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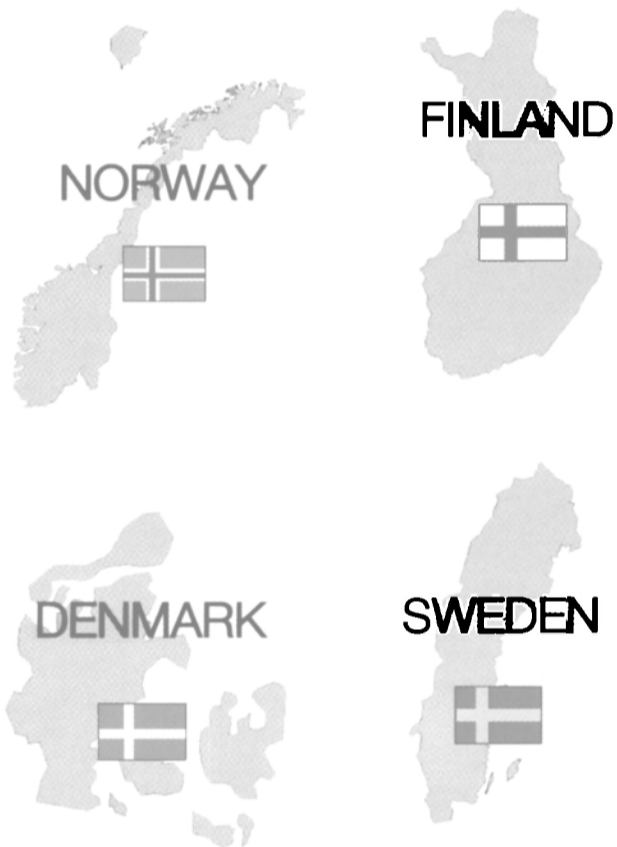
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**On the Cover:** The continuing cruise shipping boom has led to record numbers of new ship orders and deliveries. Many of today's new designs emulate great ships of the past, such as the Queen Elizabeth, pictured on the cover. Also pictured on the cover, from left to right: Voyager of the Sea's innovative rock climbing wall; Holland America's Volendam; Disney's Wonder; and the artist's rendition of the next Cunard cruise ship, designed to be the world's largest. (Note: The *Maritime Reporter* logo, in the spirit of cruise ship design, has transformed a bit this month. The background image is the artist's rendition of the Olympic Dining Lounge/Room aboard Celebrity's new Millennium ships, with the first ship due from Chantiers de l'Atlantique this summer. For full coverage of the Cruise industry, see section starting on page 19.

### 8 Model of Success

Sweden's Kockum Computer Systems has extended its well-proven Tribon shipbuilding system. — by **David Tinsley**

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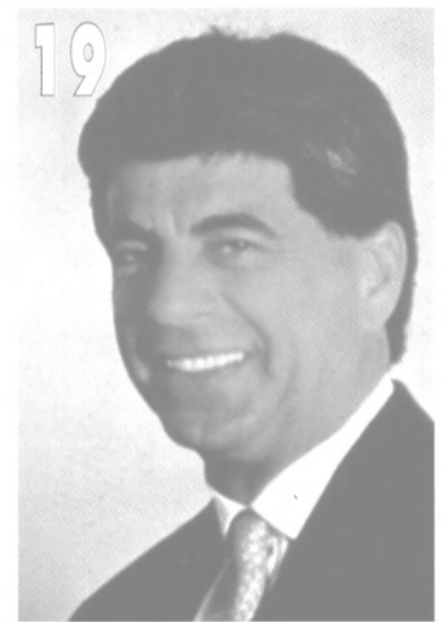
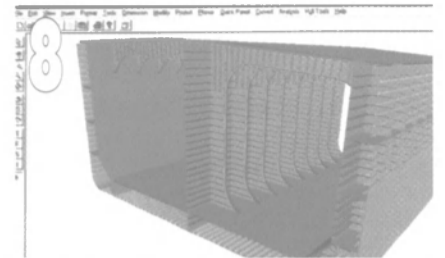
### 50 Finnish Innovation Hits New Heights

Finnish maritime companies have had quite a year, with corporate consolidations and pull-outs dominating the headlines. Regardless of boardroom politics, the country continues to lead maritime innovation worldwide.

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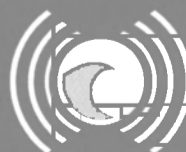
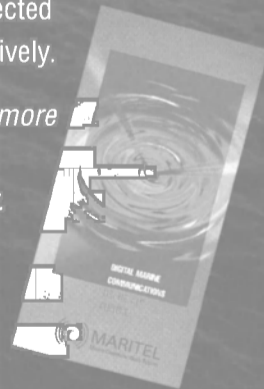
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## Editor's Note

The break up and sinking of 25-year-old Erika during mid-December 1999 at first seemed nothing more than another tragic marine mishap. However, Erika has taken on a posthumous life that threatens to shake the maritime industry from the roots up. While the case is still unfolding and much of the coverage contains more than its fair share of political rhetoric and saber rattling, it is fair to say that the name Erika could easily take on the same significance as Valdez in the coming years. It is appropriate, at this point, to state that the word "alleged" cannot be employed enough in this article. At press time, while strong evidence was mounting, nothing had been definitively proven.

Despite all of the "he said, she said" back and forth currently running between the French Government, Italian classification society RINA, French oil major (and Erika charterer) TotalFina, flag of convenience states and the various organizations entrusted with ensuring that tankers which sail the seas are worthy of carrying cargo, the controversy really boils down to a handful of points: Old Ships; Proper Maintenance; and Reliable Inspection Information.

The suspected culprit in the sinking of Erika is a corroded bulkhead, a weakness in the ship structure, which was not discovered despite the ship being put through several inspections over the past three years. TotalFina, the French oil major which chartered Erika, is being accused of using lax requirements in employing the ship, a cry which grew exponentially when it was uncovered that Royal Dutch Shell had refused to charter Erika for the last two years. The accident has French officials fuming, calling for a number of new measures, including improved national and international safety regulations in regards to tankers, and end to flags of convenience. Shipowners have joined the fray as well. Notably, Lars Carlsson, president of Concordia Maritime, was quoted as saying that shipowners could face "unpredictable and inefficient" legislation if they did not act to improve safety themselves.

If there is a silver lining, it encircles the world's "quality" owners and operators. Predictably, much of the early rumblings have centered on the ship's age, and some knee-jerk reaction has centered on unilaterally condemning ships over a given age. BP Amoco, for example, while not condemning older ships, has judiciously announced plans to tighten its rules in regard to the employment of tankers older than 20 and 25 years. But as has been proven time and again — while the age of a ship cannot be entirely dismissed — a properly maintained ship *of any age* is critical to the safe and successful transport of people and products. Thus shipowners who have traditionally employed a program of excellent ship repair and maintenance should prosper in the renewed era of heightened sensitivity; and shipyards should prosper as commitments to ship maintenance rise, either voluntarily or by legislative mandate.

*Gregory R. Franthum*



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## Contracts

### Tidewater To Build New Vessels For \$300M

Tidewater Inc. will build new vessels for a total of about \$300 million. The company said it expects to fund the program using its current cash balances, which exceed \$150 million, its projected cash flow and its existing \$200 million line of credit. Currently, Tidewater is debt-free.

According to the company, the new vessels will include large Anchor Handling Towing Supply vessels and large Platform Supply vessels.

### Chuan Hup Unit Secures PB Contract

Chuan Hup Holdings Ltd.'s joint venture company Asia-Pac Geraldton Pte Ltd. had secured an \$11.6 million contract to build seven high-speed patrol boats for the Singapore Police Force (Coast Guard). Asia-Pac Geraldton is a 50-50 joint venture between Chuan Hup's wholly-owned subsidiary Asia-Pacific Shipyard Pte Ltd. and Geraldton Boat Builders Pty Ltd., a builder of high-performance patrol boats in Western Australia, Chuan Hup said. A statement added that Asia-Pac Geraldton had previously secured a \$29.2 million contract to build 18 patrol boats and two command boats for the Singapore police in September 1997, with an option to buy up to another 21 boats. The police force had now exercised its option to buy another seven patrol boats.

### UAE Group Buys Third Ship From Hitachi

A United Arab Emirates company signed a contract with Japan's Hitachi Zosen Corp. to buy a third bulk carrier at a cost of approximately \$22 million.

The Dubai-based al-Ghurair group signed deals last year to purchase two ships from the Hitachi. Delivery of the first ship is expected by the end of this year, and the other two are expected to be delivered early in 2002.

Al-Ghurair group already has a fleet of seven ships operated by a subsidiary, including three based in Dubai and four based in India.

### Leif Hoegh Sells Three Ships

Norway's Leif Hoegh Unicoil unit sold three reefers for a total of just more than \$27 million. The sales price was close to the book value, Leif Hoegh said in a statement to the Oslo bourse. It said Unicoil had sold the vessels Baltic Spirit, built in 1986, Lincoln Spirit, built in 1987 and Tasman Spirit from 1988.

### Bergesen Orders Four Tankers From Hitachi

Norwegian shipping group Bergesen d.y. ordered four 296,000 dwt tankers from Japan's Hitachi Zosen Corp. for \$263.7 million.

Officials said the vessels were all

under construction, and one will be delivered in the first quarter of 2000, two in the second quarter and the fourth in the first quarter of 2001. Bergesen said it has an option to order two other ships for delivery in the first half of 2001. Hitachi Zosen Corp., a major Japanese shipbuilder, posted a parent

current loss of \$163.4 million for the year ended March 1999, its first current loss in 10 years, against current profit of \$65.3 million a year earlier, mainly due to losses from unprofitable overseas business.

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TIN0077/B

# A model approach from the Swedes



by David Tinsley,  
technical editor

Ever-greater pressures on shipbuilders in terms of time and resource availability, accentuated by increased project complexity in many spheres of newbuild activity, emphasize the need for well functioning design tools. Efficient data management to support the creation, distribution and handling of design and production information has become a vital factor influencing competitive performance.

The latest initiative by the Swedish company Kockums Computer Systems (KCS), in extending its proven Tribon concept to the basic design phase, offers the industry an opportunity to rationalize and integrate the whole design, engineering and manufacturing task from an earlier starting point in the cycle.

KCS is closely attuned to its client market, recognizing the cross-discipline needs of an industry characterized by a high degree of concurrency, and the evolving demands posed by its

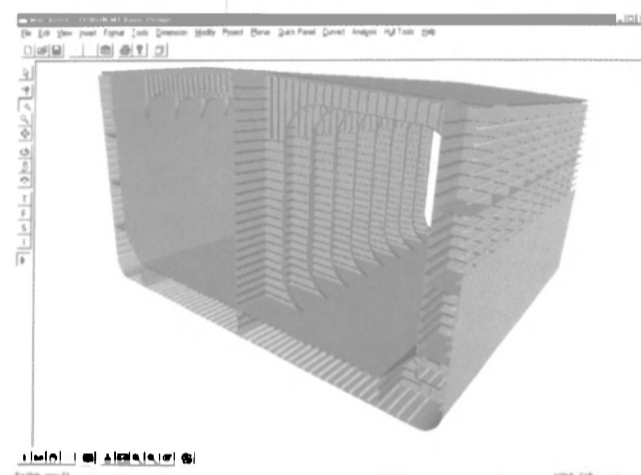
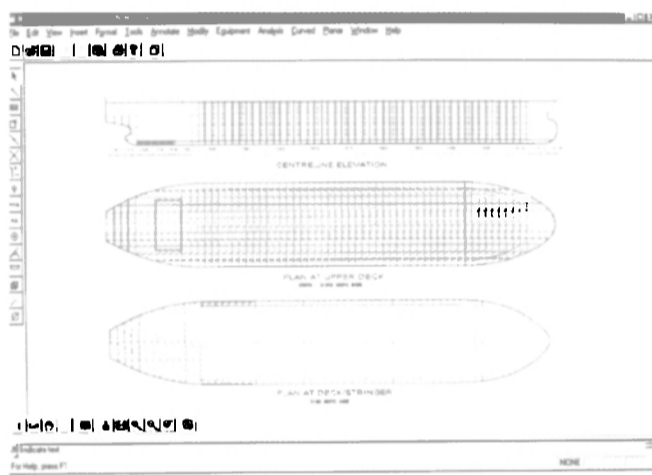
increased recourse to subcontracting and more distributed ways of working.

The Basic Design module to the Tribon M1 design and production system provides the means for evaluating and developing the preliminary structural definition and layouts which can be directly used for subsequent detailed

design and preparation of production data, using other Tribon elements. Its introduction denotes the Swedish firm's intention of eventually embracing the entire chain of design and construction, from conceptual design to automated production.

For the industry, the latest application

promises savings in man-hours and lead times at the critical early stages of a newbuild project, while conferring consistency and quality ben-



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efits stemming from a seamless transition between the basic and detailed design phases. The all-important Product Information Model (PIM), the core database in Tribon and an asset of prospective, long-term value, can now be implemented and built up at an earlier stage than before. The PIM contains all information about materials, structural components and equipment, allows simultaneous, multi-user access to the data, and supports concurrent design and engineering activities. Through the PIM, the Basic Design application is totally integrated with other Tribon 5 or MI modules, so that data created at the basic design stage is immediately available to all subsequent phases, through to outfitting and assembly planning.

Tribon MI Basic Design not only provides the means of defining the 3-D geometry of the hull structure, as the basis for the detailed hull structure development, but also enables various design alternatives to be quickly evaluated, with regard to steel weight and work input implications. Time savings, accuracy gains and enhanced data management are the keystone advantages for users.

So as to ensure that the system can benefit the industry at large, and not simply the larger or more extensively-equipped players, the latest software can be used on Intel-based personal computers (PCs) and laptops running on a Microsoft Windows NT4 platform.

KCS reckons that its design and information systems are in service at yards and design engineering offices accounting for nearly 40 percent of the present world orderbook of commercial vessels in excess of 1,000-gt. The Swedish innovator acknowledges that its large customer base continually creates new ideas and projects for enhancing the Tribon system. The Basic Design modeling tool will have its first application in Japan, adding a new client to KCS' books.

Circle 5 on Reader Service Card

## Innovative class for the banana trade

Unequivocal in its belief that European shipbuilding's future will ultimately be determined by its capacity and preparedness to innovate, Howaldtswerke-Deutsche Werft (HDW) has put down a new marker for the industry with a record-breaking class of refrigerated cargo carrier.

Bringing unprecedented unit scale to the business of transporting perishable produce, the 1,000-FEU (40-ft. equivalent unit) Dole Chile and Dole Colom-

bia are testaments to HDW's prowess in containership technology, and to its sustained plough-back of funds into application-oriented research and development.

The U.S.-owned pair maintain the international profile of a yard which headed the seminal Schiff der Zukunft (Ship of the Future) research program of

the early 1980s, and which subsequently delivered milestone, post-Panamax linehaul vessels to American President Lines, and the world's first open-top containership to Norasia Lines.

The slots encapsulated by the Panamax-beam Dole Chile correspond to a total, refrigerated cargo capacity of approximately 2-million cu. ft., far in

excess of the volume offered either by the largest, pallet-optimized reeferships or by existing, cellular container vessels with a high reefer intake.

