREA	LPG	1		0		33
K LINE	JAPAN	KAWASAKI H.I.	JAPAN	LPG	1		55,000	2	-
HARTMANN SCHIFFAHRGTS	GERMANY	SEVERNAV	ROMANIA	LPG	1		9,500	2	-
SHINWA CHEMICAL TANKER	JAPAN	HIGAKI ZOSEN	JAPAN	LPG	1		1,800	3	-
HIKARI SANGYO	JAPAN	MIURA	JAPAN	LPG	1		1,130	2	-
IM SKAUGEN	NORWAY	ZHONGHUA SHIPYARD	CHINA	LPG	2				42
STARGAS	ITALY	CANTIERI NAVALE DE POLI	ITALY	LPG	1		5,700	04	16
DOHA MARINE SERVICE	QATAR	KOUAN	CHINA	MAINTENANCE/UTILITY	1		1,300	2	-
HEINRICH JUNGERHANS	GERMANY	J.J. SIETAS	GERMANY	MULTI-FUNCTION SERVICE	2		9,600	3	-
BELUGA SHIPPING	GERMANY	VOLHARDING	NETHERLANDS	MULTI-PURPOSE	4		9,200	3	-
BBC-BURGER BEREEDS CONTOR	GERMANY	ROUSSE SHIPYARD	BULGARIA	MULTI-PURPOSE	3		0	2	-
PACIFIC CARRIERS	SINGAPORE	KOUAN	CHINA	MULTI-PURPOSE	2	1,400	25,000	3	26
CARISBROOKE SHIPPING	UK	DAMEN SHIPYARDS	NETHERLANDS	MULTI-PURPOSE	2	675	10,500	02	28
BOCKSTIEGEL REEDEREI	GERMANY	SLOVENSKE	SLOVAKIA	MULTI-PURPOSE	2		4,450	03	9.7
GEOMAR ENTERPRISES	-	SBF SHIPBUILDERS	AUSTRALIA	PASSENGER	2		0	3	6.4
CPT MARITIMA	CHILE	SEVERNAV	ROMANIA	PASSENGER / CARGO	1		3,800	2	20
GREEK INTERESTS	GREECE	SBF SHIPBUILDERS	AUSTRALIA	PASSENGER / VEHICLE/FERRY	4		0	3	11.25
HANKYU FERRY	JAPAN	MITSUBISHI H.I.	JAPAN	PASSENGER / VEHICLE/FERRY	2		5,560	3	-
VISENTINI F.	ITALY	CANTIERI NAVALE VISENTINI	ITALY	PASSENGER / VEHICLE/FERRY	1		0	3	-
CALEDONIAN MACBRAYNE	UK	APPLEDORE SHIPBUILDERS	UK	PASSENGER / VEHICLE/FERRY	1		0	03	-
UNKNOWN	UNKNOWN	EVERGREEN HEAVY INDUSTRIES	JAPAN	PASSENGER / VEHICLE/FERRY	1		0	03	-
UNKNOWN	KOREA	KANASASHI CO.	JAPAN	PASSENGER / VEHICLE/FERRY	2		0	03	-
NAVIERA ARMAS	SPAIN	BARRERAS	SPAIN	PASSENGER / VEHICLE/FERRY	1		0	03	-
WAGENBORG SHIPPING BV	NETHERLANDS	BIJLSMA	NETHERLANDS	PASSENGER / VEHICLE/FERRY	1		0	03	-
TRANSTEJO TRANSPORTES	PORTUGAL	DAMEN SHIPYARDS	NETHERLANDS	PASSENGER / VEHICLE/FERRY	1		0	04	-
SOLSTAD SHIPPING	NORWAY	PROMAR	BRAZIL	PLATFORM SUPPLY VESSEL	1		0	3	-
HALUL OFFSHORE SERVICE	INDIA	BHARATI	INDIA	PLATFORM SUPPLY VESSEL	1		0	3	-
EDISON CHOUQUEST OFFSHORE	US	BOLLINGER	US	PLATFORM SUPPLY VESSEL	3			2	-
JAYA HOLDINGS	SINGAPORE	MYANMA	MYANMAR	PLATFORM SUPPLY VESSEL	1			2	-
SOLSTAD SHIPPING	NORWAY	ULSTEIN VERFT	NORWAY	PLATFORM SUPPLY VESSEL	1		52,200	04	-
HAGENES SHIPPING	NORWAY	AKER BRATTVAAG	NORWAY	PLATFORM SUPPLY VESSEL	1		0	03	-
SHIPPING SERVICE	-	JIANGSU YANGZUIANG	CHINA	PONTOON	1		13,400	02	-
NISSHIN SHIPPING	JAPAN	USUKI	JAPAN	PRODUCTS TANKER	1		19,500	2	-
ELETSON MARITIME	GREECE	STX (DAEDON)	KOREA	PRODUCTS TANKER	2		70,000	4	60
IINO KAIUN	JAPAN	SHIN KURUSHIMA	JAPAN	PRODUCTS TANKER	1		48,000	3	-
NISSHIN KAIUN	JAPAN	SHIN KURUSHIMA	JAPAN	PRODUCTS TANKER	1		19,100	3	-
SAMHO SHIPPING	KOREA	SAMHO NEW SHIPYARD	KOREA	PRODUCTS TANKER	1		3,400	2	-
DILMUN NAVIGATION	AUSTRALIA	SAMHO NEW SHIPYARD	KOREA	PRODUCTS TANKER	1		3,000	3	7.5
HINODE KISEN	JAPAN	MIURA	JAPAN	PRODUCTS TANKER	1		4,999	2	-
OKINO KAIUN	JAPAN	MIURA	JAPAN	PRODUCTS TANKER	1		4,999	2	-
SHOEI KAIUN	JAPAN	MIURA	JAPAN	PRODUCTS TANKER	1		1,900	2	-
TSAKOS GROUP	GREECE	KOYO DOCK	JAPAN	PRODUCTS TANKER	1		68,000	4	-
ANDROMEDA SHIPPING	ITALY	JIANGDU SHIPYARD	CHINA	PRODUCTS TANKER	1		46,500	4	-
IINO KAIUN	JAPAN	IWAGI	JAPAN	PRODUCTS TANKER	2		48,000	3	54
SCHOELLER HOLDINGS	GERMANY	HYUNDAI MIPO	KOREA	PRODUCTS TANKER	2		35,000	4	52
VERENIGDE TANKREDERIJ	NETHERLANDS	DAMEN SHIPYARDS	NETHERLANDS	PRODUCTS TANKER	1		9,310	2	-
GOLDEN UNION	GREECE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	PRODUCTS TANKER	1		172,000	4	36
BYZANTINE	GREECE	STX (DAEDON)	KOREA	PRODUCTS TANKER	1		73,000	4	29.5
D'AMATO DI NAVEGAZIONE	ITALY	HUDONG SHIPYARD	CHINA	PRODUCTS TANKER	1		72,000	4	29.5
ELETSON MARITIME	GREECE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	PRODUCTS TANKER	2		70,000	3	64
FORMOSA PLASTICS	TAIWAN	SHIN KURUSHIMA	JAPAN	PRODUCTS TANKER	4		46,000	4	100
TARGET MARINE	GREECE	STX (DAEDON)	KOREA	PRODUCTS TANKER	3		46,000	4	76.5
CLIO MARINE	JAPAN	SHIN KURUSHIMA	JAPAN	PRODUCTS TANKER	2		45,800	4	54
KOYO KAIUN KK	JAPAN	IMABARI SHIPBUILDING	JAPAN	PRODUCTS TANKER	1		45,000	4	-
NIPPON YUSEN KAISA (NYK)	JAPAN	NAIKAI	JAPAN	PRODUCTS TANKER	1		45,000	4	-
IINO KAIUN	JAPAN	SHIN KURUSHIMA	JAPAN	PRODUCTS TANKER	1		45,000	4	-
OVERSEAS MARITIME CARRIERS	-	GUANGZHOU	CHINA	PRODUCTS TANKER	1		38,000	4	-
A. P. MOLLER	DENMARK	GUANGZHOU	CHINA	PRODUCTS TANKER	1		35,000	4	27.5
BROSTROM TANKERS	SWEDEN	SAMHO NEW SHIPYARD	KOREA	PRODUCTS TANKER	1		14,000	3	-
BROSTROM TANKERS	SWEDEN	SAMHO NEW SHIPYARD	KOREA	PRODUCTS TANKER	1		10,000	3	-
TABUCHI KAIUN	JAPAN	MIURA	JAPAN	PRODUCTS TANKER	1		4,999	2	-

New Ship Contracts by Ferliship

Ferliship is a strategic consultancy highly specialized in market researches guided to the shipping industry. For additional information, please contact Ferliship @: Pza. Sta. M^a Soledad Torres Acosta, 2. 2^o C, 28004 Madrid, Spain, Tel. : +34 91 531 01 78 , 689 01 45 66; Fax: +34 91 531 01 78' e-mail: ferlship@ijes.es
(Prices are in U.S. Dollars) (NOTE: Contracts are for February to April, 2002)

OWNER OPERATOR	COUNTRY SO	SHIPYARD	COUNTRY SB	TYPE	No	TEU	DWT	DELIV	PRICE M S
PERTAMINA	INDONESIA	PAL (PERSERO)	INDONESIA	PRODUCTS TANKER	1		3,500	3	-
SEMBCORP LOGISTICS	-	SAMHO NEW SHIPYARD	KOREA	PRODUCTS TANKER	1		3,000	3	-
MAEKAWA KAIUN	JAPAN	HAKATA ZOSEN	JAPAN	PRODUCTS TANKER	1		2,000	2	-
UNIQUE SHIPPING	KOREA	DAEWOO	KOREA	PRODUCTS TANKER	1		105,000	04	38
THENAMARIS MARITIME INC.	GREECE	HYUNDAI MIPO	KOREA	PRODUCTS TANKER	1		37,274	02	24
VIETNAMESE OWNER	VIETNAM	VINASHIN	VIETNAM	PRODUCTS TANKER	1		5,000	02	-
UNKNOWN	UNKNOWN	MURAKAMI HIDE	JAPAN	PRODUCTS TANKER	1		4,998	02	-
MATSUYAMA KAIUN	JAPAN	SHIN KURUSHIMA	JAPAN	PRODUCTS TANKER	1		4,970	02	-
WAGENBORG SHIPPING BV	NETHERLANDS	VOLHARDING	NETHERLANDS	RO-RO	2		9,500	3	53
TOTEM OCEAN TRAILER EXPRESS (TOTE)	US	NASSCO	US	RO-RO	2		25,000	3	350
SHUNZAN KAIUN	JAPAN	KITANIHON	JAPAN	RO-RO	1		7,300	2	-
WAGENBORG SHIPPING BV	NETHERLANDS	FRISIAN	NETHERLANDS	RO-RO	2		10,000	3	-
UND RORO ISLETMELERI AS	TURKEY	FLENSBURGER	GERMANY	RO-RO	2		14,600	5	-
WAGENBORG SHIPPING BV	NETHERLANDS	BODEWES VOLHARDING	NETHERLANDS	RO-RO	2		9,500	3	53
EGYPTIAN GOVT.	EGYPT	ALEXANDRIA SY	EGYPT	RO-RO	1		6,000	04	-
NISA NAVEGACION	CHILE	ASENAV VALDIVIA	CHILE	RO-RO	1		300	02	-
ENTMV	ALGERIA	IZAR	SPAIN	RO-RO / FERRY	2		0	4	117
BAY FERRIES	CANADA	INCAT AUSTRALIA	AUSTRALIA	RO-RO / FERRY	1		0		
KEPCO	IRAN	VYBORG SB	RUSSIA	SUPPORT VESSEL	3				55
SEARLAND SHIPPING	AUSTRIA	SANOYAS CORP.	JAPAN	TANKER	2		113,000		
SEA FORTUNE	CHINA	NANTONG COSCO KHI	CHINA	TANKER	2		300,000	5-Apr	137
IINO KAIUN	JAPAN	ISHIKAWAJIMA HARIMA H.I. (IHI)	JAPAN	TANKER	1		46,000	3	27
IINO KAIUN	JAPAN	IMABARI SHIPBUILDING	JAPAN	TANKER	2		48,000	4	54
NISSHO SHIPPING	JAPAN	HITACHI ZOSEN	JAPAN	TANKER	1		303,000	404	62.9
GOULANDRIS	GREECE	SAMSUNG	KOREA	TANKER	1		160,000	3	45
METROFIN LIMITED	SWITZERLAND	SAMSUNG	KOREA	TANKER	2		155,000	3	91
AUGUSTEA MARITIME	ITALY	NAMURA ZOSENSHO	JAPAN	TANKER	1		106,000	3	40
BP SHIPPING	UK	TSUNEISHI	JAPAN	TANKER	4		106,000	3	148
UNIQUE SHIPPING	HONG KONG	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	TANKER	1		105,000	3	-
VERENINGDE TANKEREDERU	NETHERLANDS	DAMEN SHIPYARDS	NETHERLANDS	TANKER	1			2	-
METROSTAR	GREECE	SAMSUNG	KOREA	TANKER	2		160,000	04	92
NS LEMOS	GREECE	SAMSUNG	KOREA	TANKER	2		159,000	04	100
ATHENIAN SEA CARRIERS	GREECE	HYUNDAI HEAVY INDUSTRIES (HHI)	KOREA	TANKER	2		158,000	04	92
VIKEN SHIPPING	NORWAY	SAMSUNG	KOREA	TANKER	1		155,000	03	-
ANDRIAKI SHIPPING	GREECE	SAMSUNG	KOREA	TANKER	1		150,000	04	-
SEARLAND SHIPPING	AUSTRIA	SANOYAS CORP.	JAPAN	TANKER	1		113,000	04	37
CHINA SHIPPING GROUP (CSG)	CHINA	DAUAN NEW	CHINA	TANKER	2		110,000	04	72
UNKNOWN	UNKNOWN	NAMURA ZOSENSHO	JAPAN	TANKER	1		105,000	03	36
DAICHI CHUO KISEN	JAPAN	NAMURA ZOSENSHO	JAPAN	TANKER	1		105,000	04	-
DIAMANTIS LEMOS	UK	HUDONG SHIPYARD	CHINA	TANKER	2		72,000	03	60
UNKNOWN	UNKNOWN	HIGAKI ZOSEN	JAPAN	TANKER	2		8,500	02	-
ENEAM MANAGEMENT	GREECE	ROUSSE SHIPYARD	BULGARIA	TANKER / ASPHALT CARRIER	4		5,000	4-Mar	60
MITSUBI O.S.K. LINES (MOL)	JAPAN	KANASASHI CO.	JAPAN	VEHICLE CARRIER	3		16,000	04	-
VAPORES SUARDIAZ	SPAIN	BARRERAS	SPAIN	VEHICLE CARRIER	1		4,500	03	-

(Continued from page 62)

faced with the radar, ARPA, ECDIS, or with a computer displaying electronic nautical charts, can present a complete traffic situation that has been transmitted to the vessel from the VTS center. The VTS center can also assign and switch data transmission channels on different vessels in order to more effectively control the data exchange in a busy port.

Having examined the capabilities of automated vessel tracking and identification systems it is readily apparent that a Crisis Management System can integrate well with a VTS that incorporates an AIS capability. The AIS includes more information about the vehicle/vessel than simply its current position. This additional information can be useful when a Crisis Management System is employed because additional data can be transmitted and displayed with the tracked icon or radar target such as the resources:

- Mission, e.g., booming, containment, recovery, search, firefighting
- Operational Group Assignment, e.g. "Beach Cleaning Task Force", "Division One", "Protective Booming Workgroup", "Search and Rescue Group"
- Status information, e.g. deploying, enroute to work area, transferring oil, skimming, etc.

System integration of a CMS with AIS will include the ability to capture data that is received from AIS-equipped vessels. This information must be entered into the CMS database in order to maintain a record of resources deployed, costs incurred, activities, down time, operational assignments, and other factors that are essential to response operational planning, logistics and administration.

The mobilization of a Crisis Management System in an area where an AIS-based Vessel Traffic Service is in operation will be successful if integration of the systems is possible, and if the types of vessels that respond to a crisis or emergency situation are being tracked by the VTS.

The CMS requires timely information on the locations of the principle assets that will respond to marine casualties, oil and chemical spills, or to support major harbor festivals. This includes oil spill recovery vessels, fireboats, tugboats, barges, law enforcement vessels, and workboats of all descriptions.

While international requirements for installing AIS equipment on commercial ships will be phased in over a six-year period beginning in 2002, this will only apply to passenger vessels and cargo carrying ships over 300 GRT. The types of vessels that will be employed in incident response generally do not fall into the categories that will be required to be

equipped with AIS transponders as part of their SOLAS equipment.

Part of the preparedness for incident response will be the ability of local port authorities and emergency management agencies to quickly fit out response vessels with AIS equipment that is compatible with the local network, i.e., the VTS-monitored network. This is in fact

a reasonably easy task given that portable, carry-aboard transponders exist that includes all of the necessary components.

However, as more vessels are equipped with GPS or DGPS receivers, and data exchange interfaces are standardized between shipboard equipment, fitting out a vessel for AIS participation

may only require the addition of the AIS transponder and a VHF transceiver that is capable of digital data transmission. Interconnection with the vessel's GPS receiver is possible with a standard NMEA-0183 interface.

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Northrop Grumman Delivers Second Double-Hulled Tanker



Northrop Grumman Corporation's Ship Systems sector delivered the tanker Polar Resolution in a brief ceremony at its Avondale Operations in New Orleans, La.

Polar Resolution is the second of five 140,000-dwt Endeavour-class double-hulled crude oil carriers Northrop Grumman Ship Systems is building for Polar

Tankers, Inc., a wholly owned subsidiary of Phillips Petroleum Company.

The Endeavour-class tankers are the first crude oil carriers being built for the Alaskan trade in compliance with the federal Oil Pollution Act of 1990. They meet or exceed existing and proposed environmental regulations and will set new standards for innovation and environmental protection.

The crude carriers are 895 x 152 x 86 ft. (272.7 x 46.3 x 26.2 m). The ships will hold more than one million barrels of cargo at full capacity.

Construction continues on the fourth ship, Polar Adventure, and a keel-laying ceremony for the fifth

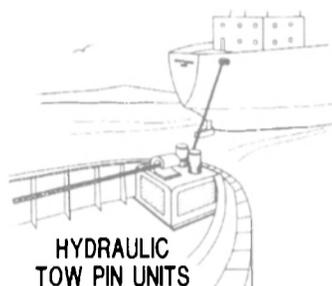
ship in the series, Polar Enterprise, was completed in April. Polar Resolution is the sister ship of Polar Endeavour, which was delivered last year.

The ships are powered by two, MAN B&W 7S50 MC-C, 15,000-BHP, slow-speed diesel engines turning twin shafts with four-bladed, controllable reversible-pitch propellers measuring 19 feet in diameter.

Polar Resolution's bridge incorporates electronic chart display and information systems, an advanced navigation and tracking system, and global marine distress and safety system.

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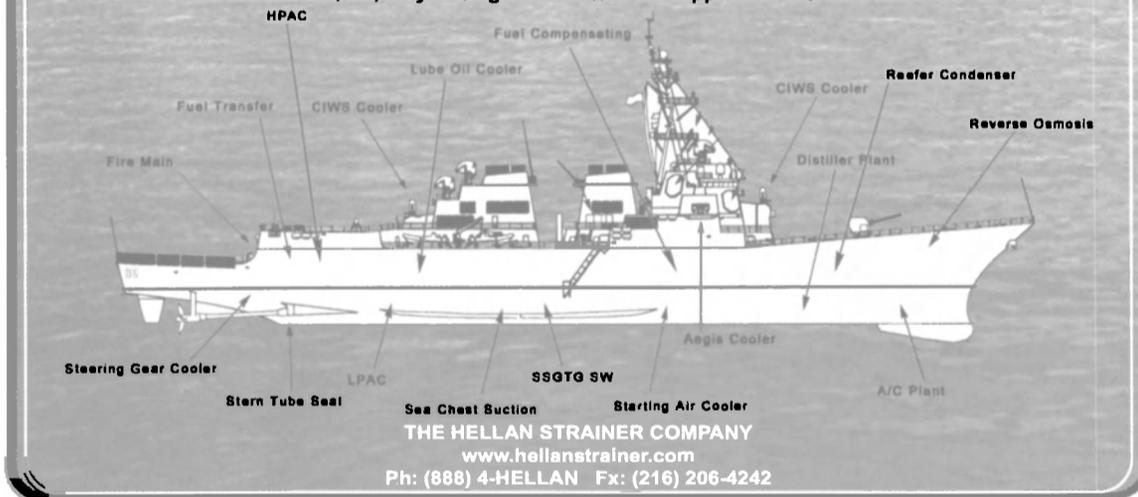
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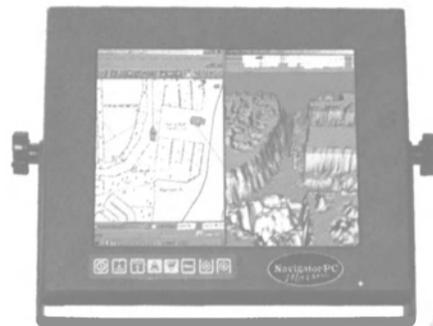
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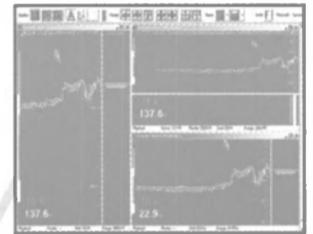
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TOTAL INTEGRATION

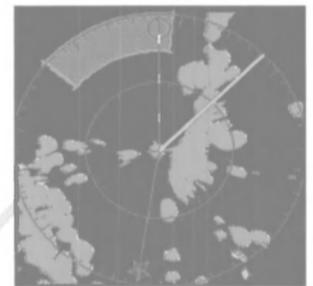
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- CONTOUR PROFESSIONAL
- VIDEO
- GPS



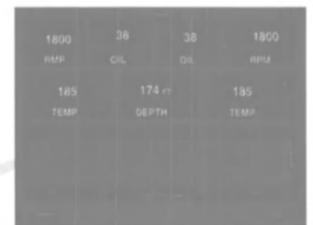
High-Bright LCD Marine Display
(Touch Screen)



3.2 KW
Fish Finder/Bottom Sounder



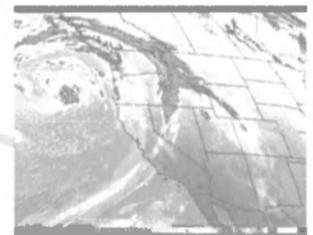
Digital Radar



Digital Engine Gauges
(Optional)



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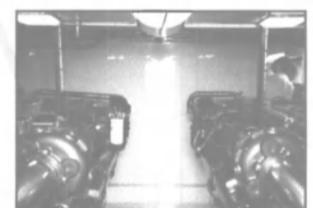
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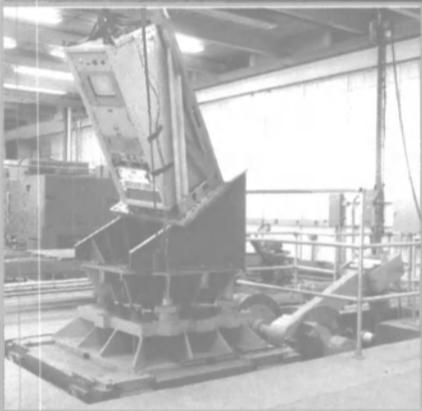
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PIII850	256 MB	20 GB	4	10/100	2	12 Volts	10.36x11.5x2.41	1 Year
Radar	Array	Rotation	P.P.O.	PC	IF, CF	Voltage	Construction	Warranty
Digital	3.5'	24 RPM	4 KW	70 Watts	60 Mhz	12/24	IPX5	1 Year
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Thordon Makes Inroads With COMPAC Shaft Bearing

Thordon Bearings has supplied its COMPAC water lubricated propeller shaft bearing systems for various commercial newbuild and conversion vessels. Known as the company's high performance water lubricated bearing system for blue water operation, COMPAC is designed for smooth start-up and long bearing wear life. It eliminates stern tube oil, as seawater is used to lubricate and cool the bearings.