The 21-knot design is all the more significant for its almost entirely hatchcover-free arrangement, and for a compar-

(Continued on page 11)



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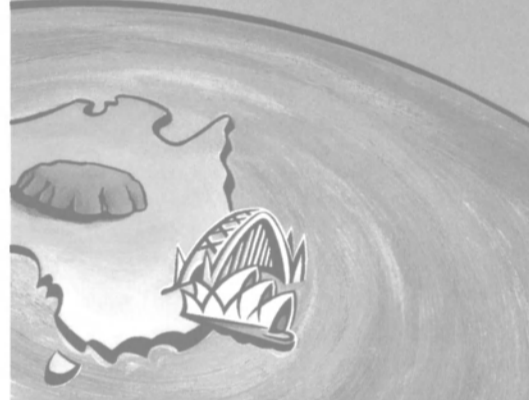
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Circle 286 on Reader Service Card

## Investment in Design

# Propeller Milestone Achieved By U.S. Navy

The U.S. Navy's drive during the past decade to become more efficient on both the ship contracting and life cycle management sides has proven to be much more than mere talk. The "new" Navy is embodied in the current LPD-17 project, and U.S. Navy senior officers and engineers recently marked a critical milestone in ship research on January 6, 2000, wrapping up a successful phase in the testing of a full-scale propeller for the USS San Antonio (LPD-17) Class amphibious transport dock ship.

The tests verify that a new compact design for the LPD-17 CPP meets the seven-year service life cycle requirements. The 17 million cycles completed at the ceremony show that this new design exceeds requirements and that the service life could be extended twofold.

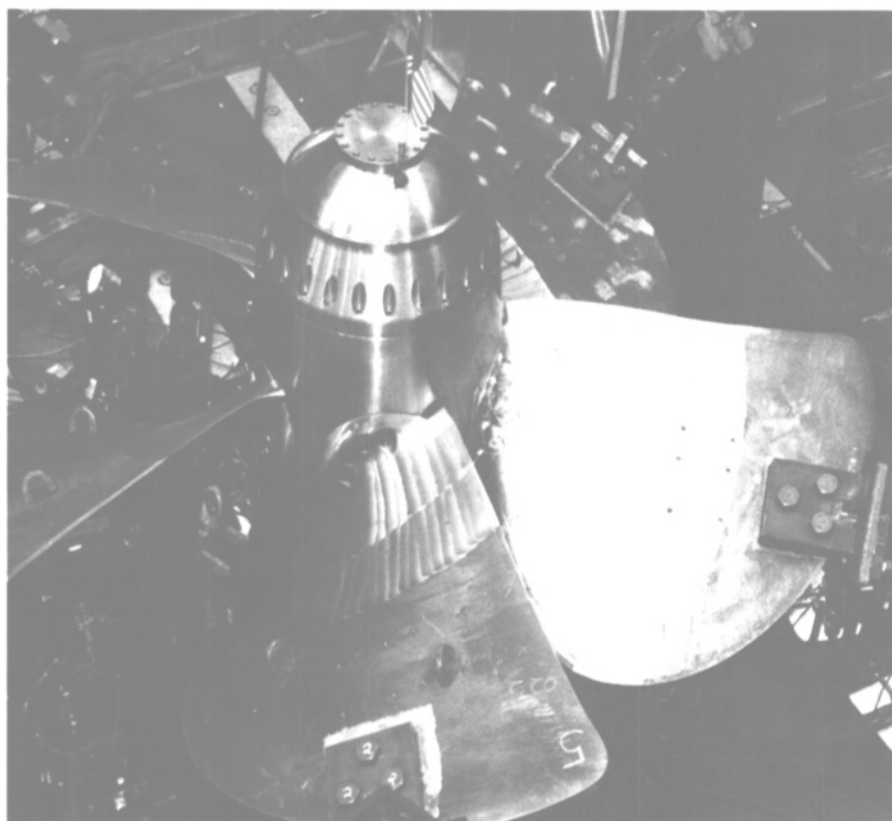
This Naval Sea Systems Command program could lead to a significant saving for the Navy in overhaul costs for the new propeller. The hub and blades, manufactured of nickel-aluminum-bronze

and steel, constitute a unique design. The hub has a smaller diameter than in the past, leaving less surface for attaching the five blades and increasing stress in the blade root area and the hub. Verifying the new design will facilitate extending the period between overhauls from seven to 14 years, producing lower costs, easier maintenance and faster upgrades — an affordable propeller with enhanced performance reflecting the fiscal constraints of the modern Navy.

Carderock propeller experts working with the Bird-Johnson Company, the hub designer and prop fabricator, designed the blades. Small scale prop models were then tested in another unique Carderock facility, the Large Cavitation Channel, in Memphis, Tenn. There, scaled props are mounted on ship model hulls where the flow of water over the hull and around the prop is the same as a real vessel at sea.

LPD-17 propeller testing supports the shipbuilder, Avondale Industries Inc.,

(Continued on page 12)



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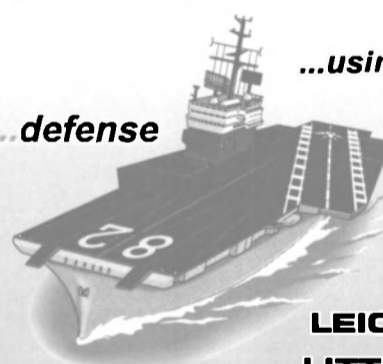
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(Continued from page 9)

tively tender, maximum draft of 33 ft. (10.2-m), features reflecting the operating requirements of Dole Fresh Fruit International. The open-top configuration and associated, raised cellular structure; adopted throughout the cargo section bar the furthest forward, No. 1 hold, promote faster turnarounds of the gantry crane-equipped vessels on their Central America-U.S. Eastern Seaboard service pattern. It also offers distinct advantages as regards heat dissipation from the cargo holds, given the considerable amount of heat given off the reefer equipment integral to the cold storage containers. The investment in the bespoke newbuilds by Dole, reckoned to be the world's largest shipper of fresh fruit and vegetables, has been made against a backdrop of strong brand demand and planning for business expansion. The introduction of the two 30,560-dwt vessels, which will be used mainly for northbound movements of bananas, is central to a strategy of realizing new transportation efficiency goals, and reducing reliance on chartered tonnage.

While considerations of the dependability of supply permeate the latest fleet project, the U.S. operator's parallel preoccupation with cargo care is manifested in the modified atmosphere (MA) arrangements adopted in the two ships. Dole and the HDW-built sisters' classification society Germanischer Lloyd have substantial experience of both MA and controlled atmosphere (CA) methods, whereby the produce is subjected to a nitrogen-rich environment. This has the effect of retarding the ripening process, so as to prolong product life and ensure that fruit reaches the consumer in peak condition throughout the year.

Circle 6 on Reader Service Card

## Tasmanian technology driver

**Robert Clifford**, driving force behind fast ferry builder and designer Incat, recently took the helm of the company's experimental wing craft, achieving a speed judged to be in excess of 60-knots. As a result of modifications including a new steering system, the fitting of ailerons, and the use of spray deflectors, there was a general improvement in performance compared with the previous development trial, when 49-knots was attained with two persons aboard. Writing in company journal — *Incat The Magazine*, Clifford said, "Never before has a heavy displacement, high-speed craft traveled so fast with so little power. I am encouraged to step up the design effort, and cannot wait to get back in the saddle."

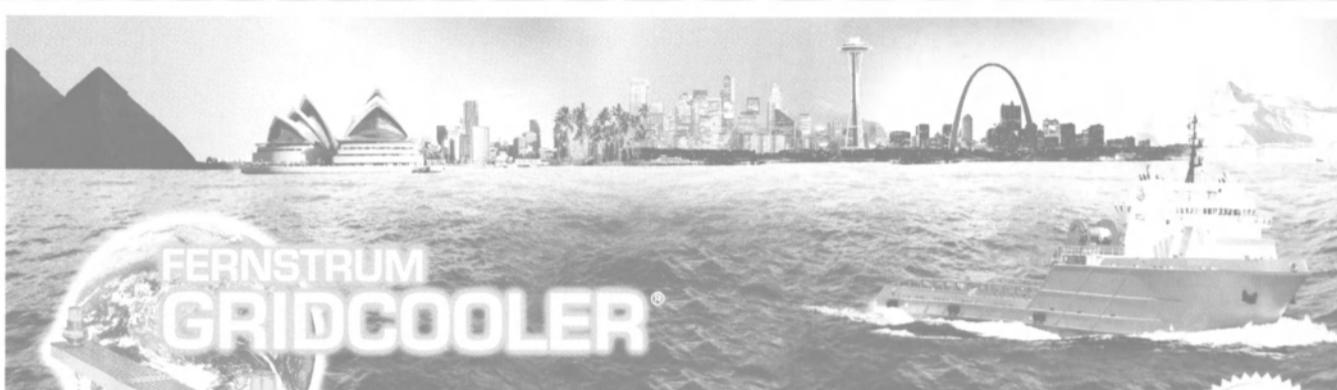
February, 2000

## Propeller & Shafting Symposium Planned

The Society of Naval Architects & Marine Engineers (SNAME) announced its ninth triennial Propeller and Shafting Symposium, scheduled to be held in Virginia Beach, Va., on September 20 and 21, 2000. Held once every three years and organized by the M-16 Panel of SNAME, the first symposium was conceived in 1972 and held in 1975 as a fact-finding forum following an industry-wide rash of propeller problems. Its objective was definition of problems and identification of appropriate solutions. This spirit of inquiry continues today. The last symposium was in 1997. It drew more than 150 attendees to hear 29 technical papers read by experts from

around the world. The M-16 Panel of SNAME is dedicated to gathering and disseminating information on propulsion shafting and was founded in 1960 as part of the society's Technical and Research Program.

These include the shaft(s), couplings, bearings, and the propulsors themselves. The panel's scope of activity does not include engines and gears, but the variety of propulsors and shafting systems has added new dimension to these propeller and shafting seminars. For additional information, contact: Mr. **Jerry Havel**, Two World Trade Center, 106th Floor, New York, NY 10048, tel: (212) 839-5095; fax: (212) 839-5214, e-mail: [jhavel@eagle.org](mailto:jhavel@eagle.org).



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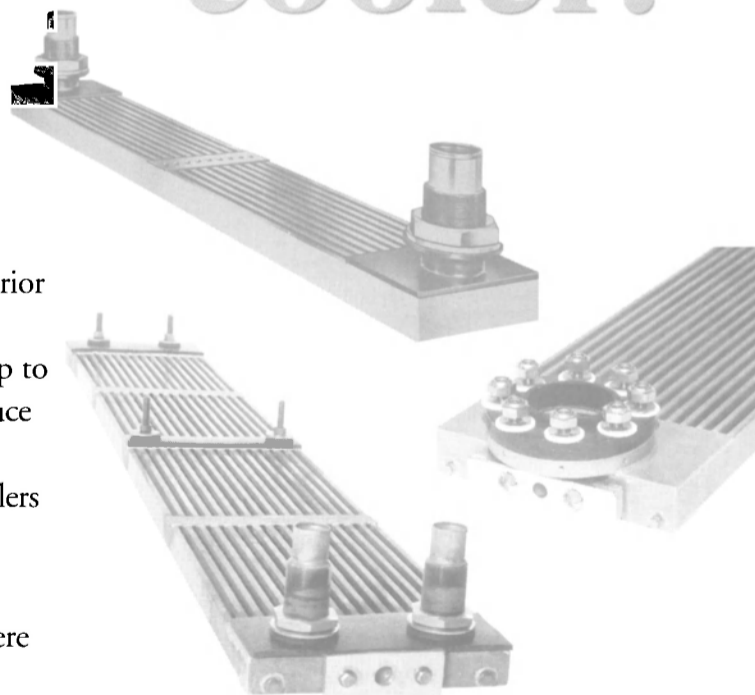
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## Investment in Design

(Continued from page 10)

and Bird-Johnson. The overall effort began at Carderock headquarters, Bethesda, in October 1998 and is a four-year, \$2.8 million program involving both structural and hydrodynamic research and development.

The Carderock Division, with its unique laboratories and test facilities, large-scale land-based engineering and test sites, and at-sea measurement facilities, is and has been at the forefront of technologies vital to the success of the Navy and maritime industry for more than a century. The key element in the technological success of the Division is the breadth and depth of its capabilities. The Division provides cradle-to-grave support for its technical products over an enormous breadth of scientific areas related to surface and undersea platforms. Today, the Division is applying its expertise to ensure that the Navy maintains tactical superiority in the most cost-effective manner. Such work

embodies "core equities" of the Naval Sea Systems Command (NAVSEA) helping fulfill a unique roll in Defense Department acquisition strategy.

## Air Products Develops World's Largest

Air Products AS, has successfully delivered and established the world's largest nitrogen generator system ever produced for shipboard application, based on membrane technology while utilizing PRISM membrane hollow fibers.

The 6,250 Nm<sup>3</sup>/h capacity nitrogen generator produces 95 percent nitrogen purity was delivered to M/T Millennium Explorer, a 98,000-dwt methanol tanker, built at Namura Shipyard in Japan. The nitrogen will be utilized for cargo-protection during sea voyage, as well as during cargo discharge.

Circle 36 on Reader Service Card

# PropacRudder Benefits Confirmed In Service

Wartsila NSD has recently completed shipboard trials with the new Wartsila NSD PropacRudder, and results are promising, according to the manufacturer. The innovative propulsion system, originally introduced a little more than a year ago, was designed to reduce propulsive power requirement, with reduced hull vibration and noise, while providing for exceptional maneuverability. The trials, undertaken last October and November aboard the 5,175-dwt paper carrier Lysbirs, reportedly confirm all of this. Norwegian owner Lys-Line AS of Oslo was the willing test partner (it should be noted that Norwegian owners are renowned for their willingness to work with the industry in the proving of new concepts), and the vessel was equipped with a Propac propulsion package, which consisted of a 6,300 kW Wartsila 6L46C medium speed diesel engine, a 4.5 m diameter Wartsila CP propeller, gearbox and PropacRudder. The PropacRudder's signature is its streamlined torpedo shaped bulb on the rudder horn. The bulb is designed to ensure a more homogeneous water flow both in front of the propeller and in the propeller slipstream. The bulb is designed to increase propulsion efficiency via a wake gain effect, meaning that it reduces the water speed into the propeller so that less power is needed to produce the same thrust. The bulb also has been shown to reduce propeller-induced hull noise and vibration by eliminating hub vortices and separation, and cavitation behind the propeller hub collapsing on the propeller. While model tests showed that solely by applying the PropacRudder, the presence of the bulb gives a large reduction in power of about 10 percent for the same ship speed compared to using conventional flap rudders, the full-scale trials actually demonstrated an even greater power savings. It was noticeable during the trial on Lysbirs that propeller-induced noise level is very low right across the range of pitch settings with constant propeller revolutions, without any noisy face cavitation or local hull vibration problems. Also of note was the vessel's maneuverability, particularly during low-speed operation and in restricted waterways. At low ship speeds, even in high winds and fast currents, the vessel was kept under control. In the trial, it was found that the ship can be maneuvered safely at speeds down to just one knot, even in strong currents. The next vessel to enter service with the PropacRudder is the 14,000-dwt chemical tanker Jo Laguna D from Italy's De Poli Yard.

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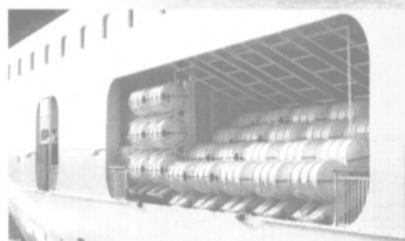
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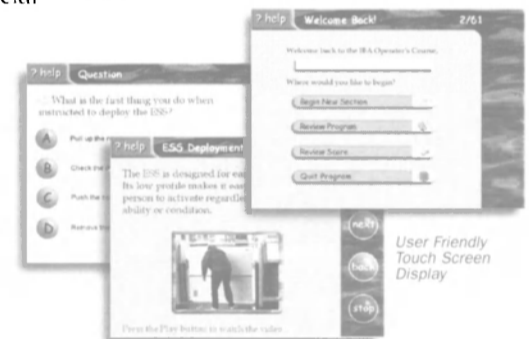
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## E&P Spending 2000: Boom or Bust?

While the theoretical jury deciding which direction the offshore drilling market will take is still out, recent data suggests that the level of spending internationally will disappoint. Calling a 10.2 percent gain in spending may seem

a bit harsh, particularly given the depths to which the market has sunken in the previous two years. But considering that the price per barrel has catapulted from the \$10 level early in 1999 to the mid-20's by the beginning of 2000, it is fair

### Summary of Oil & Gas Exploration & Production Expenditures

	2000E	1999E	Year % Chg.	# Co.
U.S. Spending by Non-Majors	13,402	10,907	+22.9%	215
U.S. Spending by Majors	10,959	10,113	+8.4%	15
Total U.S. Spending	24,361	21,020	+15.9%	230
Canadian Spending	8,030	6,272	+28%	78
International Spending	54,078	51,160	+5.7%	97
<b>TOTAL</b>	<b>\$86,469</b>	<b>78,452</b>	<b>+10.2%</b>	<b>320</b>

Source: Lehman Brothers

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to say that expectations were set a bit higher. According to a recent Lehman Brothers survey, the following are the spending plans, by world region, for more than 320 oil companies.

The silver lining to the above numbers, of course, is the level of increase expected in North America. But despite these advances — there are still noticeable reservations regarding activity levels — reservations being the result of many factors. First, the energy markets have been through — and continue to — embark on a trail toward historic levels of consolidation. It is still undefined as to how fewer, larger companies will deploy their E&P dollars. Second, the actions of the member of OPEC are still in question. Oil pricing gains are largely the result of output cutbacks. While the organization appears more committed than ever to maintaining a profitable supply and demand balance, there are no guarantees that the market won't be flooded with new reserves at any given moment. For example, countries with poorly performing economies or who weather severe natural disasters may be enticed to increase output to fill budget gaps.

While offshore players seemingly expected the bounce back to be delayed until mid-year, following naturally industry tendencies, it is fair to say that offshore rig and service providers and their investors are itching to start locking up contracts again.

### Survey of Major Oil and Gas Company E&P Expenditures

in the U.S. (1999E-2000E) (\$Millions)

Company	2000E	1999E
Amerada Hess	210	185
Atlantic Richfield	1,200	1,300
BP Amoco	1,900	1,500
Chevron Corp.	1,150	900
Conoco	450	420
Eni SpA	150	250
Exxon Mobil	1,700	1,600
Murphy Oil Co.	135	90
Occidental Petroleum	212	164
Philips Petroleum	332	239
Royal Dutch Shell	1,300	1,250
Statoil	120	115
Texaco	1,000	1,000
TotalFina Elf	500	600
USX-Marathon Group	600	500
<b>Total</b>	<b>10,959</b>	<b>10,113</b>
	+8.4%	

Source: Lehman Brothers



# New Government Statistics Show Larger, Diverse Fleet

New statistics released by MarAd reveal a much larger and more diverse U.S.-flag fleet than ever before reported. The data, unveiled by MarAd Administrator **Clyde Hart**, shows the American fleet actually totals more than 37,000 vessels, and paints a picture of a robust and diverse fleet, with great capacity to meet U.S. shippers' transportation needs while also meeting strict U.S. environmental and safety standards.

The new statistics underscore the value of the U.S. marine transportation system to the U.S. economy as it efficiently and effectively provides American businesses access to world suppliers and markets.

The MarAd report brings into sharper focus the size and character of the U.S. Jones Act fleet, combining data on self-

propelled vessels as well as barges for the first time. It shows 37,308 vessels operate domestically under the U.S. flag, a far greater number than previously reported.

It also illustrates the diverse nature of the fleet, comprised of a wide variety of

vessel types, including 25,698 barges on the U.S. inland waterways, 2,433 ships and barges carrying domestic cargo in coastal trades, and 5,446 tugs and towboats.

Fully 85 percent of the total cargo carrying capacity of the U.S. fleet is

accomplished by barges, not only in the inland market, but in oceangoing coastwise and non-contiguous trade as well.

The report is the first comprehensive government accounting of the entire American fleet ever available.

This new system of accounting has long been sought by the U.S. maritime industry as a more accurate depiction of the scope, breadth, and capacity of the

## Cargo-Carrying U.S.-Flag Fleet by Area of Operation

(Carrying Capacity Expressed in Thousands of Metric Tons) As of January 1, 1999

Total Fleet	No.	Tons
Area of Operation		
Foreign Trade	407	6,405
Self-propelled	144	5,565
>=1,000 Gross Tons	144	5,565
<1,000 Gross Tons	0	0
Non-self-propelled**	263	840
>=1,000 Gross Tons	33	230
<1,000 Gross Tons	230	610
Domestic Trade	28,947	58,058
Coastal (including non-contiguous)	2,433	13,509
Self-propelled	119	7,019
>=1,000 Gross Tons	119	7,019
<1,000 Gross Tons	0	0
Non-self-propelled**	2,314	6,490
>=1,000 Gross Tons	714	5,257
<1,000 Gross Tons	1,600	1,233
Internal Waterways	26,308	42,279
Self-propelled	610	163
>=1,000 Gross Tons	1	2
<1,000 Gross Tons	609	161
Non-self-propelled	25,698	42,116
>=1,000 Gross Tons	1,661	5,645
<1,000 Gross Tons	24,037	36,471
Great Lakes	206	2,270
Self-propelled	64	1,918
>=1,000 Gross Tons	59	1,915
<1,000 Gross Tons	5	3
Non-self-propelled	142	352
>=1,000 Gross Tons	32	192
<1,000 Gross Tons	110	160
<b>Total Commercial Fleet</b>	<b>29,354</b>	<b>64,463</b>
National Defense Reserve Fleet***	178	3,410
Ready Reserve Force (RRF)	89	1,875
Other Reserve	89	1,535
Other Government	7	258
Sealift Vessels	7	258
<b>Grand Total</b>	<b>29,539</b>	<b>68,131</b>

\* Includes General Cargo, RoRo, multipurpose, LASH vessels and deck barges; excludes Offshore Supply Vessels.

\*\* Integrated Tug Barges of 1,000-grt and greater are contained in non-self-propelled categories as follows: Foreign Trade - 2 liquid (78,000-tons); Domestic Coastal - 11 liquid (413,000-tons), 4 dry bulk (95,000-tons), 1 other freighter (20,000-tons); Great Lakes - 2 liquid (19,000), 7 dry bulk (153,100)

\*\*\* Self Propelled Vessels => 1,000-grt; excludes two RRF passenger vessels of 25,558-dwt and nine other passenger vessels of 82,822-dwt.

Source: U.S. Maritime Administration, Office of Statistical & Economic Analysis; adapted from U.S. Army Corps of Engineers, U.S. Coast Guard and U.S. Customs Service data.



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# ATB Delivered by Alabama Shipyard

Alabama Shipyard, Inc. delivered Nicole Leigh Reinauer and RTC 135, an articulated tug/barge (ATB) unit, built for Reinauer Transportation Companies of New York.

Alabama Shipyard designed the 135,000 barrel, 460-ft. (140.2 m) double-hulled barge in compliance with

OPA 90 regulations. Bob Hill of Ocean Tug and Barge Engineering designed the 7,200-hp twin-screw 124 ft. (37.7 m) tug, built by Alabama Shipyard's sister company, Atlantic Marine.

Reinauer is extremely pleased to have been able to work through Alabama Shipyard in the construction of the

first ATB unit in the history of our company," said **Craig Reinauer**, president of Reinauer Transportation Co. "It was through the efforts of **Mark Asbury**, president of Alabama Shipyard Inc., his staff and craftsmen that we were able to accept the vessels on time and to the highly recognized standards of ABS, the United States Coast Guard and Reinauer Transportation Company."

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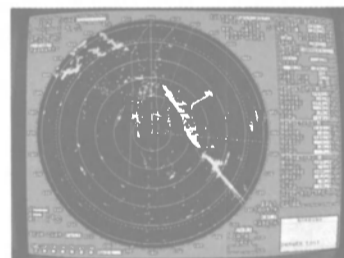
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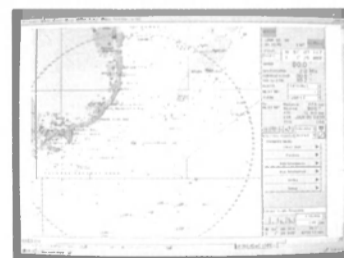
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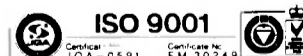
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### Main Particulars

#### Tug Nicole Leigh Reinauer

Length ..... 124 ft. (37.7 m)  
Beam ..... 40 ft. (12.1 m)  
Hull Depth ..... 22 ft. (6.7 m)  
Design Draft ..... 19 ft. (5.7 m)  
Design Top Speed ..... 11 knots  
Propulsion Engines ..... (2) Cat 3612  
Propellers ..... (2) Bird-Johnson  
Auxiliary Engines ..... (4) Cat 3304B

#### Barge RTC 135

Capacity ..... 135,000 bbls  
Length ..... 460 ft. (140.2 m)  
Beam ..... 72 ft. (21.9 m)  
Hull Depth ..... 41 ft. (12.4 m)  
Design Draft ..... 29.5 ft. (8.9 m)  
Gross Tonnage ..... Approx. 8,400  
Auxiliary Engines(4) Cat 3406C for pumps, each 462  
bhp @ 1,800 rpm  
(2) Cat 3304B gen sets, each 99 ekW @ 1,800 rpm  
Cat 3304B for hydraulic drives, 156 bhp @ 1,800 rpm

**Maritime Reporter/Engineering News**



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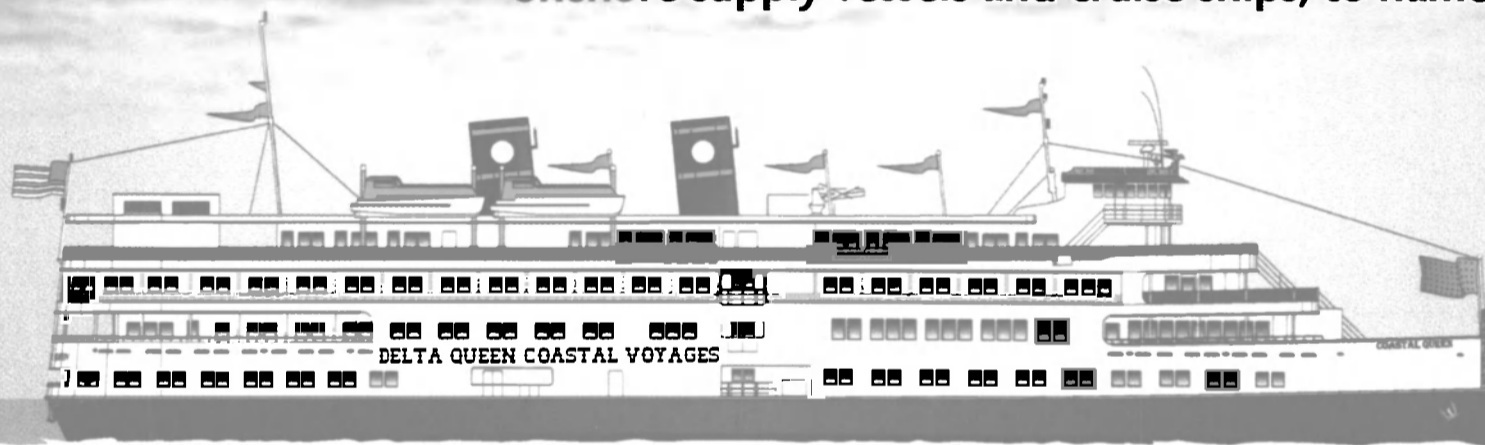
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# Cruise Shipping Annual

## The New "Class" of Celebrity's Class

*It could be dubbed "the new classic." The idea of creating a comfortable passenger vessel encompassing old world classic décor — as per the famed ocean liners of the early 20th Century - while instilling modern safety and mechanical requirements, as well as sophisticated amenities. Last fall, Miami, Fla.-based Celebrity Cruises created its own rendering of this trend via its new "Millennium" Class of ships. With construction currently underway at French shipyard Chantiers de l'Atlantique, the inaugural vessel of the four part class is scheduled for a maiden voyage in June 2000.*

— By **Regina P. Ciardiello**, assistant editor

A company only 10-years young has already earned itself a place in cruise ship history with the new "Millennium" ship series. Celebrity Cruises, which merged with Royal Caribbean Cruise Lines (RCCL) in 1997, has taken its design pursuits a step further with this new class by combining, according to Celebrity's president, **Richard Sasso**, the line's two most important facets, "traditional and elegantly casual ships, which are technologically advanced."

"We prefer to go with a unique classic style, which protects the integrity of Celebrity's casual elegance," Sasso said.

With three more Millennium vessels scheduled for construction to Panamax standards through 2002, each will cost approximately \$350 million. The first member of the fleet will perform varied European voyages from June through October 2000, before embarking on alternating eastern and western Caribbean sailings from Fort Lauderdale in November 2000.

At 91,000 tons, 965 x 106 ft. (294.1 x 32.3 m) Mil-

lennium is equipped to carry 1,950 passengers (double occupancy) at a cruising speed of 24 knots.

While the Millennium project will undoubtedly strengthen Celebrity's worldwide customer base with its tribute to early 20th Century design aspects — customers will also be treated to a vessel that houses a technological base synonymous with the 21st Century.

"If you don't invest in technology you'll be left behind," Sasso said. "When you're more technologically advanced, it makes it much easier to communicate with passengers and travel agents."

"We are trendsetters and industry leaders in developing technology and we'll continue to do that," he added.

Proving his point is the fact that Millennium will be the first vessel ever built to offer passengers with the premiere application of gas turbine technology. According to Celebrity, the vessel will house a pair of GE Marine Engines' LM2500 + aeroderivative gas turbines and a single steam turbine rather than the conventional four or five large diesel engines used on today's cruise vessels. The turbines then drive the vessel's generators, which work to provide electricity to Millennium's propulsion motors.

Long a tenet of naval vessel and specialty fast craft applications, gas turbine propulsion is quickly making inroads with the environment sensi-

tive and performance demanding cruise market.

"The gas turbine technology provides for a smooth, quiet and safe excursion," Sasso said.

Resulting from this technologically-driven application is not only less noise and vibration, but increased deck space on Millennium, not to mention the fact that the system's compact size requires less space to house and maintain, thus allowing for more spacious staterooms and activity areas onboard. Featuring the largest percentage of ocean view staterooms, with 80 percent of the total 975 staterooms having exterior views, Millennium also boasts the largest suites at sea - measuring as much as 3,000 sq. ft. with verandas. Adding to its list of firsts, the ship also houses the industry's premiere exterior glass elevators.