Recent clients include Gypsum Transportation of Bermuda, which has equipped its 49,270-dwt bulk carrier, Gypsum Centennial, with the pollution-free COMPAC system. Finter Group of the Netherlands has also chosen COMPAC bearings for a trio of 8,850-dwt multi-purpose dry cargo/container vessels, Fintersun, Finterstar and Fintersky - all of which are being built at Ferus Smit shipyard in the Netherlands. John Crane-Lips supplied the bearings as part of their propulsion system.

COMPAC also holds a presence within the passenger vessel industry, having garnered orders from Mitsubishi Heavy Industries for two new cruise vessels being built for Princess Cruises at the yard's Nagasaki location in Japan. The bearings have been fitted on three other Princess ships as well: Star Princess, which was delivered by Fincantieri in January; Grand Princess delivered in 1998; and Golden Princess, which went into service in 2001.

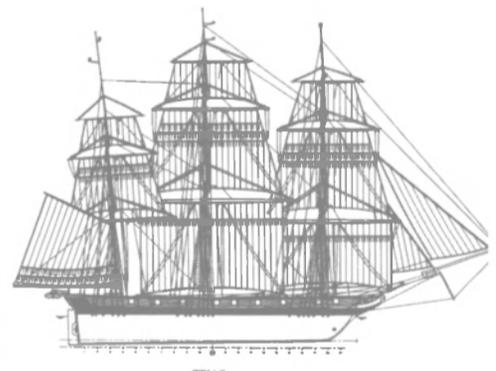
Italy's Grimaldi Group has also specified Thordon's COMPAC on its new 8,000-dwt, 3,000 passenger fast ferry, La Superba, which was built by Nuovi Cantieri Apuania in Italy. The 67,000 kW, twin-screw vessel recently completed sea trials and is scheduled to enter service shortly. The 29-in. bearings were supplied for the vessel via propulsion system Rolls Royce, Italy.

The COMPAC system has moved into celebrity status with an appearance onboard Aristotle Onassis' famed 325-ft. (99-m) yacht, Christina O, which was refurbished at Victor Lenac Shipyard in Croatia last year.

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Hike Metal Keeps Busy With Patrol Boats, Tall Ships

Hike Metal Products of Wheatley, Ontario, Canada is undertaking a variety of projects, namely a coast guard boat, patrol boat and a replica battleship from the War of 1812. Known as HMS Detroit, this vessel, which was built in Her Majesties Naval Yard in Amherstburg, Ontario for the war effort, experienced a relatively short life in action before the war ended. Measuring (41 m), the new replica is being built with a steel hull and authentic oak topsides, which will include the cabin structure, bulwarks and decks.



Certified by Transport Canada Ship Safety to carry passengers, the vessel will require more than 200 tons of ballast to be placed in the keel area — comprised of railway iron and cement. The vessel will also be fitted with not only fully square rigged masts and sails, but twin screw diesel propulsion that will enable it to sail or motor from port to port throughout the Great Lakes and St. Lawrence River.

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Halifax Lays Keel For First of Two OSV's

Halifax Shipyard has laid the keel for the first of two large Offshore Supply and Anchor Handling Vessels for Atlantic Towing Ltd.



Known as hulls 88 and 89 for the yard, the vessels have been identified as UT 722 L type, and are similar to Atlantic Eagle and Atlantic Hawk - both of which were built at the yard in 1999. They are currently deployed in support of the Canadian East Coast offshore oil industry.

Measuring 262 x 59 x 22 ft. (80 x 18 x 6.6 m), the vessels will have four main engines, each at 4,000 kW, which will give them a maximum speed of 17+ knots, and a bollard pull of approximately 180 tons. Designed to carry more than 2,700 tons of cargo, mixed between containers on deck and liquids in the tanks, the vessels will be able to provide an onboard survivor capacity of 300 persons in a rescue and stand-by mode.

Deep water anchor handling, and towing duties will be conducted via the 500-ton pull, double drum, winch. Among the largest available in the world to the OSV fleet, these winch drums can load more than 4,000 m of 3.75-in. diameter steel wire rope.

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Owners Approve White Rose Oilfield

Husky Oil Operations Limited, operator of the White Rose oil field project and its co-venturer, Petro-Canada have decided to proceed with the development of the White Rose oilfield located offshore the East Coast of Newfoundland and Labrador, Canada.

The White Rose development plan is focused on a purpose-built Floating Production Storage and Offloading (FPSO) vessel with a peak production rate of approximately 100,000 bpd. Current plans provide for a total of 19 to 21 wells to recover between 200 and 250

million barrels of oil over a 10- to-15 year period. Peak production is expected to be approximately 92,000 bpd sustained for about four years. It is anticipated that the field will achieve first oil by the end of 2005.

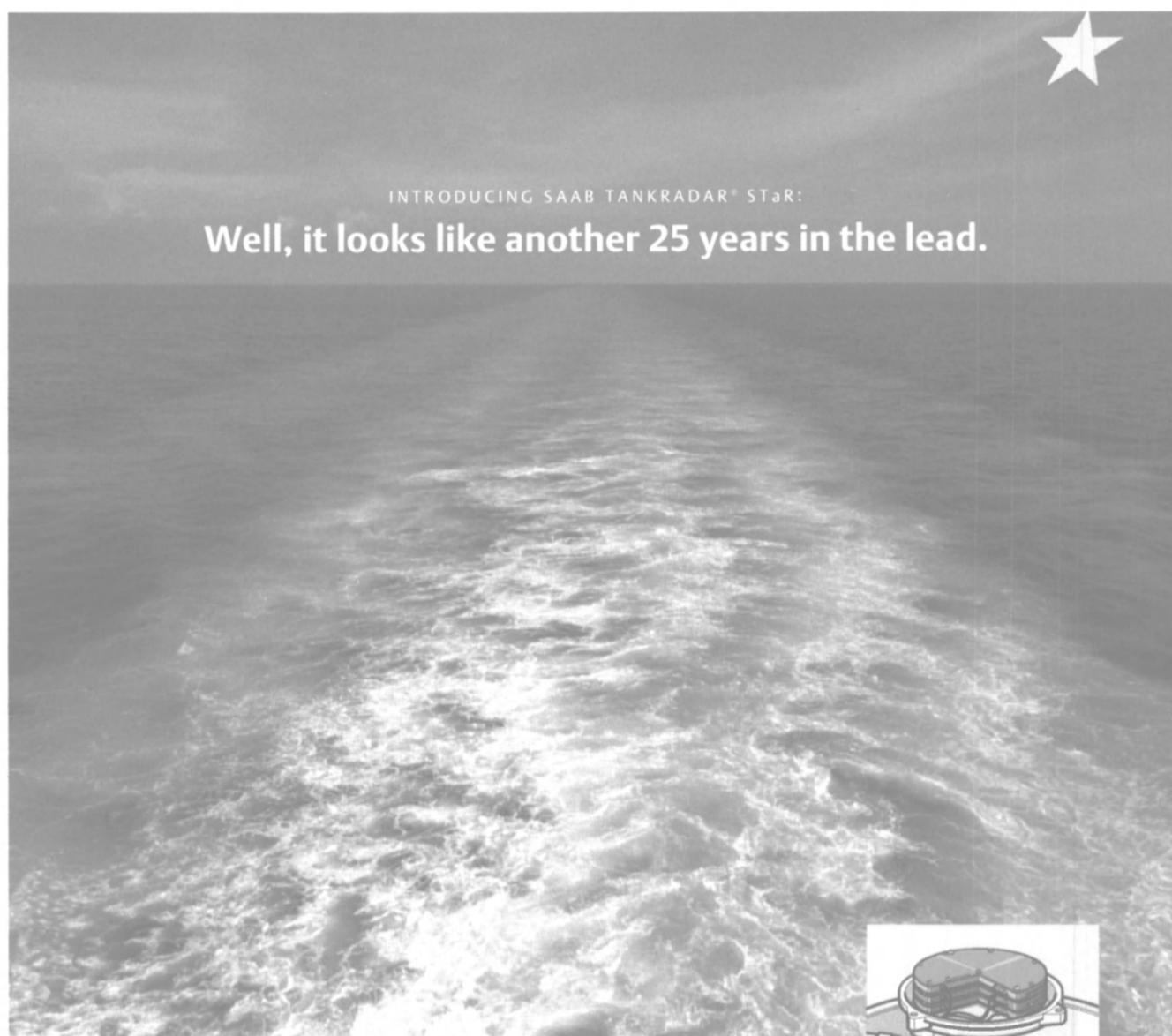
Development costs will be approximately \$1.4 billion with costs to first oil being less than \$1.2 billion. Moreover

full field operating costs are expected to be in the order of \$1.2 billion over the 15-year life of the field. During the peak production years, operating costs are expected to average approximately \$2.09/barrel.

The operators have executed an agreement with Aker Maritime Kiewit Contractors (AMKC) for the completion of

the topsides fabrication. The awarding of the other main contracts will be finalized and announced shortly.

Excavation of the subsea Glory Holes is scheduled to begin in the field in the third quarter, 2002, and development drilling is expected to commence in the first half of 2003.

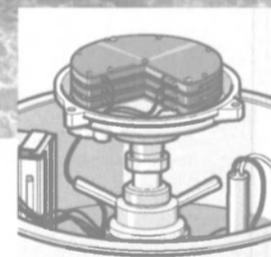


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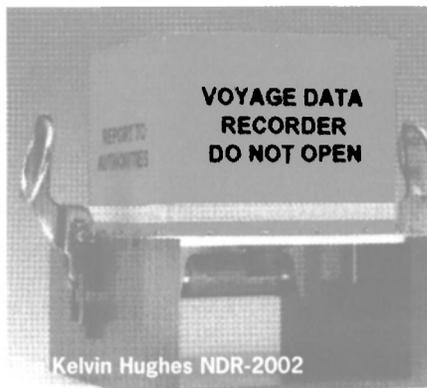
A closer look at the electronics inside the tank gauging unit. The new STaR 3-in-1 solution integrates Level Gauging, High Level Alarm and Overfill systems in a single unit—designed as independent measuring channels, galvanically separated and intrinsically safe. The system is approved according to international standards and class certificates.