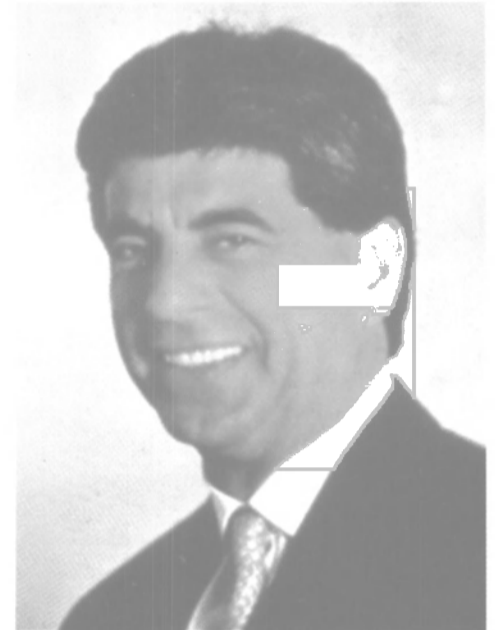
### A Historical Discovery

It was a time where the trend of simple elegance ruled the day, as was reflected through the famed White Star Line's great ship of 1911 — R.M.S. Olympic. Sistership to the world-renowned Titanic, the vessel was referred to, according to maritime historian, **John Maxtone-Graham**, "as the first of a huge new class of ships."

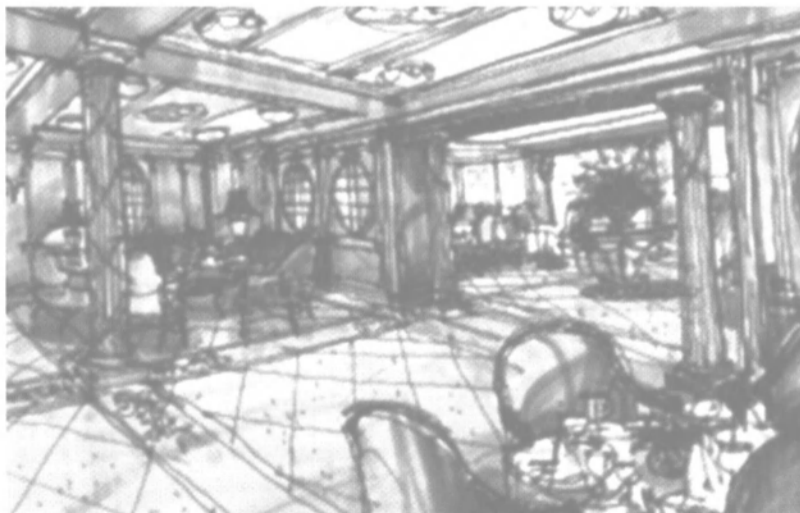
The Olympic, which debuted in June of that year was "White Star's response to Cunard Line's Lusitania and Mauretania," said Maxtone-Graham, who also acts as Celebrity's historical consultant for the Millennium Class.

With the debut of Cunard's Mauretania in 1907, White Star chose a different route of shipbuilding by deciding to build a vessel that focused on comfort rather than speed — thus the idea of Olympic was born.

Displacing 45,000-tons, and boasting "all the comfort that a large ship could," Olympic housed a swimming pool, squash and racquetball court and the



**Richard Sasso**, president, Celebrity Cruises, said "If you don't invest in technology you'll be left behind ... When you're more technologically advanced, it makes it much easier to communicate with passengers and travel agents."



A rendering of the Olympic Dining Lounge/Room as it will appear onboard Millennium. The lounge area holds the original paneling that once stood in the a la carte dining room aboard the famed R.M.S. Olympic.

## Cruise Shipping Annual

notable a la carte dining room — the vessel's popular restaurant — that was frequented by Olympic's passengers. After Titanic's tragic and much publicized sinking, White Star returned Olympic to its original builder Harland & Wolff in Northern Ireland, where it received an inner skin to avoid a similar fate. Olympic continued to operate transatlantic crossings until 1935 when it was decommissioned and scrapped in Jarrow, Northumberland.

But Olympic still lives today — and not just through memories and drawings. Years later Celebrity discovered that some of the original paneling from the vessel's a la carte restaurant was preserved in an English residence. Its owners, who had purchased the paneling at an auction after the ship had been cut up, recently decided to sell the piece of history to Sotheby's — the Manhattan auction house where Celebrity made its winning bid.

Walking into the original a la carte dining room one would be encompassed by the elegant honey-colored French walnut paneling that was flecked by gold colored leaves. Boasting a rose-colored carpet, the Louis XV-inspired room would hold tables with French-backed

chairs, as well as an adjacent waiting room where a piano trio played as guests waited to dine.

"The paneling will recapture the elegance and glory of one of the North Atlantic's greatest ocean liners," Maxtone-Graham said.

The paneling has since been sent to Chantiers for installation on Millennium's historical apex — the Olympic dining lounge. But before taking on this task, the paneling had to be cleaned and restored. A subcontractor hired by Chantiers fixed imperfections such as scratches and discoloration on the paneling.

According to **Francesca Bucci**, an associate at New York City-based Birch Coffey Design, the original paneling for the Lounge Room consists of 40 linear meters of French walnut with gilded details, while the remaining 10-15 percent of the lounge, and the entire wine cellar was filled with a replication of its original.

Bucci, whose firm designed the Olympic Dining Room and Lounge aboard Millennium, as well as various public areas, explained that since the paneling is made of wood, it would have to be treated to meet the flammability

requirements.

"Traditionally, flammable materials would be coated with a special fire treatment," Bucci said. "Since this was a special situation, we could only treat the back of the paneling and sprinkler systems were added in the lounge instead."

Bucci also mentioned that an original credenza that once stood in the R.M.S. Olympic's dining room will accompany the paneling in the lounge. Measuring 2 m x 90 cm, the piece will be placed outside of the restaurant's display kitchen.

While Celebrity may be taking the path of, as Bucci says, "traditional luxury ambiance," the trends in cruise design are split two-fold.

"We basically have two mainstream designs," Bucci said. "The subtle, sophisticated and historical European style, or on the other end, the Vegas-style, flashy decor. For the moment, these are the most popular trends among cruise design."

### The Future of the Fleet

Celebrity has achieved a healthy growth spurt not only by the merger with RCCL, and the addition of its Millennium Class, but by exceeding its expectations as a whole.

"We are very steadfast in delivering a quality product," Sasso said. "We promised a lot, and yet we delivered more."

As it would seem highly unlikely at this point in time, resulting from an average of 10.7 cruise vessel newbuilds scheduled each year through 2003, how would Celebrity handle a possible downturn? According to Sasso, who has been involved in the cruise industry for the past 29 years, "Not since the fuel crisis of the 1970s and skyrocketing interest rates of the mid-1980s has the industry experienced such a dip."

He added, "Our [the cruise] industry has proven to be successful in down markets, today there are ships out there with greater technology. Ships are more attractive and offer more of a variety of amenities, thus attracting more customers."

Although Celebrity might be dubbed by some industry insiders as new competition for other cruise lines that have already made their mark, 2000 could also be dubbed as the year of Celebrity.

"2000 is our year," Sasso said. "We'll spend a lot more this year on bigger ships, as well as doubling our fleet size throughout the next five years."



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## Cruise Shipping Annual • New Cruise Ships in 1999

For information on Royal Caribbean's Voyager of the Seas, see story on page 50

**Vessel name** Disney Wonder  
**Owner** Disney Cruise Lines  
**Yard** Fincantieri

Disney Cruise Lines on October 1, 1999, christened its second vessel, Disney Wonder - sistership to Magic. Dubbed a modern classic, the vessel boasts an Art-Nouveau inspired interior encompassing an entertainment district, restaurants and lobby. Renowned restaurant designer **Adam Tihany** and glass blower **Dale Chihuly** are the masterminds behind Wonder's interior creativity. Performing its maiden voyage this past August, Wonder offers the best of land and sea with a three- or four-day Bahamian cruise, combined with three or four days at Walt Disney World Resort. The vessel also spends a full day at the Port of Nassau and Disney's private island - Castaway Cay. Measuring 964 ft. (293.8 m) at 83,000-tons, Wonder is powered by five 16-cylinder diesel engines and two 19 MW General Electric propulsion motors at a cruising speed of 21.5 knots. With a crew of 919, the vessel is equipped to carry 1,750 guests double occupancy (2,400 max. capacity) in 875 staterooms and suites.

### Main Particulars

Delivery date	August 1999
Flag	Bahamas
Length	964 ft. (293.8 m)
Width	106 ft. (32.3 m)
Draft	25 ft. (7.6 m)
Tonnage	83,000 tons
Propulsion	GE propulsion motors
Speed	24 knots (max.)
Capacity	1,750 guests double occupancy
Crew	919



**Vessel name** Carnival Triumph  
**Owner** Carnival Cruise Lines  
**Yard** Fincantieri

Despite its delivery delay this past summer, Carnival's newest "Fun Ship" Triumph began four- and five-day excursions to the Canadian Maritime Provinces on July 27.

The 102,000-ton vessel was forced into drydocking on the brink of its launching date due to overheating on the bearing located on one of its shafts. Situated at the home of its builder - Italian shipyard Fincantieri, the vessel underwent a replacement of both shafts, since both utilize the same type of bearing. The shipyard also agreed to compensate Carnival for the resulting delays in launching. Since October 23, the Panamanian-flagged vessel has been operating additional venues to the Caribbean departing from the Port of Miami. Ranked as one of the largest cruise ships, the vessel offers an array of activities and culinary options, such as the Old-World style Vienna cafe, casual Olympic Bar and Club Monaco Casino.

### Main Particulars

Delivery date	July 1999
Flag	Panama
Length	893 ft. (272 m)
Beam	116 ft. (35.3 m)
Max. draft	27 ft. (8.2 m)
Speed	225 knots
GRT	102,000
Capacity	3,473
Crew	1,150



Photo: Carnival Cruise Lines

**Vessel name** Mistral  
**Owner** First European Cruises  
**Yard** Chantiers de l'Atlantique (Alstom)

The newest addition to First European's fleet is Mistral, which completed its inaugural cruise from the Port of Genoa in Italy on July 17, 1999. Mistral — meaning "Provençal wind," was constructed by the Saint Nazaire yard of Chantiers de l'Atlantique. The 48,000-ton vessel was delivered ahead of schedule during the end of June. Equipped to handle 1,200 passengers at 20 knots, Mistral offers weekly summer cruises to the Eastern Mediterranean and the Greek Isles; Transatlantic voyages in the fall via the Canary Islands; and winter excursions to the Caribbean. The 708 ft. (215.8 m) vessel holds 598 staterooms and 80 suites.

### Main Particulars

Delivery date	June 1999
Flag	France
Length	708 ft. (215.8 m)
Breadth	95 ft. (28.9 m)
Tonnage	47,900 tons
Cruising speed	20 knots



Photo: First European Cruises

**Vessel name** MS Volendam  
**Owner** Holland America Line  
**Yard** Fincantieri

Volendam, the third Holland America vessel to bear the name, was delivered to its owners in October and was scheduled to depart for its maiden voyage on November 12.

Constructed at Fincantieri shipyard in Marghera, Italy, the 63,000-gt vessel is classed by Lloyd's Register and measures 781 ft. (238 m) carrying 1,440 passengers at a speed of 23 knots. Issued a Passenger Safety Certificate (PSSC) by Lloyd's on behalf of the Government of the Bahamas, Volendam is a combination of classic and modern features including a \$2 million collection of art exhibited throughout the vessel, as well as a lido swimming pool area with retractable glass magradome ceiling.

### Main Particulars

Delivery date	November 1999
Length	780 ft. (238 m)
Beam, (waterline)	105 ft. (32.2 m)
Beam, (extreme)	113 ft. (34.4 m)
Draft	26 ft. (7.8 m)
GT	63,000-grt
Diesel engines	Five Sulzer V12 40 ZAS
Propulsion power	Cegele, Kamewa
Side thrusters	Kamewa
Joystick	Kamewa
Max. passenger capacity	1,846
Crew	647



**Vessel name** Norwegian Sky  
**Owner** Norwegian Cruise Lines  
**Yard** Lloyd Werft

Constructed under the direction of Norwegian Cruise Line's (NCL's) newbuilding team and renowned marine architects Tillberg Design of Sweden, the company was able to deliver its newest — the \$300 million Norwegian Sky — on a timely basis. In August 1999, NCL inaugurated the 77,104-ton, 2,002 passenger vessel as the newest member of its fleet, which was constructed at the Lloyd Werft shipyard in Bremerhaven, Germany. Its focal point being a towering eight-deck-high glass-domed atrium, Norwegian Sky measures 853 ft. (259.9 m) in length with a breadth of 106 ft. (32 m) and a 26 ft. (7.9 m) draft. Holding 1,001 staterooms, each measuring approximately 150 sq. ft., Sky also boasts 257 suites each with private balcony. The vessel operates itineraries out of Miami, Seattle and Los Angeles, headed for the corresponding destinations of the Eastern and Western Caribbean, Alaska and the Panama Canal.

### Main Particulars

Delivery date	August 1999
Flag	Bahamas
Length	853 ft. (259.9 m)
Width	106 ft. (32.3 m)
Draft	26 ft. (7.9 m)
Speed	23 knots
GT	77,104 (total)
Machinery, diesel electric	STN/LDW
Propellers	Kamewa
Diesel generators	MAN B&W



**Vessel name** Seven Seas Navigator  
**Owner** Radisson Seven Seas  
**Yard** T. Mariotti Shipyard

Christened in October 1999 by **Marilyn Carlson Nelson**, chair and CEO of the Carlson Companies, the \$200 million vessel Seven Seas Navigator was constructed by Italy's T. Mariotti shipyard to hold 490 passengers. The all-suite vessel, which debuted in the Mediterranean in August with a series of seven- to 11-night cruises, measures 560 ft. (170.6 m) weighing 33,000 tons. With 80 percent of its 245 ocean-view suites boasting private balconies, the vessel is the largest — and at 20 knots cruising speed — is the fastest in the Radisson Seven Seas fleet.