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SHAPING THE FUTURE IN TANK GAUGING

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The **Kelvin Hughes NDR-2002** is designed to exceed the IMO Performance Standard A.861 (20) for Shipborne Voyage Data Recorders (VDR) and IEC 61996, in carriage requirements. The VDR collects data from the various sensors on board the ship and stores the information digitally, in an externally mounted Crash Survivable Module (CSM). The CSM is a tamper-proof unit designed to withstand the extreme shock, impact, pressure and heat, which could be associated with a maritime incident. The CSM may be retrieved from the vessel and the stored data replayed by the authorities for investigative purposes.

Samsung Heavy Industries (SHI) and **Echelon** announced jointly the certification of SHI's LonWorks Voyage Data Recorder (VDR) by Det Norske Veritas (DNV). DNV approval is the last hurdle for receiving a Wheel Mark certification — a European maritime equivalent of the CE Mark. DNV is also able to grant CE Mark certification. VDRs are a key entree into the lucrative ship control system market for Samsung Heavy Industries.

IMO established a regulation stipulating that by July 1, 2002, all new ships must be equipped with Voyage Data Recording systems. Additionally, existing ships that use European ports must have VDRs. All passenger ships, including RoRo and ferries, are considered vessels with a priority need for VDRs in light of tragedies that have resulted in loss of life in the passenger ferry industry.

Sperry Marine won multiple type approvals from classification societies and national authorities for the VoyageMaster Voyage Data Recorder (VDR) system. The type approvals certify that the VoyageMaster system meets or exceeds all requirements for shipboard VDR equipment to meet the International Maritime Organization (IMO) carriage requirements, which come into effect July 1, 2002.

The VoyageMaster VDR, similar to an aircraft "black box," records vital information concerning the ship's position, movement, physical status and command and control for the period leading up to and following an incident.

Transas has added two new hardware/software products to its portfolio,

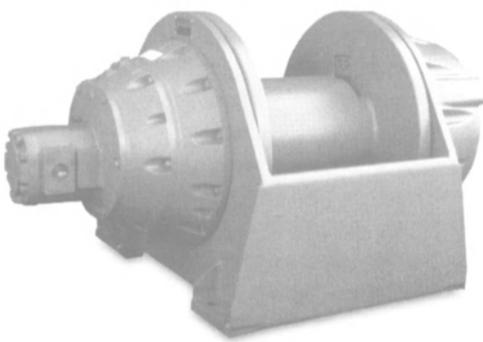
the Voyage Data Recorder, Navi-VDR, and Automatic Identification System, AIMS MIII. The former allows the recording, compressing, storage and replaying of ship's data as required by existing IMO regulations for such equipment, including IEC6196. The Navi-VDR package consists of three modules including a System Interface Unit, a

Data Management Unit and a Hardened Storage Unit. An optional Replay facility can be supplied to complement the equipment.

For additional information please circle the corresponding number on the Reader Service Card, or log onto www.maritimereporterinfo.com:

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Lift Lower Pull Position



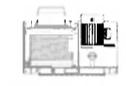
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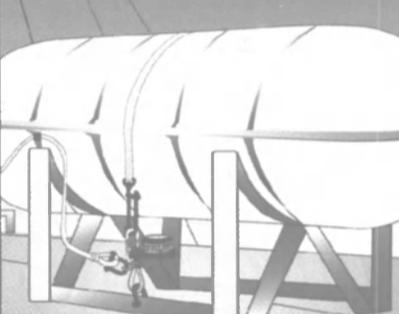
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Sperry Marine Introduces New River Radars

Sperry Marine has unveiled a new generation of flat-screen river radars designed to provide significant savings in size and weight for installation in a small, crowded wheelhouse.

The new MK6217/9 River Radar, which meets all Rhine River Radar spec-

ifications for European inland waterways, features a high-resolution color 18.1-in. (46 cm) TFT flat panel display. The flat-screen display can be table-, bulkhead-, deckhead- or console-mounted. The processor unit measures 3.5 x 9.3 x 11.5-in (90 x 235 x 293 mm). The system comes with a choice of 7-ft (2.1m) or 9-ft (2.7m) antenna with two

menu-selectable turning speeds.

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Saab TransponderTech Gets First AIS Approval

Saab TransponderTech is claiming the world's first Automatic Identification System (AIS) type approval, by German

test house "Bundesamt für Seeschifffahrt und Hydrographie" (BSH). AIS, the system made mandatory by International Maritime Organization (IMO) in SOLAS chapter V, regulation 19, has been given its first type approval. AIS is the new system that many see as the most important revolution in maritime safety and security since Radar and GPS were introduced.

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Leica Marine's DGPS/AIS System Is Type Approved

Leica Marine's MX 420/8 DGPS/AIS system has been type approved by Bundesamt für Seeschifffahrt und Hydrographie (BSH). The German type approval signifies that the Leica product complies with the IMO MSC.74 (69), ITU-R M.1371-1 and IEC 61993-2 standards for shipborne automatic identification systems (AIS) equipment.

The MX 420/8 was introduced by Leica last year as a fully integrated solution to marine DGPS and AIS requirements. The system combines the industry's most accurate marine GPS receiver, a built-in dual-channel DGPS beacon receiver and an IMO-compliant AIS transponder system, with a single control and display unit.

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Transas Installs VTS System

In May 2002, Transas installed its Navi-Harbor 3000 VTS systems in two Moroccan ports, Jorf Lasfar and Mohammedia. Transas has won these orders following the success of Soremar, its local distributor in Morocco and North Africa, in the international



tender. The VTS system configurations ordered for the both ports are identical and comprise in each case a radar sensor with a Transas ORS-3 radar processor, Transas VTS Server used as Master operator station and one full-functional Operator Display Unit Workstation.

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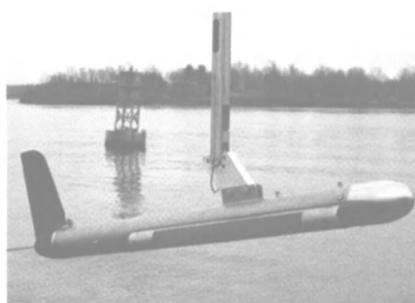
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incorporating designs from Klein's field proven Model 5000 Multi-Beam Focused Sonar system. The system, which is completely software-driven, features superior imagery at long ranges, dual (100 & 500 kHz) frequencies, a standard depth rating to 4,921 ft. (1,500 m),

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Sperry Marine Introduces Steermaster

Sperry Marine introduced the marine industry's first network based ship steering and heading control system with self-tuning autopilot technology.

The SteerMaster control system is designed to simplify installation on all types of ships to all classification society requirements, while providing for easy future expansion and upgrades in the field. The system's network architecture repeatedly provides 20 to 25 percent cost savings in cabling and installation compared with traditional steering systems with point-to-point wiring.

The heart of the system is the Navinet 4000 network, which is based on industrial Controller Area Network (CAN) technology. It is one of the first marine electronic systems to implement the new U.S. National Marine Electronics Association (NMEA) 2000 data communications standard. NMEA 2000 is a bi-directional multi-transmitter, multi-receiver serial data network interface that permits multiple devices to share data over a single signaling channel. It was released by the NMEA in 2001.

The network is built around a multi-purpose steering control interface unit, which provides simple rail-mounted plug connections to all units on the Navinet 4000 bus.

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Klein Launches Model 3000 Side Scan Sonar

Klein Associates, of Salem, N.H., has begun full-scale production of the advanced Model 3000 Side Scan Sonar. The all digital, single-beam system is a result of the extensive application of new technologies used to develop the transducers and circuitry, along with

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ns In Morocco Ports

The systems supplied provide target tracking within the area extending from 20 n.m. outside the port to ship berthings on the port basin. The open-architecture configuration of the Transas system allows for its expansion in the future to include extra sensors



and operator's stations. External VTS data users, such as Customs Service, Port Police and shipping agents can be connected to the system on a server/client basis.

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Ship Repair

Titan Re-Floats Maersk La Guaira

On March 7, 2002 the 19,520-dwt, 515 x 78 x 42 ft. (157 x 23.7 x 12.8 m) Maersk La Guaira, fully laden with containers, lost power and ran aground while entering Guayaquil Harbor in Ecuador.

Titan Maritime immediately responded with a two-man survey team



Titan's team removes containers off Maersk's La Guaira.



The team that responded to the vessel's grounding.

from Panama, who boarded the vessel for a damage survey and to create a salvage plan. With the plan approved by owners, Titan was awarded the re-floating contract and mobilized an additional five man team from their Fort Lauderdale, Fla. headquarters and Brazil offices.

Using locally contracted vessels, Titan lightered 46, 40-ft. refrigerated containers from the vessel for a total of 900 tons.

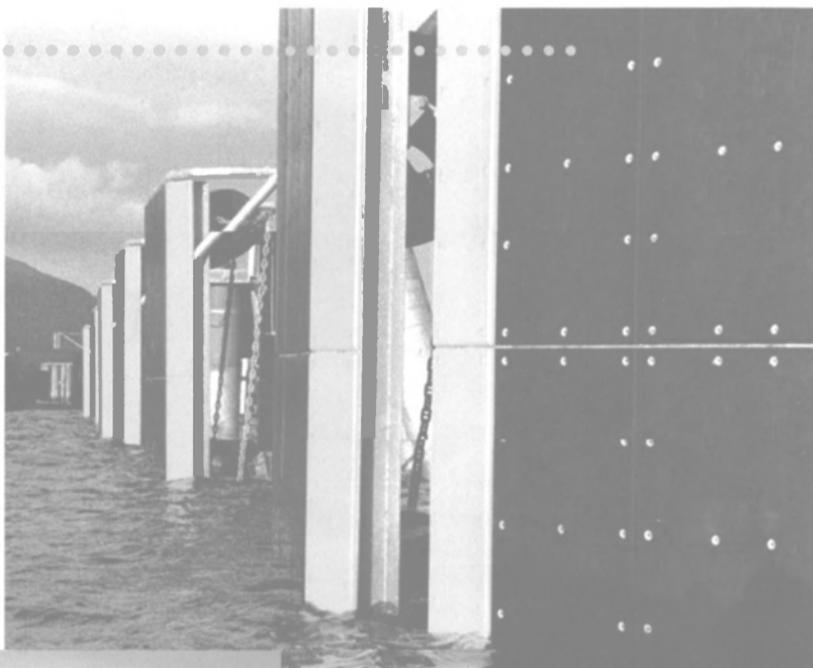
As the cargo was removed, the weight was replaced with ballast water to ensure the vessel remained in place until a controlled re-floating operation commenced.

With local tugs in place, Titan removed ballast and re-floated the vessel on the evening tide of March 15, 2002.

The re-floating was a delicate operation that required precision to ensure the vessel did not contact rocks in the area.

The vessel was delivered to owners, safely afloat, in Guayaquil anchorage four days after contract was awarded to Titan.

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Austal USA Enters Repair Market

Following an accidental collision by a large OSV while in port, the Seba'an was taken to the Austal USA facilities in Mobile, Ala., for an extensive but quick repair.

The damage was to the starboard side at window height breaking all of the windows and damaging some of the fitout and internal structure on that side of the boat.

Originally sold to a client in Japan as the passenger ferry "Speeder" by Austal Ships seven years ago, the ferry was purchased by Otto Candies, LLC, in December 1999, and renamed "Seba'an".

Bender Shipbuilding in Mobile converted the ferry to a crew/supply vessel by attaching a platform to the back of the boat for the loading and offloading of supplies and passengers and adding crew quarters inside.

After the collision in Mexico, Otto Candies, LLC, contracted Austal USA to replace the broken windows, replace some sections of the superstructure side shell and framing, remake the mid ship boarding doors, rebuild most of the internal walls on the starboard side and paint.

The repairs were completed in short order and the Seba'an was last month on its way back to Mexico just 3.5 weeks after its arrival in Mobile.

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Maritime Industry Remembers Nealis

On March 24, 2002, **Charles Nealis** passed away at the age of 76. Nealis' accomplishments were the co-conception, testing and first at sea of a commercially viable demonstration of a

McCormack Lines.

Subsequent to taking a shoreside job, Nealis rose to become a senior surveyor with the American Bureau of Shipping, later joining Seatrain Lines (Hudson

Waterways Corporation) as a Senior Port Engineer. He worked his way up to Vice President of Engineering and Operations.

In the late 1970's, Nealis, along with the principles of Seatrain Lines, formed a new company called Bay Tankers, where Nealis remained until 1993, when

he retired from the firm as Vice President of Engineering and Operations.

Noted for his wealth of knowledge within all facets of the shipping industry, Nealis continued his efforts within the maritime industry following his retirement as a Maritime Consultant to various shipping companies.



Charles "Charlie" Nealis will be remembered for his wealth of maritime industry knowledge.

blended residual fuel system for aero derived gas turbine engines.

In addition, he served as the Owner's Representative for the conversion and operation of the 112,000-ton super-tanker, S.S. Manhattan, which was refitted to break ice during its momentous passage across the top of North America in the 1970's. The S.S. Manhattan now has a display commemorating these achievements in the Smithsonian Institute's Museum of History.

Nealis had approximately 21 conversions of both Commercial and Military vessels to his credit, including turning old WWII vessels in to modern Commercial vessels. These included heavy lift, RoRo, container ships, bulk carriers, and tankers.

He was known for his resourcefulness, ability to cut through red tape and deliver innovative project completions, under budget and often ahead of seemingly impossible schedules. Nealis achieved an exemplary working relationship with the U.S. Navy and their Military Sealift Command during both the Vietnam War and War with Iraq, receiving numerous plaques and commendations for his efforts.

What could probably be marked as Nealis' greatest achievement was the reactivation of the Brooklyn Naval Shipyard during the mid 1970's, training unskilled minority labor to build four ULCC Tankers, TT Bay Ridge, TT Brooklyn, TT Stuyvesant, and TT Williamsburg. The Brooklyn Naval Shipyard had been inactive since shortly after WWII.

During WWII, Nealis joined the Merchant Marine as a seaman and by age 22 had worked his way up to Chief Engineer, sailing for Robin Lines and Moore

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Brookfield

Brookfield Engineering has released its new 70 page full color catalog that features expanded sections on Brookfield Laboratory instruments, process instruments, Brookfield Systems for viscosity measurement and accessories. The new 2002 edition also provides information on Viscosity Testing Service, Methodology Consulting Service on Viscosity Test Development, and Instrument Calibration and Certification Services.



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Magellan

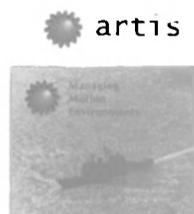
Offering both ruggedness and portability in a marine GPS receiver, Magellan's new MAP 330M is an excellent navigation tool on the water or on land. The PC-compatible MAP 330M offers mariners a 7 MB downloadable memory, advanced features and a 9-MB, built-in database with thousands of nav aids, coastline details and road maps, all in a single handheld device that floats. For a higher level of versatility and navigation power, the MAP 330M is a must-have for anglers and boaters alike.



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Noco Marine's Power Control System (PCS) is geared to solve battery problems, improving starting low-voltage conditions, and permitting control of batteries from anywhere on a boat or ship, resulting from a safer electrical system. The brainpower of the PCS is a rugged microprocessor that has proven itself in many demanding and harsh environments and applications.



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Eagle Electronics

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



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Furuno

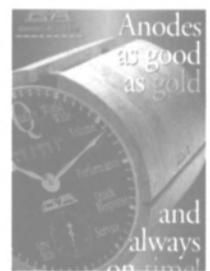
Furuno has made an addition to its popular NavNet series of Radar/Chart Plotters, the 1953C & 1953C/NT. Designed for all types of vessels, the 1953C series bundles high-power X-band radar performance with the latest NavNet technology. Built to commercial-grade standards for rugged reliability, the 1953C is a 12kW Radar with a 1/8 to 72 n.m. range. It is available with either a 4 ft. or 6 ft. open array antenna.



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Galvotek

Galvotek Alloys, Inc. has been the leading innovator in the Anode industry since 1984. The company has been providing satisfied customers with the highest quality Aluminum, Zinc and Magnesium Anodes on the market. Galvotek's state of the art laboratory and dedicated staff guarantee that all of your quality and design requirements are met on time and at a fair price.



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Lowrance

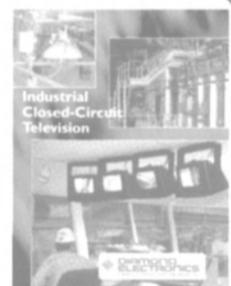
Lowrance Electronics, Inc. is a designer and manufacturer of Sonar, GPS, Mapping and Aviation instruments. Lowrance sonar products visually communicate underwater information and are principally used by sport fishermen as fish finders and by recreational boaters as navigational and safety devices. GPS receivers are used by boaters for navigation, as well as by hunters, hikers, backpackers, pilots and others to record and return to the precise location of areas of interest.



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Inmarsat

Inmarsat Ltd., has approved Fleet F77, its new maritime Mobile ISDN and Mobile Packet Data service, for commercial service. Stations have been authorized in all four ocean regions. Fleet F77 combines the high quality and speed of a 64 kb/s Mobile ISDN service with the world's first global, high-speed, maritime Mobile Packet Data service via satellite, to deliver e-mail, secure Internet and intranet access and voice, plus a choice of two fax services, making it possible to have a truly mobile office at sea.



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JRC

JRC's RADAR1800 is a 2kW transmitter with a low noise receiving circuit which provides equal performance to other 4kw radar models. It features a 6.5 in. bright color TFT LCD display and is viewable in sunlight. It also is a Plotter with a digital electronic chart system, using C-MAP NT micro charts, capable of worldwide standard chart. The plotter picture and radar picture can be viewed together on a split screen.



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Harris Communications

Harris Corporation is an international communications equipment company focused on providing product, system, and service solutions for commercial and government customers. The company's five operating divisions serve markets for microwave, broadcast, network support, secure tactical radio, and government communications systems. With more than 10,000 employees, including 4,000 engineers and scientists, Harris is a technology powerhouse.



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Ritchie Navigation

Ritchie has introduced the Trek compass series designed to compliment the style of today's runabouts, center consoles, ski boats, flats boats and bass boats in the 20-ft. range. The Trek is available in either bracket or surface mount and in three color combinations of black, gray and white. Ritchie Navigation is a manufacturer of magnetic marine compasses. Currently the company offers over 100 compass models for power and sail boats as well as commercial, work and fishing boats.



Circle No. 114
www.maritimereporterinfo.com

LandSea Systems

LandSea Systems introduces the new Capsat Fleet77. The Fleet77 consists of a transceiver, antenna and handset w/cradle providing mariners with 64K connections to the Internet, the ability to network with your companies Intranet, high quality voice communications and high-speed fax in a smaller system than previously available. The system also supports shipboard computer networks.



Circle No. 115
www.maritimereporterinfo.com

ACR Electronics

ACR Electronics, Inc., a Chelton Group Company, designs and manufactures a complete line of safety and survival products including EPIRBs, personal utility lights, marker lights, radios, SARTs and safety accessories. The quality systems of this facility have been registered by UL to the ISO 9000 Series Standards. Recognized as the world leader in safety and survival technologies, ACR has provided safety equipment to the aviation and marine industries as well as to the military since 1956.



Circle No. 150
www.maritimereporterinfo.com



PLASTIC PILINGS INC.

STRENGTH & INNOVATION



Plastic Pilings, Inc. (PPI) is a world leader in the development of recycled composite plastic and steel or fiberglass reinforced pilings, lumber and camels. PPI's ability to adjust the core strength provides for a wide range of physical properties.

All PPI products are manufactured using a patented method to provide for a marine product that is guaranteed against UV deterioration and corrosive intrusion.

Plastic Pilings, Inc., through their UK agent Barry Rising with Silver Fox & Associates, have recently supplied recycled plastic fender piles, wales and vertical fender planking to replace damaged hardwood fenders along the North West Wall Jetty at the Portsmouth Naval Base. This latest contract is part of a long-standing initiative by the British Royal Navy to find a reliable replacement to the hardwoods historically used for heavy-duty quayside fenders.

Contact PPI for your design or specification questions.



Plastic Pilings, Inc. 1485 S. Willow Ave. Rialto, CA 92376 USA 909-874-4080 Fax: 909-874-4860 www.plasticpilings.com

Circle 291 on Reader Service Card or visit www.maritimereporterinfo.com

Products

CDI

CDI Corp. helps clients in targeted vertical markets improve their profitability and efficiency by providing professional project outsourcing, specialized temporary staffing and permanent placement, allowing them to focus on their core competencies. CDI has more than 50 years of experience and an extensive network of offices, technical professionals and recruiters. CDI Corporation is a provider of engineering, information technology and workforce solutions.

Circle No. 117
www.maritimereporterinfo.com



Machine Support

Vibracon SM elements provide an ideal foundation for machinery. The product, patented by Machine Support, permits quick and extremely accurate alignment. In many cases, costly machining of foundations can be avoided. Vibracon SM is widely used for mounting various types of machinery aboard seagoing vessels and the product has a broad range of uses in industry. It has been approved by leading classification societies and machine suppliers.

Circle No. 118
www.maritimereporterinfo.com



Diamond Power

Diamond Power Specialty Company introduces the new HydroJet boiler cleaning system. One HydroJet device can replace a complete furnace wall of sootblowers, and is designed to clean division, furnace, and wing walls. It can even clean across the entire width of the furnace inside many utility boilers. The HydroJet boiler cleaning system sets a new standard for precision, reliability and water efficiency.

Circle No. 119
www.maritimereporterinfo.com



Jewell Instruments

For over 60 years, Jewell Instruments and predecessor companies have provided high quality panel meter solutions for a wide range of aerospace, industrial and commercial applications. Jewell and Modutec are some of the most trusted brands in the industry. Jewell Instruments can provide a proven, quick and cost-effective solution to your panel meter needs.

Circle No. 120
www.maritimereporterinfo.com



Imperial International

The founders of Imperial International, Inc. have been in the marine industry for decades, as manufacturers of the Imperial Immersion Suit. We are steadfast to ensure the protection of individuals within the marine industry. One of the best features of our suit is the quick donning and sizing of our suits. Imperial also offers certified service stations around the world.

Circle No. 121
www.maritimereporterinfo.com



RV Triton

RV Triton, the world's largest motor powered trimaran, is owned by QinetiQ plc. With its high top speed, wide beam and fitted active fin stabilizers, it is a flexible and adaptable trials vessel.

Circle No. 122
www.maritimereporterinfo.com



H.O. Bostrom

As a provider of seating for over 50 years, H.O. Bostrom is one of the most respected names in the industry. The SeaPost series seats are "marinized" to withstand their environment. Call us today for more information about our complete line of helm and passenger seating.