### Main Particulars

Length	560 ft. (170.6 m)
Width	81 ft. (24.6 m)
Draft	21 ft. (6.4 m)





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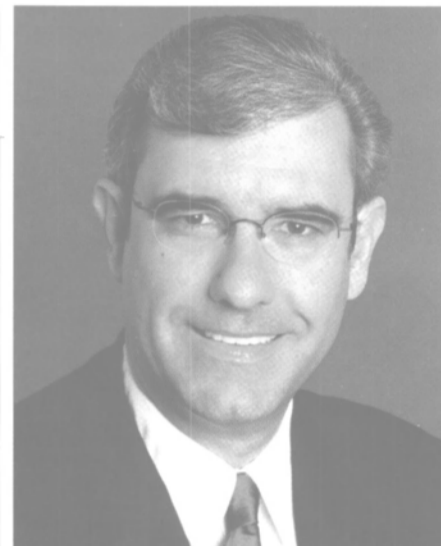
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# Cunard Creates The Classic Liner (Again)

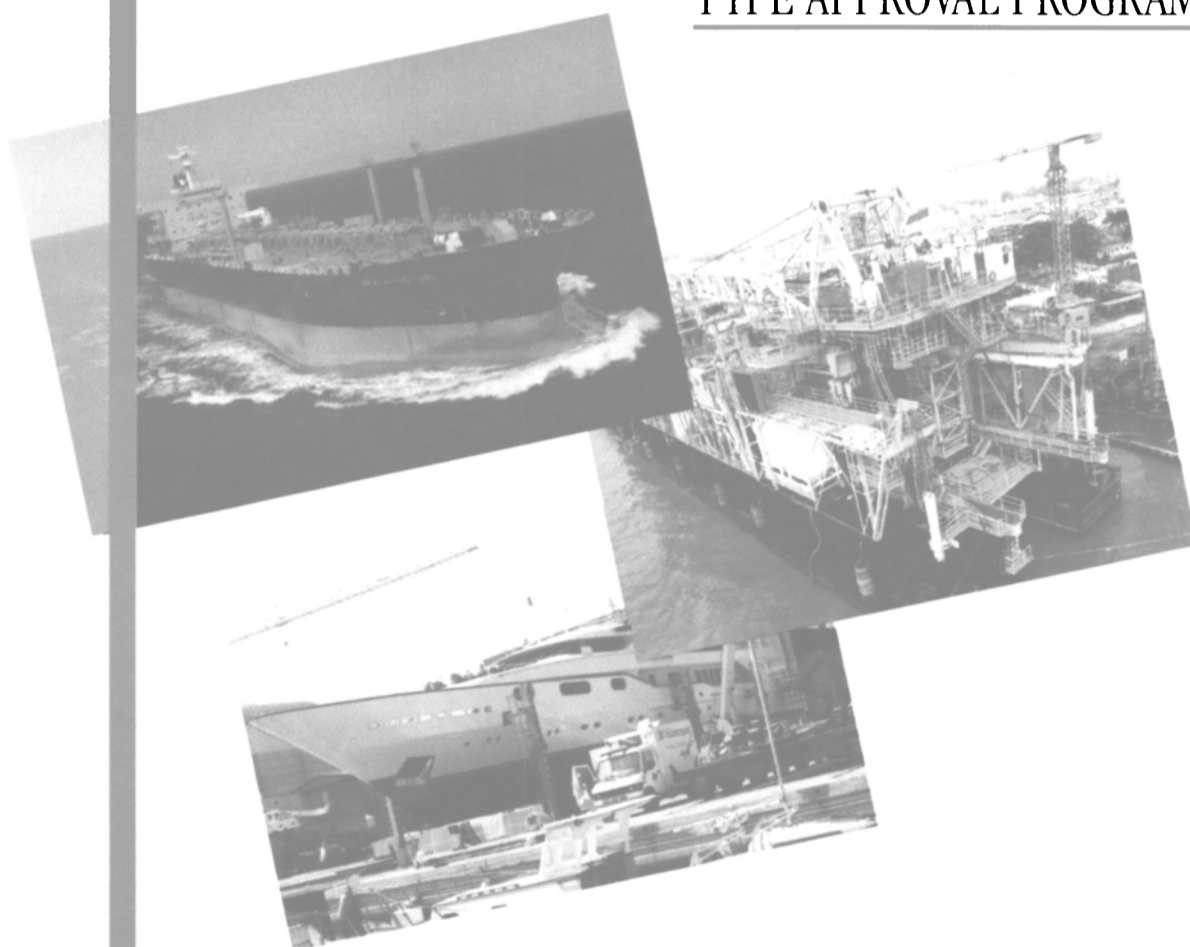
First announced in June 1998 by the company that prides itself on "its growth lying in its past," Cunard Line Limited has plans to construct the world's

largest passenger vessel to ever sail the high seas. Scheduled for completion 2003, *Queen Mary 2* will measure a record 1,100 ft. (335.2 m).

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Larry Pimentel, president & CEO of Cunard



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the introduction of its *Queen Mary 2* project. Rough plans for the vessel were introduced in November, and at press time a contract to build the vessel in a European yard was imminent.

Cunard divulged that the new ship's interiors will be similar to that of White Star Line's *Titanic*, while its hull will be painted in classic matte black. Boasting a raked prow, reminiscent of the *QE 2*, the vessel's large red single stack with black bands, will tower 20 stories above its keel. "Project *Queen Mary* will be the world's most famous ship," said **Larry Pimentel**, president & CEO of Cunard Line. "The vessel will reflect the golden age of sea travel for those who missed it the first time around."

With a deep, narrow draft designed for a smooth ride, the 140,000-hp vessel will be able to move across the sometime harsh conditions of the North Atlantic at speeds of 30 knots.

The original *Queen Mary*, which was completed in 1936 by John Brown & Co. of Glasgow, produced 160,000-shp for a speed of more than 30 knots. Performing voyages on the Southampton-Cherbourg-New York route, the vessel remained commissioned until 1967, and now operates as a floating museum/hotel in Southern California.

Further singling out *Queen Mary 2* as an ocean liner of yesteryear, rather than today's mega cruise ship, it will hold a heritage trail type onboard museum of maritime history, depicting Cunard's accomplishments — such as its significant wartime efforts when *QE 2* was requisitioned by the British Government for the Falkland Islands Campaign.

**Winds of change**

The proud company has gone through more corporate change in the last five



years than the previous 155 cumulatively, but Pimentel sees the takeover by Carnival and subsequent merge with Seabourn as a saving grace.

"Carnival has brought down our debt significantly, and provided us with one of the greatest balance sheets in recent history," he said.

The Carnival acquisition also allowed Cunard to expand on its current fleet by hiring German shipyard Lloyd Werft to perform a trio of refits for the company. Awarded a contract worth more than \$40 million, the yard performed refits of the QE2, Vistafjord (renamed Caronia) as well as Seabourn Line's Royal Viking Sun (renamed Seabourn Sun).

The line will also continue to focus on expanded voyages for Cunard's core

audience, which ranges from teens to "older adults who remember tea in the afternoon," to the Seabourn fleet — whose typical customer is in their mid-forties and enjoys a pampered, intimate atmosphere.

With the cruise market evolving at a fast pace, Pimentel cited that the industry will tend to lean towards more specialized markets, as well as more con-

solidation among cruise companies

"You're going to see more niche market playing, specifically on spas, golf programs and broader destinations," he said. He continued: "Though it's not a ball game for shallow pocketbooks or the meek," Pimentel said. "Without a doubt, I think there will be more industry consolidation."

— Regina P. Ciardiello

## Cruise Industry Leaders To Convene At SeaTrade

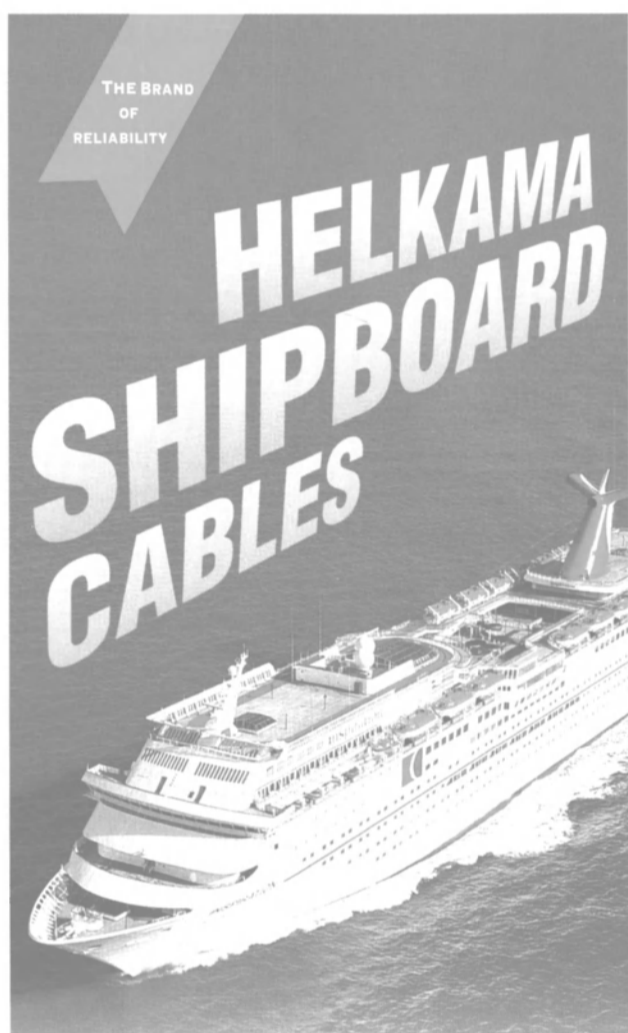
Scheduled from March 7-11, 2000, at the Miami Beach Convention Center, SeaTrade Cruise Shipping Convention will provide attendees with the latest happenings and innovations joining a new century of cruising. Registration begins on Tuesday, March 7 at 8 a.m.

Wednesday, March 8 will begin with an introductory address by **Vicki Freed**, chairman, Cruise Line International Association (CLIA), and senior vice president sales & marketing, Carnival Cruise Lines, which will then segue into a "State of the Industry" Debate among some of the industry's leading players. Featuring **Bob Dickinson**, president, Carnival Cruise Lines; **Richard D. Fain**, chairman & CEO, Royal Caribbean Cruises; and **Matt Ouimet**, president, Disney Cruise Line, they will discuss and debate the current state of the cruise industry, as well as its prospects for the new decade.

Exhibitors from around the world will display their latest wares to the industry. Segmented on the exhibit floor by specific categories of manufacturers of ship equipment, providers of ship services and hotel operations, destinations and distributors & manufacturers of food and beverages - allowing attendees to focus on certain categories of their choice.

The exhibition concludes on Saturday, March 11, where attendees will be invited to step aboard various cruise vessels currently operating in the industry.

Contract: Seatrade Cruise Shipping Convention, Miller Freeman (Princeton) Inc., 125 Village Boulevard, Suite 220, Princeton, N.J. 08540-5703; tel: (609) 452-2800; fax (609) 452-9374.



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# Cruise Share Performance

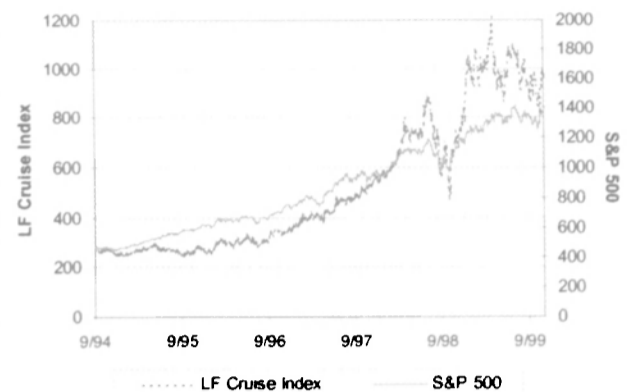
Towards the end of 1999, the stock market had shaken off concerns about the economy becoming too strong, interest rates had backed up and the general economy was sound. The S&P had moved back into positive territory, led by a rally in the technology sector and assisted by oversold sectors such as the retailers. Since early November, the cruise shares staged an impressive rally, with an 11.6 percent one-month rise in the LF Cruise Index (pictured), which is consistent with the performance of the two leaders, CCL and

RCL. Even more impressive was the truly explosive one-month performance of Star Cruises, which rose 50 percent.

Star is now the fourth largest cruise line in the world based on its market capitalization of \$5.6 billion. The Lazard Freres Cruise Index enjoyed good performance in the last few years, with a five year cumulative return of 264 percent.

— excerpted, in part from Lazard Freres' 1999 "Cruisin' Miami" Fieldtrip.

PERFORMANCE OF LF CRUISE INDEX vs. S&P 500



**UPWARD MOBILITY**

Cruise shipping shares have, in general, been upwardly mobile for the past year. The following charts give a general representation of share price activity. For more specifics, see chart next page.

**amcv** American Classic Voyages



**ccl** Carnival Corp.



**nrw** NCL Holding ASA



**rcl** Royal Caribbean



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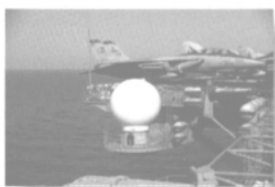
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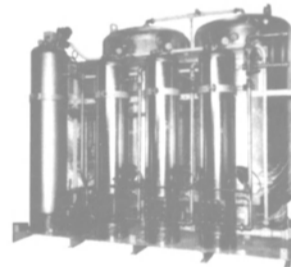
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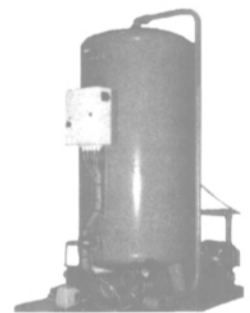
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The biggest cruise lines, by market capitalization, as of 11/12/99

Co	Price	Shares Out(mm)	Mkt. Cap (\$mm)
CCL	\$46.50	616.9	\$28,686
RCL	\$51.69	195.1	\$10,084
P&O*	\$29.83	333.5	\$9,947
Star	\$9.00	624.5	\$5.62
NCL	\$2.90	257.3	\$746
AMCV	\$24.69	19.6	\$484
ROCLF	\$3.94	14	\$55

Source: Lazard Freres' 1999 "Cruisin' Miami" Fieldtrip

\* Parent company of Princess Cruises.  
\* Star Cruise Lines is listed on the Singapore and Luxembourg exchanges.

### Litton Marine Systems Supplies IBS Order

Litton Marine Systems will supply integrated bridge systems (IBS) for two new cruise ships for Royal Caribbean International (RCI).

The two vessels are currently under construction at Meyer Werft Shipyard in Papenburg. Radiance of the Seas, will be delivered in early 2001, with the second vessel scheduled to arrive during the second half of 2002.

In accordance with Royal Caribbean's two-bridge concept, each vessel will house a completely redundant package comprised of two independent Vision 2100 integrated bridge systems. The total package will include interswitched BridgeMaster E S-band and X-band radars, a Sperry Marine Voyage Management System (VMS) with ECDIS and a docking system.

Litton also supplied the IBS installations for RCI's Eagle-class ships, the first being Voyager of the Seas delivered late last year.

Circle 37 on Reader Service Card

### Voyager Of The Seas Goes Live

Maritime Telecommunications Network (MTN), a subsidiary of ATC Teleports of Alexandria, Va. set sail from Finland to the port of Miami on the world's largest cruise ship — Voyager of the Seas.

MTN has equipped Voyager with full redundancy services including dual antennas and two MPEG-2 Digital Video units. Each antenna on the 142,000-ton vessel will have 12 lines for multiple voice and data capabilities. In preparation for Voyager's live broadcast, MTN modified one of the existing communications antennas for full motion video uplink. In addition, two flyaway video/audio systems, which are used to

convert analog signals to digital are located below deck.

Circle 38 on Reader Service Card

### MSC Europe Experiencing Steady Growth Stream

MSC (Europe) Ltd., the European sub-

siary of Maritime Services Corporation, Hood River, Ore. is currently handling various projects throughout the U.K. and Europe, mainly a \$2 million conversion of a fast ferry into a casino vessel for Israeli-based Athissa Shipping. MSC provided ship units, project management and fitters for installation

of duty free and other shops onboard Fred Olsen's MV Black Watch. The company also installed galley modifications and waste handling equipment onboard Arcalia Shipping's Princess Danae at A&P Falmouth.