Circle No. 123
www.maritimereporterinfo.com



Meltric Corporation

Meltric Corporation's products are designed to improve the problems posed by standard pin and sleeve technology. Utilizing a silvernicket contact similar to contacts found in a motor starter or other switching equipment, Meltric products developed as a combination plug, receptacle, and a switch.

Circle No. 124
www.maritimereporterinfo.com



Thordon Bearings

Thordon Bearings, a pioneer in the development of pollution free bearing designs offer a choice of sealed or open, water lubricated propeller shaft bearing systems. The Thor-Lube sealed stem tube system combines proven XL bearings with Thor Lube, a water soluble, non-polluting lubricant. Thordon's open water lubricated system choices are COMPAC, XL and composite; each offering specific advantages in different water environments.

Circle No. 125
www.maritimereporterinfo.com



Seafire

In order to help a boater protect investments, Sea-Fire now offers its Stinger FT Series FM-200 fire suppression systems. Designed for critical areas in need of fire protection, such as bow thrusters, generator and small electrical enclosures, consoles and fuel storage spaces, Stinger FT systems feature a unique method of extinguishant release. They incorporate high-tech polymer tubing that ruptures when the proximal temperatures rises above 175 degrees. The rupture forms a small nozzle that directs the FM-200 agent at the source of the fire.

Circle No. 126



Maritime Associates

Maritime Associates has the capabilities to supply signage needs, including complete shipboard conversion projects and sign upgrading services. They are a manufacturer with the flexibility to produce signs, cost-effectively in the U.S., in a wide range of materials, mounting and installations methods. Order online, or contact them for a free CD product guide. See their new product lines, including their innovative photoluminescent material, bright white, and the SlimLine Low Location Lighting System.

Circle No. 127
www.maritimereporterinfo.com



Geislinger

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

Circle No. 128
www.maritimereporterinfo.com



Desmond-Stephan

Desmond-Stephan's Swirl-Off is a tool that can remove paint, rust, scale and other hard coatings from almost any hard surface. Features for this tool include: built-in safety guard, balanced design for easy operation, operates underwater, environmentally safe, fits 5/8 in. - 1 1/2 in. shaft, no lubrication or maintenance required, drive adaptors for 3/8 in. or .5 in. drill chuck available and cutters for all models are interchangeable and self-cleaning.

Circle No. 129
www.maritimereporterinfo.com



Climax

Climax's line of more than 25 machine tools provides effective solutions for repairs at sea and valuable alternatives to costly off-site machining in ship repair or refurbishing operations. Contact Climax for complete information on these tools and an unlimited range of custom tool designs for unique repair applications.

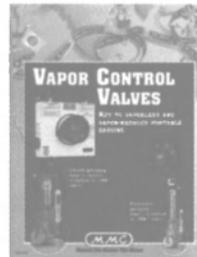
Circle No. 130
www.maritimereporterinfo.com



MMC International

MMC International Corp. is the leading manufacturer of "Intrinsically Safe," UTI portable liquid level measurement devices, product samplers, vapor control valves, liquid level alarm systems, CL Products (quick connect couplings and deck covers) for the petroleum and chemical marine transport and land-based industries.

Circle No. 131
www.maritimereporterinfo.com



GS Hydro

GS Hydro provides innovative solutions to high and low pressure pipe jointing problems, and is rightly known as the world's leading supplier of "piping without welding." GS Hydro provides substantial cost savings and other major benefits to clients around the world. GS piping systems are inherently clean, leading to reduced flushing costs and warranty claims.

Circle No. 132
www.maritimereporterinfo.com



Kvichak

Founded in 1981, Kvichak Marine Industries has established itself as one of the country's premier aluminum boat builders. Kvichak's reputation for quality and reliability has been proven time and again in the North Pacific fisheries, one of the world's most demanding marine environments. Whether it's oil spill response, enforcement, commercial fishing, passenger ferries, dive boats, or general commercial use, we know everything we build is a workboat.
Circle No. 133
www.maritimereporterinfo.com



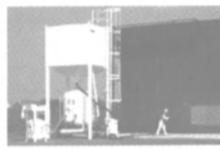
Pres-Vac Engineering

Pres-Vac Engineering manufactures of high velocity pressure / vacuum valves and other tank venting equipment, mainly for the maritime industry. Product creations include the first true high velocity pressure/vacuum valve, the first high velocity valve with proximity switches and 100 percent vapor tightness, the first non-hammering high velocity valve, valves with life-prolonging mechanical damping elements, the first remote controlled mast riser valve, the first electrically heated flame arresters and valves.
Circle No. 134
www.maritimereporterinfo.com



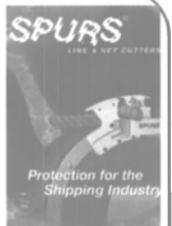
Schmidt

Schmidt introduces a new abrasive blasting systems brochure which details the company's abrasive blasting equipment, including portable systems, blaster packages, bulk abrasive blasters, metering and control valves, aftercoolers and air dryers, and bulk loading systems. The brochure also includes a guide for determining air and abrasive consumption per blast nozzle.
Circle No. 135
www.maritimereporterinfo.com



Spurs

Spurs Marine Manufacturing have engineered and developed a cutting system to protect aft oil seals from rupture and failure due to line and net intrusion. Spurs cutters are a combination of two or more rotary cutting blades mounted on the propeller forward face and one stationary cutter blade assembly welded into the rope guard. The cutter system insures that lines or nets do not have a chance to enter the seal area, as they are cut and washed away before allowing a build-up on the propeller.
Circle No. 136
www.maritimereporterinfo.com



MSHS

MSHS is an authorized distributor and service center for most of the world's major diesel engine and turbocharger manufacturers. They maintain an extensive inventory of spare parts and our service engineers, technicians, and parts department are on 24-hour call worldwide. Committed to keeping up with technology, MSHS also offers the very latest in laser alignment as well as filtration systems.
Circle No. 137
www.maritimereporterinfo.com



USFilter

USFilter has released a four-page, brochure describing the company's CAPAC corrosion protection systems for fixed structures. The brochure provides a general overview of the CAPAC system, describing its history, benefits and uses. The brochure contains a description of different fixed-structure application where CAPAC systems can be beneficial: vessels; offshore production and drilling platforms; jet-ties and piles; and power plants.
Circle No. 138
www.maritimereporterinfo.com



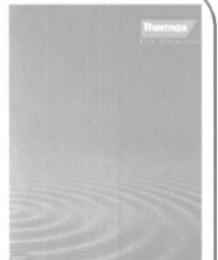
E-Crane International

The parent company of E-Crane International USA is Indusign NV, a Belgian engineering company. Indusign NV is the inventor and exclusive owner of the E-Crane product line and all technical data contained within. In order to create a positive environment for the E-Crane product and to expand into the American market, a new company, E-Crane International USA, Inc. (ECI) was created. E-Crane International USA was formed in 1999 and has its headquarters in Bucyrus, Ohio.
Circle No. 139
www.maritimereporterinfo.com



Thermax

Thermax, non-combustible, non-toxic, marine construction boards are used worldwide for joiner bulk heads, panels, liners, ceilings, door and furniture cores. Thermax has all major regulatory body certificates (USCG, Canada, DNV et al) and meets the requirements of IMO/SOLAS resolutions. Thermax is sold, distributed, warehoused laminated and cut to size in North America by PSI.
Circle No. 116
www.maritimereporterinfo.com



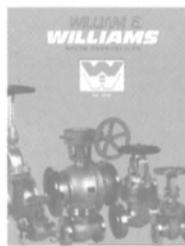
Micro-Surface

Micro-Surface Finishing Products, Inc. manufactures Micro-Mesh, a cushioned abrasive cloth, liquids, and related products. The Micro-Mesh Kits are designed for the removal of scratches from acrylic and plastic surfaces. All of the kits contain Micro-Mesh cushioned abrasive, one or both of the polishing liquids, and easy to follow step by step instructions.
Circle No. 141
www.maritimereporterinfo.com



William E. Williams

William E. Williams Founded in 1918, William E. Williams Valve Corporation has continuously produced high quality valves for industrial and commercial applications including: oil refining, chemical processing, power generation, mining, paper pharmaceutical processes, as well as, commercial and military shipbuilding.
Circle No. 142
www.maritimereporterinfo.com



General Thermodynamics

General Thermodynamics Corporation's BMEP engine Cylinder Balancer is used to balance the cylinder loading of any internal combustion engine equipped with individual cylinder fuel adjustment. It is made of stainless steel, has no moving parts, and requires no calibration. Accurate, reliable, and easy to use, the unit can help reduce downtime and improve fuel efficiency.
Circle No. 143
www.maritimereporterinfo.com



Alstom

ALSTOM is the global specialist in energy and transport infrastructure. ALSTOM serves the energy market through its activities in power generation and power transmission and distribution, and transport through its activities in rail and marine. Alstom designs, supplies and services a complete range of technologically advanced products and systems.
Circle No. 144
www.maritimereporterinfo.com



Davie

Davie has an international reputation for excellence in producing high quality vessels and complex heavy industrial products for the offshore, marine and other industries. Since 1971, Davie has been active in the offshore sector. Davie has constructed and delivered 13 jack-up type rigs. Davie has also played a significant role in the Hibernia project in fabricating the GBS utility shaft.
Circle No. 145
www.maritimereporterinfo.com



Samson

Samson Rope Technologies, manufacturer of high performance synthetic ropes and cordage recently completed the installation of the world's largest strength testing equipment for synthetic rope products at its R&D center in Ferndale, Wash. This equipment is the final step in Samson's efforts to expand its R&D capabilities through additional personnel and testing capabilities.
Circle No. 146
www.maritimereporterinfo.com



Hellan

Hellan Strainers remove all types of solids (such as algae, zebra mussels, sand, grit, debris, machine cutting chips, etc.) from various fluids. They are extremely popular due to their reliability, efficient operation and cost savings. Instead of trapping solids like conventional basket strainers (which necessitate frequent basket removal for cleaning), the Hellan Strainer discharges solids from the flow without disassembly.
Circle No. 147
www.maritimereporterinfo.com



Transmarine

Transmarine is a leader in the design, supply, installation and servicing of cargo access and handling equipment to ships and ports worldwide. The company has earned a reputation for successfully working with clients to solve problems or create opportunities, both as a product supplier and as a consultant. Transmarine can call upon the exceptionally broad range of services and products relating to ship and port developments.
Circle No. 148
www.maritimereporterinfo.com



BUYER'S DIRECTORY

This directory section is an editorial feature published in every issue for the convenience of the readers of MARITIME REPORTER. A quick-reference readers' guide, it includes the names and addresses of the world's leading manufacturers and suppliers of all types of marine machinery, equipment, supplies and services. A listing is provided, at no cost for one year in all issues, only to companies with continuing advertising programs in this publication, whether an advertisement appears in every issue or not. Because it is an editorial service, unpaid and not part of the advertisers contract, MR assumes no responsibility for errors. If you are interested in having your company listed in this Buyer's Directory Section, contact Mike Lowe at (212) 477-6700.