The company has further extended its expansion capabilities with new offices

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Circle 225 on Reader Service Card

## Cruise Shipping Annual

in Cape Canaveral and Ft. Lauderdale, Fla. to meet the growing demands in these markets. According to **Dan Bell**, MSC's local manager, the Port Canaveral location will specialize in turn day work, riding crews and larger projects. The Ft. Lauderdale location will provide manufacturing, warehousing, engineering, estimating and administrative func-

tions to be performed in one facility — supporting operations throughout the Florida and Caribbean area.

Expansion has also been underway at MSC's headquarters in Hood River, Ore. Ongoing projects include a new warehouse (with another planned for spring) for inventory of "quick ship" joiner materials and expanded space for the

addition of six CAD positions. An upgraded and expanded marine interior design department is also included.

**Circle 90 on Reader Service Card**

### ACCL Adds New Itineraries

Known as the original smallship cruise line, American Canadian Caribbean

Line (ACCL), has established 25 new itineraries for the year 2000. Included in the new schedule are: Gulf Intracoastal Waterway; seven-day Belize/Barrier Reef; Chicago/Upper Mississippi; and Great Lakes/Quebec City. Able to hold between 84 and 100 passengers each, ACCL's three-vessel fleet Grande Caribe, Grande Mariner and Niagara Prince kicked off the new year in Central America and the Caribbean. Next summer Niagara Prince will travel the northern rivers and lakes near Chicago.

**Circle 44 on Reader Service Card**

### New President Elected At ICCL

The International Council of Cruise Lines (ICCL), a trade organization representing the North American cruise industry, has appointed **John A. Bastek** as interim president. Bastek, who has served as ICCL vice president since January 1999, will be responsible for daily operations of the Association until a permanent replacement is named. He was named to the position after **Cynthia A. Colenda**, announced in November that she was stepping down as ICCL president, effective January 1, 2000.

### Drew Marine To Provide Water Treatment System

An AWT Automated Water Treatment System from the Drew Marine Division of Ashland Specialty Chemical Company was scheduled for a January installation onboard Royal Caribbean's first Vantage Class newbuilding, currently under construction at Meyer Werft GmbH in Germany. Delivery will be made to contractor GE Packaged Power of Houston, Texas under a purchase agreement effective August 30, 1999.

The AWT system is a fully automated water treatment system for marine use. The system continuously monitors boiler water conditions and automatically doses chemical treatments to required levels for optimizing the performance of the steam-generating system.

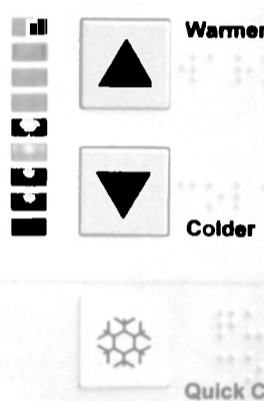
**Circle 45 on Reader Service Card**

### Seabourn Sun Unveils \$15 Million Upgrades

Proceeding a \$15 million refurbishment program, Cunard Line's 758-passenger Royal Viking Sun was recommissioned as Seabourn Sun under the Seabourn Cruise Line banner. The vessel was taken out of service following a call at Genoa on October 29, to undergo a complete refit at the Lloyd Werft Shipyard in Bremerhaven, Germany. The architectural firm of Tillberg Design formatted the design plan encompassing 14 public areas, including a new health spa and expanded golf facilities.

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## James P. Colie Completes Cruise Ships Refurbish



Royal Caribbean Online, an Internet Cafe built by James P. Colie & Associates is featured on Grandeur of the Seas.

Marine interior contractor James P. Colie & Associates has completed installation of its Internet Cafes for Royal Caribbean cruise vessels, the most recent on the Legend of the Seas, which was scheduled for a December 1, 1999 completion.



The entry to the main dining room on Royal Princess, renovated by James P. Colie & Associates

Dubbed Royal Caribbean Online, the new areas boast IBM computer equipment providing passengers with Internet access while cruising.

James P. Colie staff installed wallpaper, carpeting, owner-supplied equipment and new custom-built cabinetry in the 600 - 1,200 sq. ft. rooms containing six to 10 terminals each.

The company also refurbished the main dining room and purser's desk onboard Royal Princess during a drydock in the fall of 1999 at Baltimore Marine Industries. The project was just one of many contracts that Princess Cruise Lines has awarded to the marine general contractor.

Involving more than 60 craftsmen, the bulk of the project included the renovation of the vessel's dining room. Large, circular ceiling elements constructed of wood and mirror, surrounded by lighting fixtures were added, as well as marble walls and crown molding.

New waiter stations were installed in the dining room with granite tops supplied by Colie & Associates. Granite tile flooring surrounds the waiter stations, and carpet was installed throughout the remainder of the room.

Circle 91 on Reader Service Card

## Newbuilds To Feature Solasafe

Manufactured by South Shields, U.K.-based Solar Solve Marine, Solasafe anti-glare roller screens will be featured on current newbuilds constructed at Chantiers De l'Atlantique for delivery to Renaissance Cruises.

In a contract worth more than \$65,000, Solar Solve will provide 19 roller

screens for the vessels, bringing the amount of ships to boast the product to eight.

Dubbed Sunglasses for Ships™ by the company, the screens will also be installed in the wheelhouse windows on two Royal Fleet Auxiliary vessels, RFA Brambleleaf and RFA Diligence.

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## Premiere Tron VDR Installed

Maritime Ship Information Systems (MARIS) from Horten and Jotron have installed the first Tron VDR in conjunction with the MARIS VDR system on the passenger vessel, Crown of Scandinavia, operating on the Oslo — Copenhagen route.

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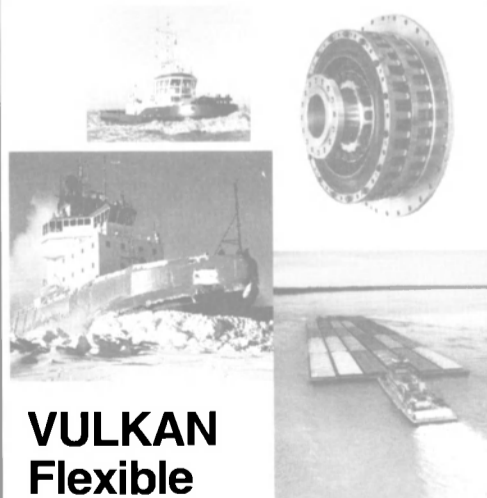
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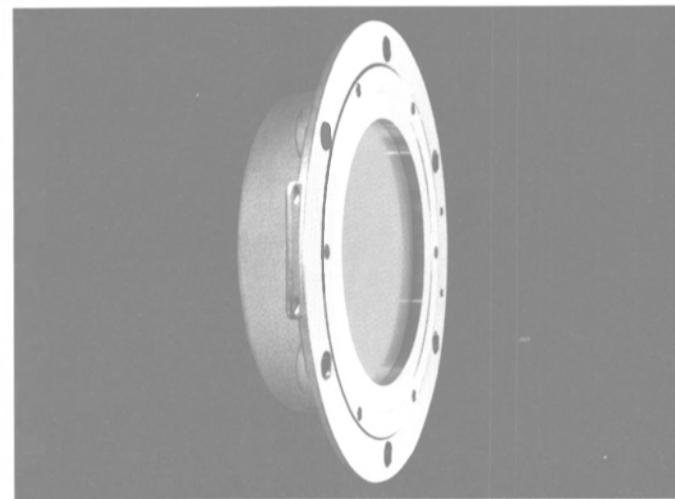
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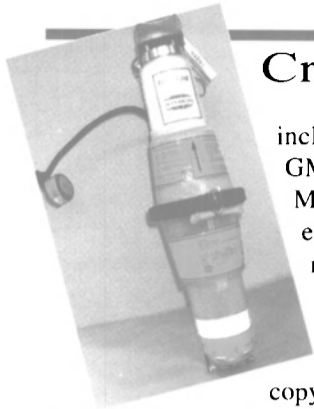
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## Cruise Shipping Annual

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emergency transmitting for positioning and rescue.

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### KVH Goes Digital With TracVision G4

KVH introduced the smallest, in-motion satellite television system pro-



KVH's TracVision G4.

viding the marine mobile user with the most reliable identification and tracking of Digital Video Broadcasting (DVB) satellites. TracVision G4 is the first single antenna system formulated to assess a range of DVB compatible satellites and transponders. The product can then accurately identify, acquire and maintain tracking of the one selected by a mobile user.

Featuring a built-in DVB compatible tuner and easy-to-use interface, TracVision G4 includes the award-winning KVH GyroTrac sensor at no extra charge.

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### NMEA Presents Product Awards

The National Marine Electronics Association (NMEA) presented product awards to 13 companies in 25 categories at the association's Annual Convention held in October.

#### 1999 NMEA Product Award Recipients

Category	Recipient
Best of Show	Furuno GP1650 Series GPS/DGPS
Autopilot, Commercial	Simrad Robertson AP9MK3
Compass, Electronic (Tie)	KVH AZ1000; Simrad Robertson RFC35
Gyrocompass	KVH Gyro Trac
Electronic Cartography, Vector	C-MAP NT
GMDSS Console	Furuno RC1500
GPS/DGPS Navigator	Northstar 951XD
Instrumentation	Raytheon Autohelm ST-60 Series
Marine Antenna	Shakespeare Galaxy 5225-XT
Marine Specialty Product	Raytheon NightSight
Navigation Plotter	Northstar 961XD
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Radar, Commercial	Furuno FR-2105 Series
Safety Equipment	Northern Airborne Technology
SatComm - Data	SEA 6003
SatComm - Data/Voice	KVH Tracphone 25
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# New Cruise Ship Designs Impact Terminal Ops And Logistics



By **Philip A. Crannell, Jr., AIA**, chairman, Gee & Jenson Engineers - Architects - Planners, Inc.

High-powered maneuvering systems and larger logistical features incorporated into today's new generation of cruise ships are causing seaports to take a close look at the infrastructures with which they are serving the industry.

Management considerations related to terminal operations and logistics must first take into account the requirements posed simply by the increased size of some of the latest cruise vessels, such as RCI's Voyager of the Seas, Princess's Grand Princess, and Carnival's Triumph.

In terms of implications related to vessel size, the first place impacted by the enormity of the megaships is the dock facility itself, which must be equipped to handle severe line loads necessary to hold their ship safely at berth. This means extra-heavy-duty docking hardware, fendering, bollards, fits, cleats, etc.

Hardware that could handle an older generation cruise vessel might literally be torn from the pier by a ship classified at more than 100,000 gross registered tons — twice that of many of the vessels that for years represented the industry standard.

On-dock provisioning requires more than a few forklifts. The vast amounts of goods required by these vessels make it necessary that docks be designed so that 20- and 40-ft. containers full of provisions can be loaded aboard, often in places where service doors on older generation ships had not been located.

Of course, the terminal itself must be able to deal with the sheer volumes associated with the pleasure ships that carry 3,000 or 3,500 or more passengers. This means sufficient queuing and waiting areas so that

these thousands of people may be swiftly and efficiently processed and embarked. The same flows must be handled at disembarkation, so, in both processes, there must be sufficient passenger access; hence, current designs may call for dual gangways, each of a width of eight or more feet.

After disembarkation, there must be a laydown area to handle and process through Customs upward of 7,500 to 8,500 pieces of luggage. To serve these, cruise ports must furnish a seamless transportation system for both passengers and baggage between the airport and the ship and vice versa.

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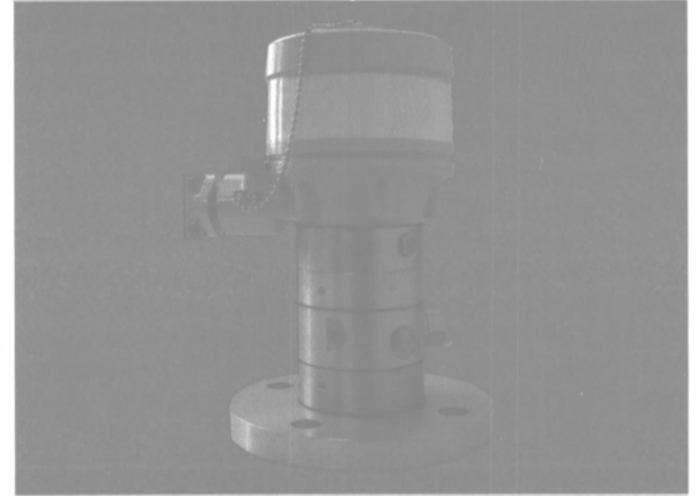
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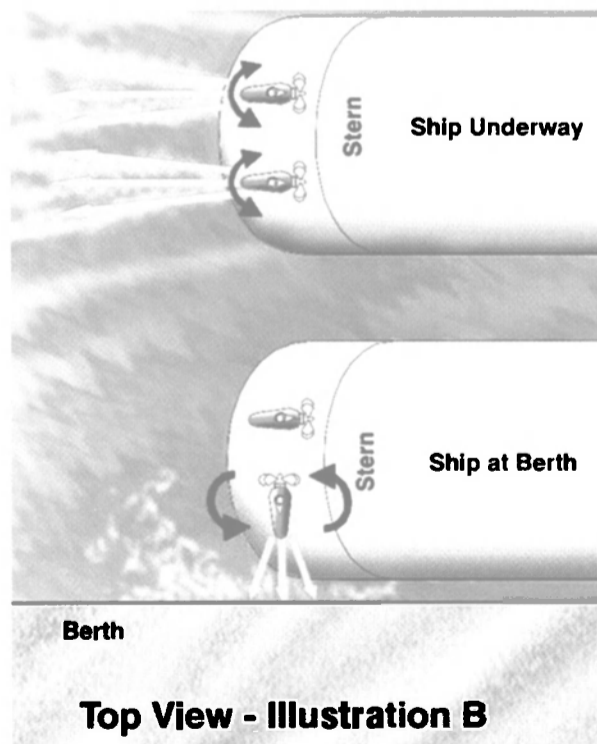
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The advent of podded propulsion systems — which because of the operational flexibility they allow have become the system of choice for many new cruise ships — have created new challenges for the ports in which they reside.

## Cruise Shipping Annual

To accommodate passengers who drive to the port, extra-large parking garages have become requisite for seaports that host — or are hoping to attract — the largest of industry vessels. As a bonus, parking revenue is usually the second largest profit center for cruise

ports. While these and other sweeping adjustments are necessary at places visible to the more casual observer, other changes are being made below the water line. Just because these modifications are not readily visible, they are nonetheless equally essential to support these

massive ships. An excellent example of this relates to the impact of Azipod propulsion systems upon the structural integrity of retaining walls and piles.

The Azipod systems that are increasingly finding their way onto the latest cruise ships replace the traditional wheel

and rudder. Azipods are rotating pods that contain powerful motors capable of rotating 360 degrees. This in turn allows for remarkable maneuverability without the need for rear thrusters.

Cruise lines are using more Azipods because of their benefits — from fuel savings to freeing up hull space in order to add income-producing berths.

Ports need to prepare for the impacts of azipods. The high water velocity generated by conventional thrusters during a berthing operation already can threaten support structures such as piles and sheet piles in some ports. The scouring and undermining from this high water velocity can eventually cause a failure of a pile or wall.

If one considers that Azipods can be nearly 10 times as powerful as conventional thrusters, it is easy to see that there indeed is a need for planning. An Azipod utilizes about 14 mkW, while a conventional thruster uses about 1.5 mkW.

Also, the center of water forces exerted by Azipods is lower and therefore closer to the bottom and to key berth supports. The level of impact upon ports will depend upon such factors as the type of material that supports water from structures. For example, waterfronts where rock prevails should be less vulnerable than those with sand and clay. But all seaports would be well-advised to consider the potential for Azipod-related scouring impact and seek solutions.

Gee & Jenson has worked with many seaports in managing such potential impacts by: surveying berth conditions to evaluate the potential for scour damage; installing deflectors in the Azipod velocity zone; using scour mats to protect vulnerable area; protecting the base of areas of vulnerable piles and sheet piles; and designing new berths that are resistant to scour damage.

As is the case with so many issues, some of the simplest (and best) solutions can come by way of open, frank discussions. In this case, communications with ship operators can help develop berthing plans that designate Azipod zones to minimize potential for scouring impacts. With such massive cruise ships not only providing vast profit potentials for cruise ports and their environs but also posing potentially big challenges for seaports, it has never been more important for seaport operators and those who utilize their facilities to work closely together and with qualified terminal facility experts to ensure maximum levels of service for vacationers while minimizing the possibility of negative impacts.

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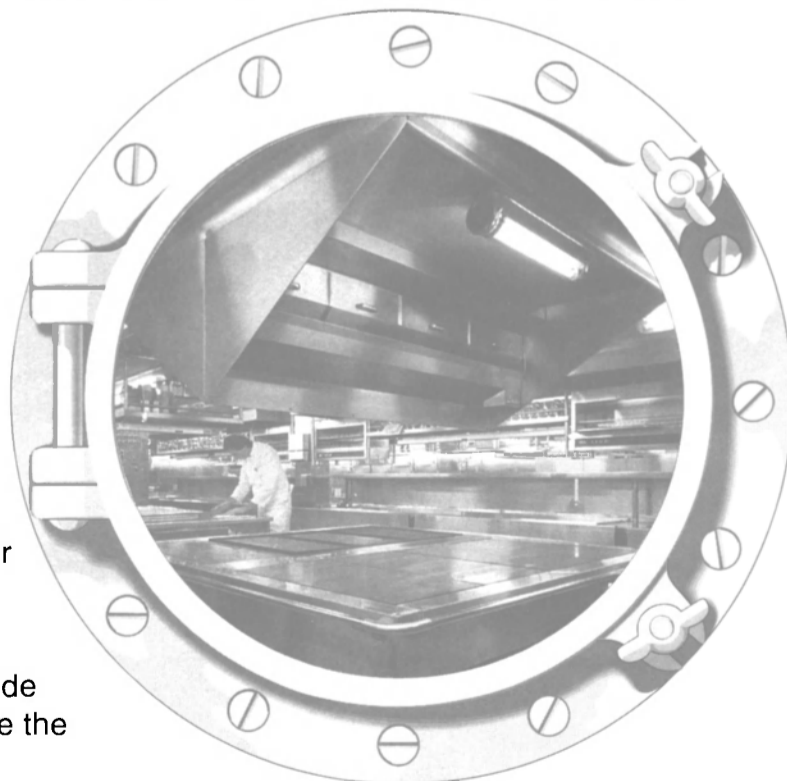
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# Royal Caribbean Commits To Environmental Endeavors

Today's era of stringent environmental policy marvelates that cruise lines must work to achieve good environmental practice. The marine industry in general, the cruise market in particular, have continually worked to project the image of

environmental friend. However through high profile cases of negligence and/or abuse, significant new layers of rules and regulations are entering force to ensure shipping companies are truly committed to protecting the valuable

environment within which they operation. Royal Caribbean (RCCL) — following a year in which it was levied record fines of \$18 million for its poor environmental practices — has since established a compliance program called



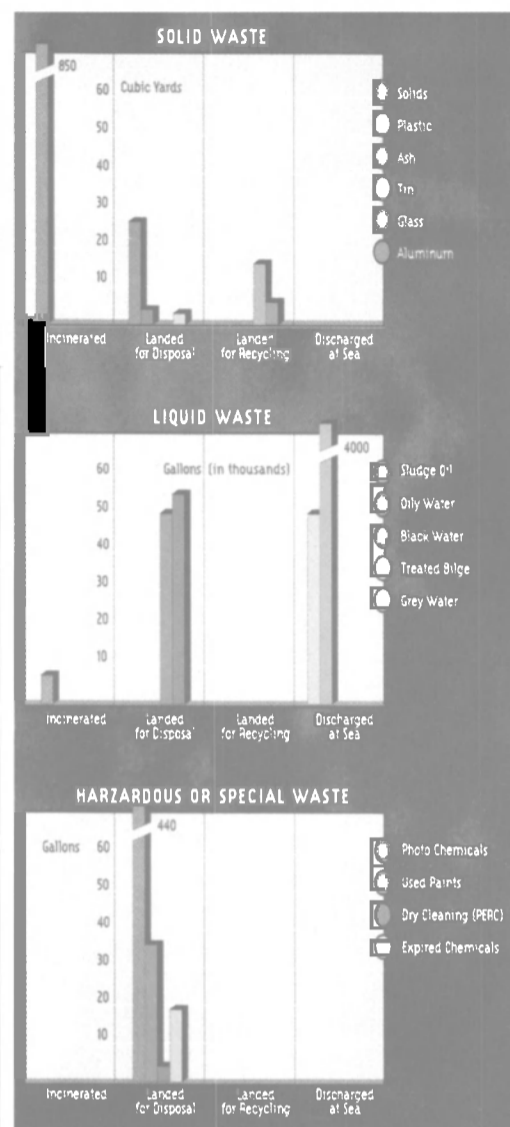
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Above and Beyond Compliance (ABC) — in addition to its environmentally-sound Save The Waves Program. The company also maintains the motto of not discharging any solid waste into the oceans, as well as safely and responsibly disposing of any waste that does remain.

The Miami, Fla.-based company has strived to uphold voluntarily environmental standards that surpass National and International regulatory requirements. According to RCCL, by the end of 1997, its performance complied with prescribed Safety and Environmental Protection (SEP) and ISO 9002 standards as certified by Det Norske Veritas (DNV). In 1998, RCCL was the first to garner ISO 14001 certification for the environmental management system on its megaclass ships. During that year, the company also tapped former Environmental Protection Agency (EPA) administrator, **William K. Reilly** on its board of directors to supervise its environmental policies, procedures and research efforts.

According to RCCL, in one month a typical cruise vessel weighing 75,000-tons gathers large quantities of ship stores and/or provisions. Once these items are utilized, the waste that results is then recycled, landed for disposal, incinerated or discharged. Items such as incinerator ash, plastic and photo-chemical waste are ridded ashore; while sludge oil, which is used as fuel com-

bustible solids is incinerated at sea, and treated bilge water, grey water and black water are discharged at sea.

The company has made an extended effort to replace many items with those that can be recycled such as paper towels instead of cloth, cellophane-wrapped plastic utensils with reusable, washable plastic or china dishes. RCCL also provides separate trash containers throughout its ships collecting paper, plastic, aluminum cans and glass containers — to begin the controlling of the waste flow.

RCCL maintains to conserve its resources by enlisting various ships' resources to serve two functions. Heat from each vessel's engine is used to pre-heat water onboard — saving fuel and energy. In addition, condensation running of the ship's air conditioning system is siphoned off to produce water for onboard laundries — thus conserving both fuel and water. All showerheads in ships' cabins are set to lower the flow of fresh water for savings. Equipment used onboard RCCL vessels to accomplish the "Save the Waves" program encompasses a Marinfloc device, which is an advanced cleaning system that purifies bilge water. The system works to lower the oil content of bilge water, in general, to less than five parts per million — much below the 15 ppm international standard. The company has also planned to use General Electric's gas turbines instead of conventional diesel engines on its two, 85,000-ton Vantage-class cruise ships scheduled for a 2001 and 2002 delivery. The utilization of gas turbines will reduce exhaust emissions by 80 to 98 percent, as well as lowering the level of noise and vibration experienced by guests.

### Ellsworth, LeBlanc & Ellsworth Adds Marine Division

Construction insurance and bonding firm, Ellsworth, LeBlanc & Ellsworth has added a marine division, effective immediately. Encompassing the new division in the company's New Orleans office are **Ron Grieshaber, Tom Hood and Kyle C. Wild**; while **Linda Kempf, Deborah D. Orillion and Sheral Robinson** serve as customer service representatives. An auxiliary office in Cut Off, La., is headed by **Brad Blanchard**.

Circle 95 on Reader Service Card

### Superseacat Service To Be Launched

Sea Containers will launch its \$30 million Superseacat Four fast ferry ser-

vice operating between Tallinn, Estonia and Helsinki, Finland beginning April 2000. Measuring 328 ft. (100 m), with a capacity for 752 passengers, the Italian-flagged vessel will provide three sailings a day (four during peak season) until year-end.

Sea Containers is currently establishing a company in Estonia who will man-

age the vessel, while Silja Line of Helsinki will serve as general sales and marketing agents.

The service will boast the Silja brand name. The technologically driven ferry will operate between Tallinn and Helsinki in 90 minutes at an average speed of 37.8 knots, about 42-rpm. Already operating on the Irish Sea and English Chan-

nel are Superseacat's trio of sisterships, offering a smooth ride resulting from an underwater wing called a T-foil, which acts as a stabilizer for the vessel, and working like an aerofoil, improves the ride by 60 percent. Facilities onboard Superseacat include guaranteed seating for all 752 passengers on two decks and a 50-seat business class lounge.

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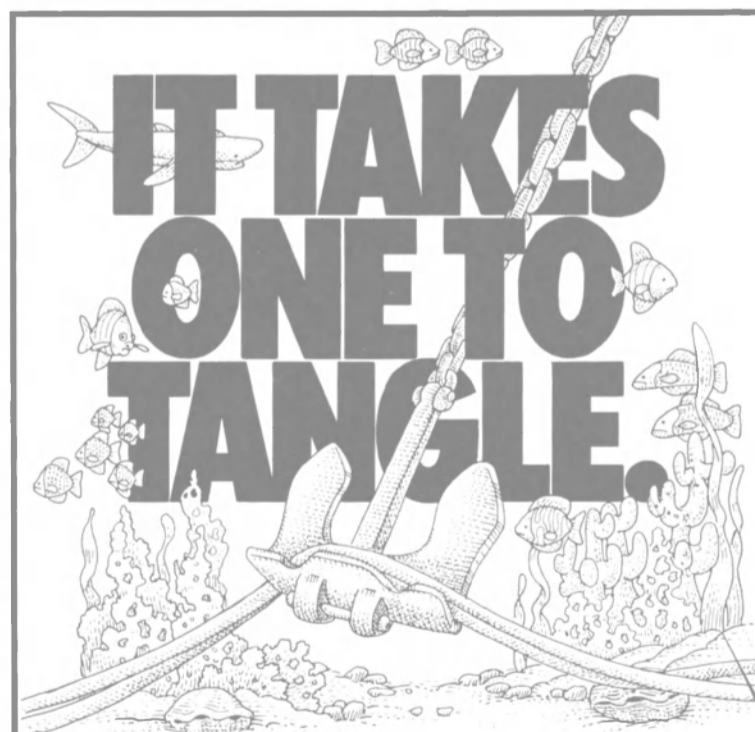
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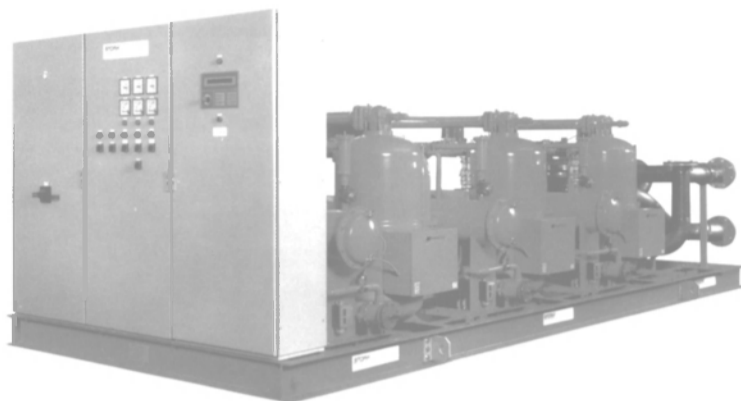
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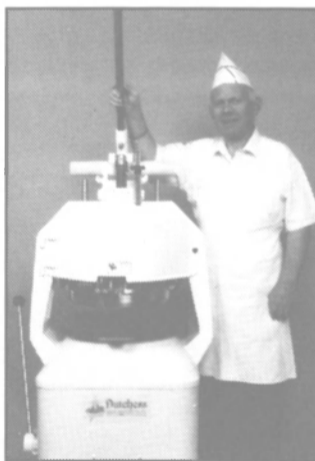
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## Cruise Shipping Annual

The cruise industry will continue its amazing run well into the new decade, with nearly 65,000 berths either contracted or on option through 2003.