ABS/USCG APPROVED VALVES

Nornseal PO Box 40525 Houston, TX 77240

ACTUATORS, VALVE

J.A. Moody Equipment Specialist, Inc., 3223 Phoenixville Pike, Malvern, Pa 19355
(800) 355-3810 (Northeast); 809 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

Adrick Marine, 81 Mahan St., W. Babylon NY 11758
Bailey Refrigeration, 4986-1 Euclid Road, Virginia Beach, VA 23462
Cospolich Refrigeration, 14695 Highway 11, Norco LA 70079
Flagship Marine 2427 SE Dixie Highway, Stuart, FL 34996
Port-A-Cool, P.O. Box 2108, Center, TX 75935
Stork Bronsweik Inc., 3755 C boul Matte, Brossard, Quebec Canada J4Y2P4
Taylor Made Environmental PO Box 15299 Richmond, VA 23227

AIRHORNS/SIGNALING EQUIPMENT

Kahlenberg Marine, P.O. Box 358, Two Rivers, WI 54241

ALARMS, FACTORY MUTUAL-APPROVED

NREC 1701 Engineers Rd Belle Chase, LA 70037

SELCO 353 A Asbury Commons Dr., Atlanta, GA 30338

ALUMINUM BOATS

Island Boats 6806 Highway 90 East New Iberna 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

Crandal Dry Dock Engineers Inc. P.O. B 505804, MA 02150

GJ Wortelboer Jr B.V. PO Box 5003, 3008 AA Rotterdam, Netherlands

Washington Chain Inc., Box 3645, Seattle, WA 98124

AUTOMATED SELF UNLOADING

Seabulk Systems Inc., Suite 100, 3751 Shell Road, Richmond, British Columbia, CANADA V6X2W2

AUTOPILOT SYSTEMS

Beier Radio 1990 Industrial Ave Harvey, LA 70058

ComNav Marine, 1915 Stansburg Ave., Vancouver, B.C. CANADA

Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851

BALLAST

Balast Technologies, 4620 S. Coach Dr., 85714, Tucson, AZ

Redland Genstar Inc., Executive Plaza IV, Hunt Valley, MD 10912-1031

BeARING—Rubber, Metalliz, Non-Metalliz

American Babbitt Bearing PO Box 3069 Rt 2 Huntington, WV 25702

Craft Bearing 2506 58th St Hampton, VA 23661

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

Orkol Composites, 2535 Prairie Rd., Unit D, Eugene, OR 97402

Shore Turbomachinery 132 Gilbertville Rd PO Box 889 Ware, Mass 01082

Thordon Bearings Inc., 3225 Mainway, Burlington, Ont., CANADA L7M 1A6

Vesco Plastics, P.O. B. 40647, Cleveland 2022 SOUTH AFRICA

BILGE SYSTEMS

Fast Systems 14040 Santa Fe Trail Dr. Lenexa, Kansas 66215-1284

BLACKS & RIGGING

Skookum, P.O. Box 280, Hubbard, OR 97032

BOILERS (HEAT RECOVERY)

Deltak LLC 2905 Northwest Blvd Ste 150 Plymouth MN 55441 USA

BOATBUILDER

Allen Marine PO Box 1049 Sitka, AK 99835

Hike Metal, Box 698, Wheatley, ON Canada N0P 2P0

Kivchak Marine, 469 NW Bowdoin Pl., Seattle WA 98107

Sea Ark Marine PO Box 210 Monticello AR 71655-0210

Washburn Doughty, P.O. Box 296, E. Boothbay ME 04544

HOLLARDS

Maritime International, 100 E. Vermilion Street #212, Lafayette, LA 70501

BROKERS

Marcon International, Inc., P.O. Box 1170, Coupeville, WA 8239-1170

Mowbray's Tug & Barge Sales Corp., 35 De Hart St., Morristown NJ 07960

BRUSHES

Sohre Turbomachinery Inc 132 Gilbertville Rd PO Box 889 Ware, MA 01082-0889

BULKHEAD SEALS/PANELS

CSD North America, 880 Candia Rd., Unit 10, Manchester, NH 03109

Thermax, 15006 Shaw Rd., Tampa, FL 33625-5500

Thermax 3115 Range Rd Temple, TX 76501

BUOYS

Dafrex, P.O. Box 1150, Kinder, LA 70648

Urethane Products 9076 Rosecrans Ave Bellflower, CA 90706

BUTTERFLY VALVES

Nornseal 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 Kashtan Place, Victoria, B.C. Canada V8X4L7

Autoshop Systems Corp., #403, 611 Alexander St., Vancouver, BC, Canada V6A1E1

Creative Systems, Inc., P.O. B. 1910, Port Townsend, WA 98368

Kokkum Computer Systems AB, PO Box 50555, S-202 15 Malmo SWEDEN

Scientific Marine Services, Inc., 101 State Pl., Suite F, Escondido, CA 92029

Ship Motion Associates, 10 Danforth St., Portland, ME 04101-4567

CAP TREADS

Washington Aluminum, 1330 Knecht Ave., Baltimore, MD 21229

CAPTAINS

G.J. Wortelboer Jr BV, P.O.B. 5003, 3008 AA Rotterdam, Netherlands

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

CARGO MONITORING & CONTROL SYSTEM

Hermetic Inc., 4522 Center St., Deerpark, TX 77536

CAST IRON REPAIR

Metal Surgery, 2901 W Mill Road, Milwaukee, WI 53209

In-Place Machining 1929 N. Bufum St. Milwaukee, WI 53212

CHAINS

Crandal Drydock Engineers PO Box 505804 Chelsea, MA 02150

Washington Chain, PO Box 3645, Seattle, WA 98124

CHEMICALS

Unigervice Americas 57124 Hardin Rd, Slidell, LA 70461

CLASSIFICATION SOCIETY

Lloyd's Register 71 Fenchurch St London EC3M 4BS

CNC PLATE CUTTING

Advanced Fabricating Inc PO Box 3721 Galveston, TX 77552

COATINGS / CORROSION CONTROL / PAINT

American Safety Technologies 565 Eagle Rock Ave Roland NJ 07068

Anker Marine Paints, 21 Charles Street, Westport, CT 06880

Aqua-Dyne, 3620 W. 11th St., Houston, TX 77008

Chesapeake Specialties Products, 5055 North Points Blvd, Baltimore Md 21219

Chugoku Marine Paints PO Box 73 47932H Finaart The Netherlands

Esgard, Inc., P.O. Drawer 2698, Lafayette, LA 70502

Fero Corp., 1301 North Flora St., Plymouth, IN 46563

Furo International corp., 23500 64th Ave. south Kent, WA 98032

Jamestown Distrib., P.O. Box 348, Jamestown, RI 02835

Jotun Paints Inc. 1401 Severn St., Baltimore, MD 21230

Mascoat Products, 10890 Alcott Unit 102 Houston, TX 77084

Nace Int'l., 1440 South Creek Dr., Houston, TX 77043

Resto Motive Laboratories PO Box 1335 Morristown, NJ 07962-1235

Sherwin Williams, 101 Prospect Avenue, Cleveland OH 44115

Wasser High Tech Coatings, 8041 South 228th St., Kent, WA 98032

COMMUNICATIONS SERVICE

Comsat Maritime Services, 6660 Rock Spring Drive, Bethesda, MD 20817-1146

Manie Marine Communications, 16 E. 41st St., NY, NY 10017

Maritime Telecommunications Networks, Inc., 3044 N Commerce Pkwy Miramar FL 33025

COMPOSITE PILINGS

Hardcore Composites 618 Lambsons Lane New Castle DE 19720

COMPOSITE FENDERING SYSTEM

Hardcore Composites 618 Lambsons Lane New Castle DE 19720

COMPOUNDS

Philadelphia Resins, P.O. Box 309, Montgomeryville, PA 18936

COMPRESSORS

Hatipapa Uetersener Maschinenfabrik Tornescher WEG 5-7 D-25436 Uetersen, Germany

COMPRESSOR PARTS

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

COMPUTER / COMPUTER SOFTWARE

Autoshop Systems Corp., #403, 611 Alexander St., Vancouver, BC, CANADA V6A1E1

Creative Systems, Inc., P.O. B. 1910, Port Townsend, WA 98368

Fleet Technology, 311 Leggett Dr., Karata, Ontario, Canada K2K 1Z8

Lloyd's Register, 100 Leadenhall St., London, England EC3A 3BP

MIL Systems, 200-1150 Morrison Drive, Ottawa, Ontario K2H 8S9

Navigator PC, Plantation Technology Park, 6601 N.W. 14th St., Suite 4, Plantation, FL 33313

Shp Motion Associates, 10 Danforth St., Portland, ME 04101

COMMUNICATIONS

Beier Radio 1990 Industrial Ave Harvey, LA 70058

Japan Radio, 1011 SW Kickitay Way, Bldg B, Suite 100, Seattle, WA 98134

Mackay Comm Inc 2721 Discovery Dr Raleigh NC 27616-18

Rydex, An Inmarsat Ventures Co., 130-13111 Banier Place, Richmond, BC V6V2J1

COMPUTER SOFTWARE SYSTEMS

Autoshop Systems Suite 312-611 Alexander St Vancouver BC V6A1E1

Spec Tec Professor Koth's Vey 1366 Lysaker Norway

CONSOLE - GMDSS

Furuno USA, Inc., 4400 NW Pacific Rim Blvd., Camas, WA 98607

Japan Radio, 1011 SW Kickitay Way, Bldg B, Suite 100, Seattle, WA 98134

Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27616-1851

CONSULTANTS

Captain R.J. Underhill & Associates, P.O. Box 1030 Groves, TX 77619

Eliot Bay Design Group 5301 Shisholee Way, Bldg B, Suite 201, Seattle, WA 98107

Hornblower Marine PO Box 112476 Campbell CA 95001

CONTAINER LIFT SPREADERS

Tandemloc Inc. 824 Highway 101, Havelock, NC 28532

CONTROL SYSTEM - Monitoring/Steering

Beier Radio 1990 Industrial Ave Harvey, LA 70058

Electronic Marine Systems, 800 Fernside Pl., Rahway, N.J. 07065

Governor Control Systems, 3190 W 4th Ave., Ft. Lauderdale, FL 33315

G.R. Bowler 2261 Lake Rd, Ontario, NY 14519

Kobelt Manufacturing Co., Ltd., 8238-129 street, Surrey, B.C. V3W0A6

Kokkum Sonics, Inc., 819 Veterans Blvd., Suite 201, Kenner, LA 70068

MMC International, 60 Inip Dr, Inwood, NY 11096

Motor Services Hugo Stamp, 3190 S.W. 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 Lionel Terrace Stuart, FL 34996

COUPLERS - Tugs & Barge

Intercontinental Engineering PO Box 9055, Kansas City, MO 64168

COUPLINGS

Acomarni International Corp., 4710 Habana Ave., Tampa FL 33614

American Vulkan, 2525 Dundee Rd., Winter Haven, FL 33884

American Vulkan, PO Drawer 673, Winter Haven, FL 33882

Centa Corp., 815 Black Hawk Dr., Westmont, IL 60559

Geisinger, Hallwanger Landesstr. 3, 5300 Hallwang Salzburg, Austria

Lo-Rez Vibration Control, Ltd., 186 West 8th Ave., Vancouver, B.C. V5Y1N2

Mapeco Products, 91 Willenbrock Rd Unit B, Oxford, CT 06478

MMC Int'l, 60 Inip Drive, Inwood, NY 11096

CRANE-HOIST-DERRICK-WHIRLES

Basso Marine Co. PO Box 4113, New Orleans, LA 70178

E Crane 241 Executive Dr. #3 Manon OH 43302

Edgewater Machine & Fabricators, P.O. Box 358, Edgewater, FL 32132-0358

Holly Host Corp., P.O. Box 86, St. Clair Shores, MI 48080-0086

Lebberh-Werk Nenzing GmbH PO Box 100, Nenzing Austria

M-Jack Products, 3111 West 17th Street, Hazel Crest, IL 60429

Westmont Industries, 10805 Panter Ave., Santa Fe Springs, CA 90670

CRANKSHAFT DEFLECTION ANALYZER

Pisma Teknik AB Sweden, www.prismateknik.com

CRANKSHAFT GRINDING

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. Bufum St Milwaukee, WI 53212

CUSTOM CLOSURES

Walz & Krenzer, 91 Willenbrock Rd., Oxford, CT 06478

CUTTING AND WELDING MACHINES

Bug-O-Systems, Inc., 3001 W. Carson St., Pittsburgh, PA 15204

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D-24100 Kiel, Germany
(Distributor for Raytheon) Klein Navigation, 11 Klein Drive, Salem NH 03079
Saab Marine Electronics AB, Box 13045, 402 Göteborg, SWEDEN
Scandinavian Micro Systems, P.O. Box 155, N-1411, Kolbotn, NORWAY
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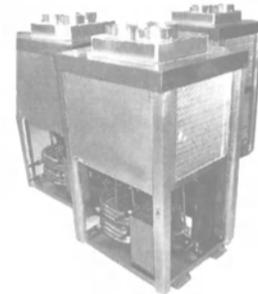


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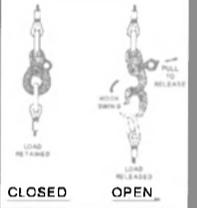
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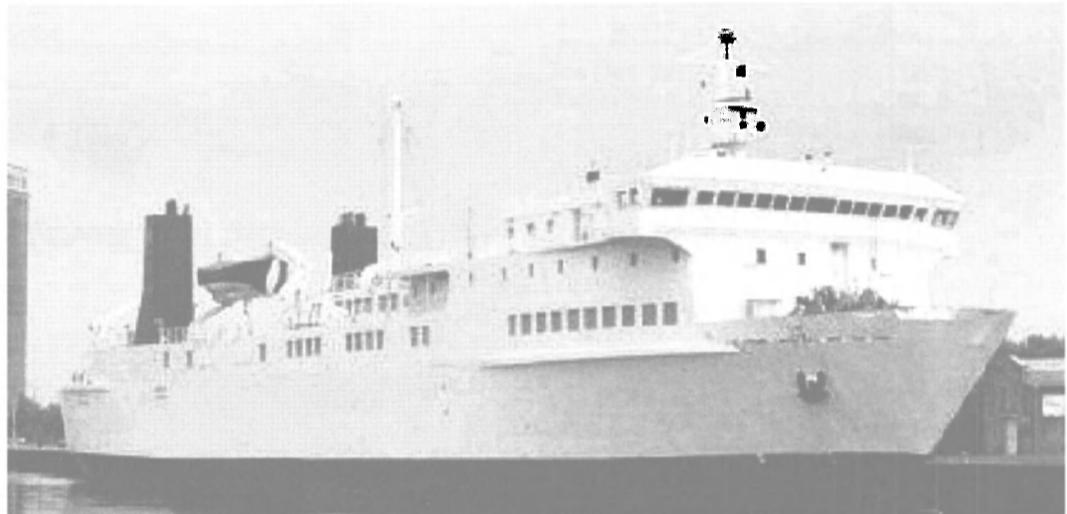
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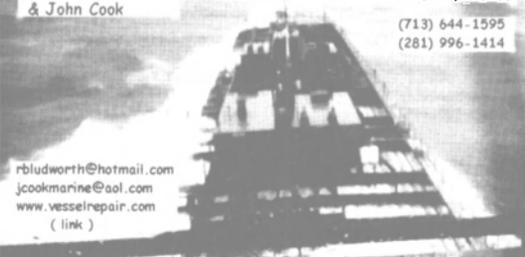
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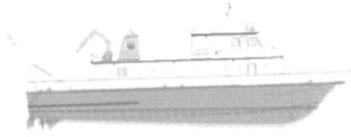
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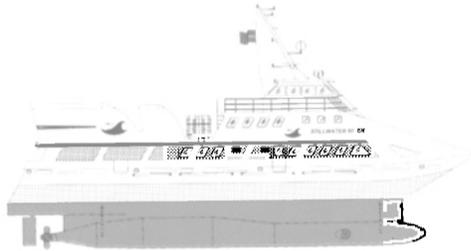
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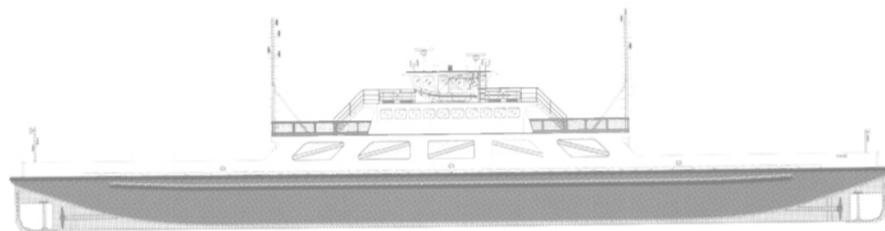
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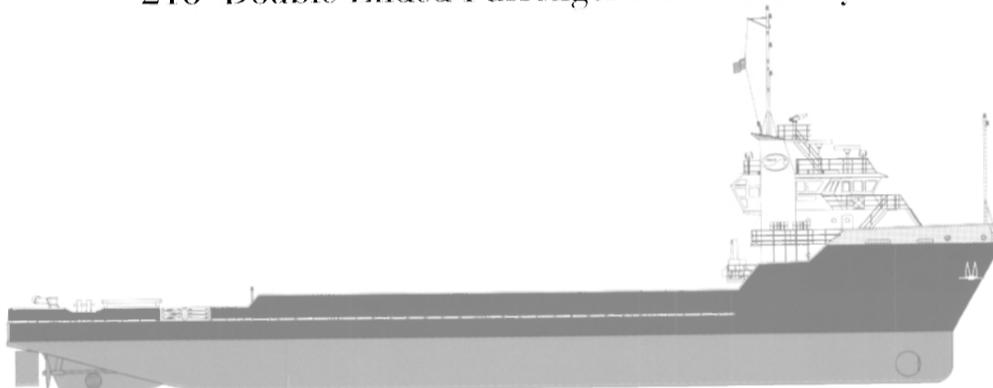
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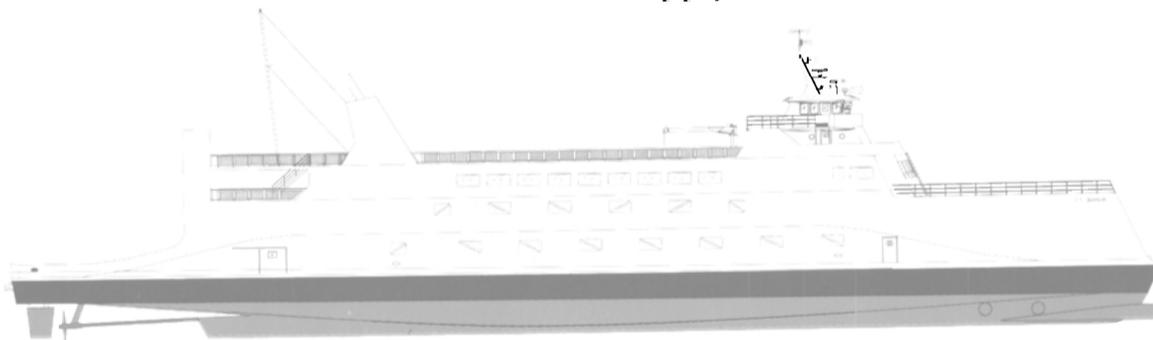
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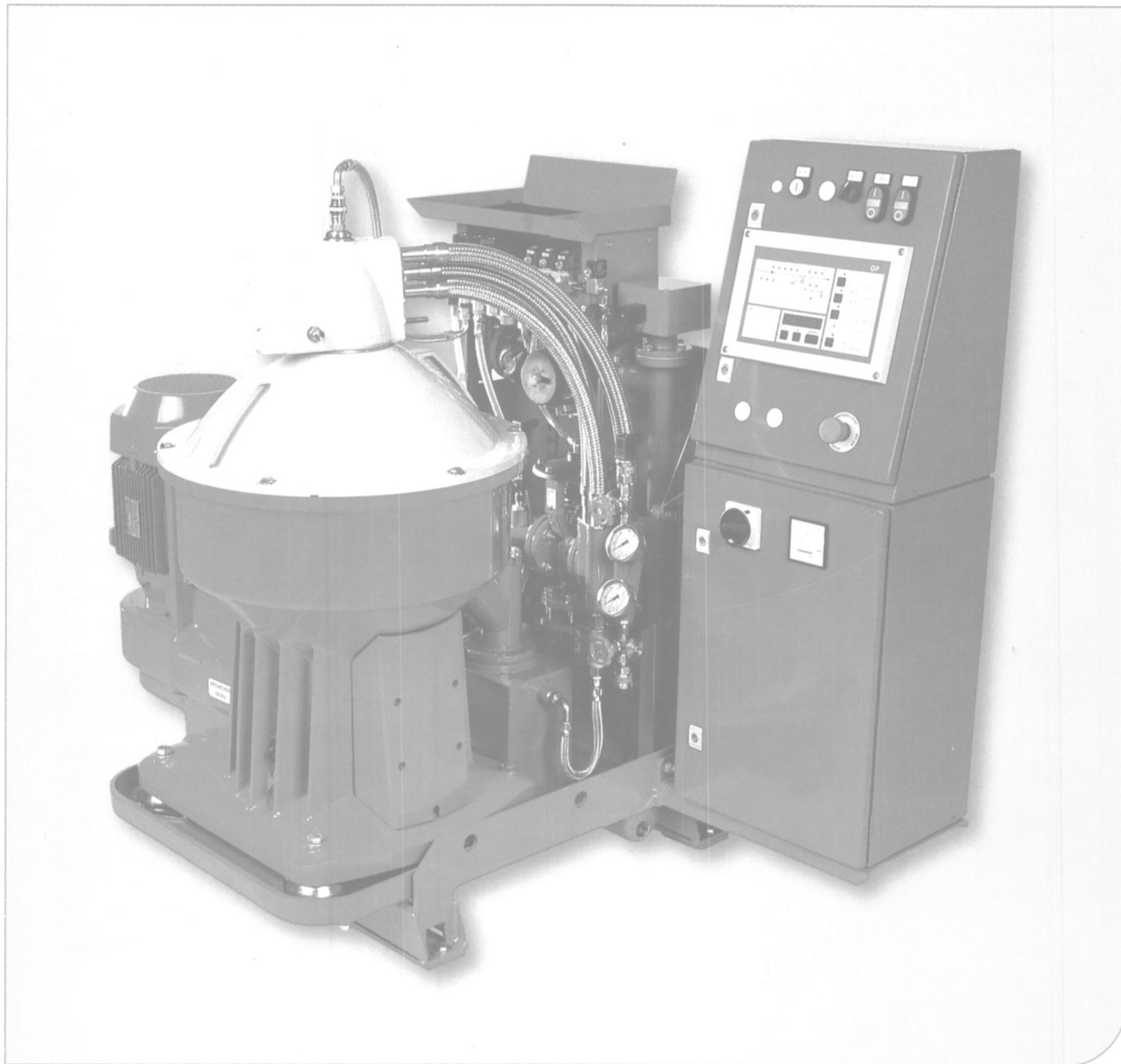
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