### Cruise Vessel Deliveries • 2000

Owner	Add Del.	Delivery Name	Berths	
Carnival Cruise Lines	A	2000	Carnival Victory	2,740
Celebrity Cruises	A	7/00	Millennium	1,950
Costa Cruise Line	A	2000	Costa Atlantica	2,112
Holland America Line	A	2/00	Zaandam	1,440
Holland America Line	A	10/00	Amsterdam	1,376
Norwegian Cruise Line	D	4/00	Norwegian Crown	-1,026
Orient Lines	A	N/A	Crown Odyssey	1,050
Princess Cruises	A	3/00	Ocean Princess	1,950
Princess Cruises	D	11/00	Sky Princess	-1,200
Royal Caribbean Intl.	A	11/00	Explorer of the Seas	3,114
Royal Olympic Cruises	A	2000	Olympic Voyager	800
Silversea Cruises	A	8/00	Silver Shadow	388
<b>CLIA Total:</b>				<b>14,895</b>
American West Steamboat	A	2000	Empress of the North	224
Delta Queen	A	4/00	Columbia Queen	161
Renaissance Cruises	A	1/00	R5	684
Renaissance Cruises	A	5/00	R6	684
<b>Non-CLIA Total</b>				<b>1,753</b>
<b>2000 Grand Total</b>				<b>16,448</b>

### Cruise Vessel Deliveries • 2001

Owner	Add Del.	Delivery Name	Berths	
Carnival Cruise Lines	A	2001	Carnival Spirit	2,100
Carnival Cruise Lines	A	2001	Carnival Pride	2,100
Celebrity Cruises	A	1/01	Millennium 2	1,950
Celebrity Cruises	A	9/01	Millennium 3	1,950
First European Cruises	A	5/01	Unnamed	1,260
Norwegian Cruise Line	A	2001	Unnamed	2,000
Princess Cruises	A	4/01	Unnamed	2,600
Princess Cruises	A	10/01	Unnamed	2,600
Radisson Seven Seas	A	3/01	Seven Seas Mariner	708
Royal Caribbean Intl.	A	3/01	Radiance of the Seas	2,040
Royal Olympic Cruises	A	2001	Unnamed	800
Silversea Cruises	A	6/01	Silver Mirage	388
<b>CLIA Total</b>				<b>20,496</b>
Delta Queen Steamboat Co. A	A	3/01	Coastal Queen	226
<b>Non-CLIA Total</b>				<b>226</b>
<b>2001 Grand Total</b>				<b>20,722</b>

### Cruise Vessel Deliveries • 2002

Owner	Add Del.	Delivery Name	Berths	
Carnival Cruise Lines	A	2002	Carnival Conquest	2,740
Celebrity Cruises	A	5/02	Millennium 4	1,950
First European Cruises	A	N/A	Unnamed	1,260
Norwegian Cruise Lines	A	2002	Unnamed	2,000
Princess Cruises	A	10/02	Unnamed	1,950
Radisson Seven Seas	A	12/02	Unnamed	712
Royal Caribbean Intl.	A	5/02	Adventure of the Seas	3,114
Royal Caribbean Intl.	A	7/02	Brilliance of the Seas	2,040
Silversea Cruises	A	2002	Unnamed	386
<b>CLIA Total</b>				<b>18,154</b>
Delta Queen Steamboat Co. A	A	2002	Coastal Queen II	226
<b>Non-CLIA Total</b>				<b>226</b>
<b>2002 Grand Total</b>				<b>16,360</b>

### Cruise Vessel Deliveries • 2003

Owner	Add Del.	Delivery Name	Berths	
American Hawaii Cruises	A	1/03	Unnamed	1,900
Carnival Cruise Lines	A	2003	Carnival Glory	2,740
Cunard	A	2003	Queen Mary 2	2,500
Norwegian Cruise Lines	A	2003	Unnamed	2,000
Princess Cruises	A	6/03	Unnamed	1,950
Princess Cruises	A	7/03	Unnamed	2,600
<b>CLIA Total</b>				<b>11,190</b>
<b>2003 Grand Total</b>				<b>11,190</b>

Source: Cruise Lines International Association (CLIA) Cruise Industry Overview

# Strong Finish To A Strong Year In Oslo

A December rally on the Oslo Stock Exchange gave maritime shares an extra glitter and ensured a strong finish to an already strong year. Shipping and offshore shares performed marginally better than shares on the general Oslo market during 1999, rallying 8.6 percent in December to finish the year a solid 48.0 percent above last year's close.

The All Share Index, which includes all shares on the Main List, was up 45.5 percent for the year, and shaking off the dismal record in 1998 when the index dropped 26.7 percent. The All Share Index is still 4.4 percent away from its all time high, while the Shipping Index is 24.4 percent below its top mark.

The world's largest cruise operator, Carnival Corporation, announced a bid for NCL Holding (NCL) on December 1 creating an immediate rise in the NCL share. NCL management did not approve of the offer price of \$4 per share. Later in December Asian operator Star Cruises announced it had acquired more than 40 percent of the shares in NCL and so was obliged to make a mandatory offering to the remaining shareholders. The offer is reported to be \$4.40 per share and NCL ended the year at 34.60 - up 52.4 percent for the month.

For the year as a whole Frontline (FRO), I.M. Skaugen (SKA), Jinhui Shipping (JIN) and Stolt-Nielsen B (SNIB) all more than doubled their value, while at the other end Loki (LOI) and MIF (MIF) on low volumes more or less halved their share prices during 1999.

Among offshore shares Havila Supply (HAV) topped an impressive December

ranking with a rise of 50 percent. Other high performing shares in the month were Det Søndenfjeldske (SFJ), Ocean Rig (OCR) and Ugland Nordic Shipping. These four shares, however, also

occupy the first four spots on the losers' list for 1999 as a whole.

Navis (NIS) ended in second place in December as the share rose 28.3 percent, while Awilco B (AWSB) snatched

fifth place on the all year losers' list just in front of its A-class share (AWS).

TGS Nopec (TGS) fell almost 60 percent during 1998, but came back strongly last year with an increase in its share price of 183.1 percent. Stolt Comex Seaway (SCS) and Stolt Comex Seaway A (SCSA) were closest; both were up about 95 percent.

## Diesel Power

simply the less expensive propulsion system



### Winners this month

Shipping	List	Change
NCL Holding	Main	+ 52.4%
Belships Co.	Main	+ 33.3%
Frontline	Main	+ 32.3%
Stolt-Nielsen B	Main	+ 24.2%
Bergesen A	Main	+ 22.7%

Offshore	List	Change
Havila Supply	SMB	+ 50.0%
Navis	SMB	+ 28.3%
Det Søndenfjeldske	Main	+ 20.5%
Ocean Rig	SMB	+ 18.2%
Ugland Nordic Sh.	Main	+ 16.7%

### Losers this month

Shipping	List	Change
Ivar Holding	Main	- 10.0%
Royal Caribbean Cruises	Main	- 9.0%
Waterfront Shipping	Main	- 7.0%
Wilh. Wilhelmsen A	Main	- 3.3%
I.M. Skaugen	Main	- 1.8%

Offshore	List	Change
Nortrans Offshore	SMB	- 12.8%
Stolt Comex Seaway	Main	- 3.1%
Brøvig Offshore	SMB	- 2.1%
Stolt Comex Seaway A	Main	+ 2.3%
ProSafe	Main	+ 3.1%

Passenger ships, ferries and cruise liners are connecting ports, coasts and continents by timetables which are accurate right down to the last minute.

### Worldwide Service

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Circle 313 on Reader Service Card

## Cruise Shipping Annual

### New MaK M 43 Series Aids German Branch

MaK Motoren's latest addition to its engine offerings, the M 43 Series, has made an essential contribution to the record number of orders received by the German-based MaK Sales Organization.

With its headquarters located in Hamburg and branch offices in Bremen and Rostock, the organization reported that this past year's orders exceeded \$51.8 million.

The first three diesel engines of this latest series were presented to the market at the end of 1998 by MaK, and were

recently shipped from the company's works' quay. With a total power output of 22 MW, two members of the engine trio built for Irish owners, will power what is currently known as the largest fishing trawler worldwide. The third engine will be used in a chemical tanker built for a Norwegian owner. Currently,



more than 40 units of this engine have been sold in various cylinder configurations with a total power output volume of 340 MW.

Circle 93 on Reader Service Card

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### Wärtsilä To Power Grimaldi Ferries

Contracted by Nuovi Cantieri Apuania SpA in Marina Di Carrara, Italy, another pair of luxury cruise ferries for the Italian-based Grimaldi group is to be powered by Wärtsilä NSD Corp. The vessels will house four Wärtsilä 16V46C main engines and four Wärtsilä 6R32LNE diesel generating sets. The main engines have a combined output of 67,200 kW at 500 rev/min., and the auxiliary engines 10,800 kW at 720 rev/min. Scheduled for delivery in May 2002 and May 2003, these twin-screw vessels each have a capacity for 2,800 passengers with 1,000 cars. With a service speed of 28 knots, they will be operated by Grandi Navi Veloci SpA, a member of the Grimaldi group, between the north of Italy and Sicily.

### Isotta Fraschini Marine Diesel Engines Available on W. Coast

The Italian line of marine diesel engines built by Isotta Fraschini are now available through Marine Matrix Northwest, Inc. MMNW selected Isotta Fraschini to complement its Volvo Penta line, since the well-respected Isotta Fraschini engines range from six cylinder in-line 600-hp, to V-16 3,200-hp and are featured in a large variety of commercial, military and high-speed pleasure craft around the world.

Most notably, the U.S. Navy selected Isotta Fraschini engines as a result of an extremely demanding Military Specification testing program for the 24-boat fleet of Minesweepers built during the late 80s and early 90s over Caterpillar and MTU engines.

There are two series of engines available. The 130 mm bore series offers the highest hp to weight ratio available in any diesel engine up to 1,200-hp. The 170 mm bore series is heavy duty workhorse of the line starting at 950-hp.

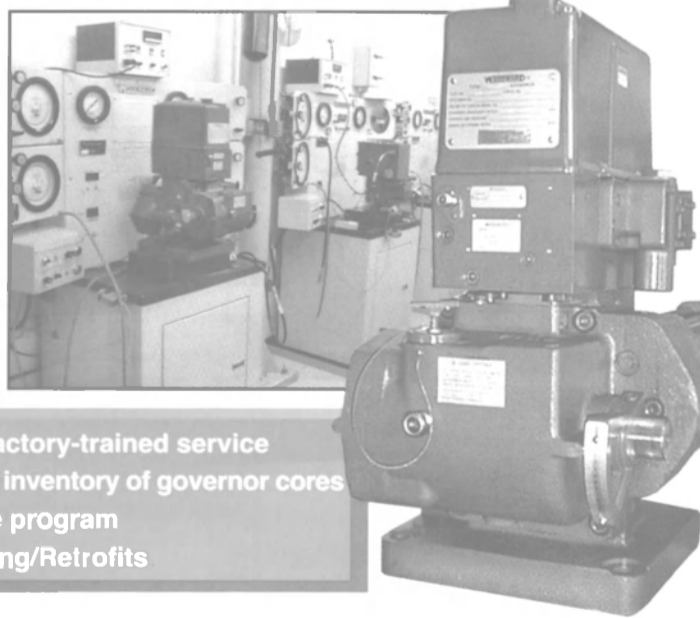
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Circle 275 on Reader Service Card

## Cruise Shipping Annual

### DeJong & Lebet Assists On Vessel Conversion

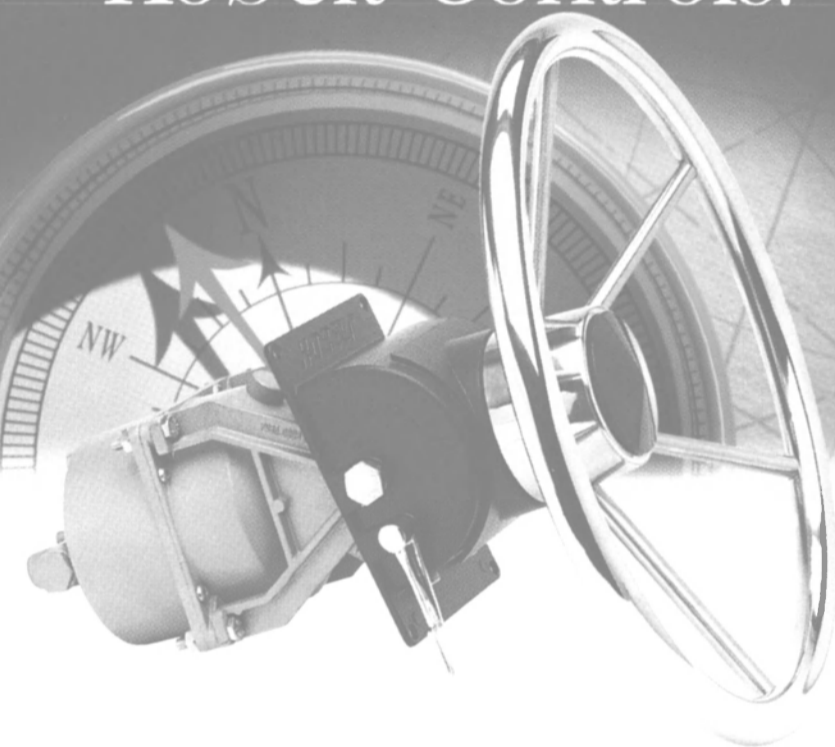
Eclipse, a converted 210 ft. (64 m) cruise vessel, recently began operating in the Galapagos Island Cruise business. The vessel conversion was designed by DeJong and Lebet, Inc., Naval Architects, Jacksonville, Fla.

Eclipse was originally constructed as ferry vessel Aegean Sea, for service in the Mediterranean by a Spanish shipyard in 1982. The current owners bought the vessel in 1997 and began the conversion process.

The original vessel was laid out as an 800-passenger day ferry. The vessel's passenger lounges were completely



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stripped. The second level was extended and a third enclosed level was created on a formerly open deck. The existing swimming pool was refurbished.

The result is a modern overnight cruise ship with 27 comfortable staterooms and a capacity of 48 passengers and 28 crew. The staterooms are located on the main deck and third deck, including four suites on the third deck. All of the staterooms were furnished by Marine Accommodations. All interior spaces were fitted with new modern air conditioning and ventilation systems, including fresh air replacement capability.

Other interior accommodations include refurbished crew staterooms, separate passenger dining room and lounge on the second deck and a library area. A new large size stair tower was added for increased safety.

The vessel is powered by the original Deutz engines, 1,175-hp each. The existing Deutz generators were also reused, and a new emergency generator was added.

Circle 99 on Reader Service Card

#### Main Particulars

Length, (o.a.)	210 ft. (64 m)
Beam, (molded)	41 ft. (12.4 m)
Depth	14 ft. (4.2 m)
Draft	11 ft. (3.3 m)



### Aurora Floated Out For P&O

The new 76,000-gt cruise liner Aurora left Meyer Werft's covered dock on January 8, proceeding extensive dock trials. The float out and funnel mounting of Aurora occurred that morning before the vessel was ultimately berthed.

Measuring 886 ft. (270 m) with a breadth of 106 ft. (32.2 m) and a speed of 24 knots, the vessel will undergo final outfitting in the next few weeks, subsequently traveling down the river Ems to the harbor Emshaven to commence sea trials in the North Sea.

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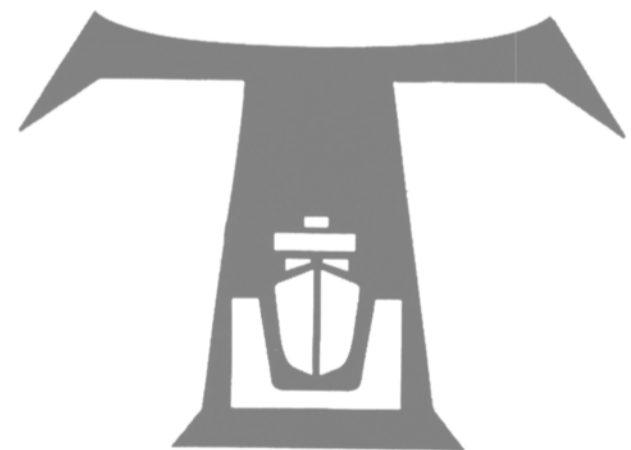
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## Cruise Shipping Annual

### DCS Offers Speedy Communication Links

DCS Marine Data, a division of DCS based in Westbury, N.Y., is a wireless communications and systems integration firm that has been in operation since 1996. The company's marine data solutions and services for the maritime industry provide a reliable, high speed, communication link for Internet access on demand, broadcast e-mail, as well as a secure environment to access corporate networks while at sea.

Circle 98 on Reader Service Card

### Univex Goes The Distance

Univex commercial mixers offer a unique two-piece Swing Ring Safety Guard, allowing operators to open both sides for full bowl access or swing either side out of the way to check product quality. The Swing Ring essentially detaches in a matter of seconds and is suitable for cleaning in a dishwasher or sink. Univex's continuous variable transmission (CVT) drive uses special torque-sensing pulleys and rugged cogged belts to drive a fixed reduction gear train.

Circle 101 on Reader Service Card

### Garland Introduces The Master Series

Garland has presented its master series - a select group of its finest ranges, broilers and fryers. The series offers a new level of speed, comfort and control, beginning with its Starfire 35K burner, which reduces preheat times and provides greater heat input for cooking in large-sized vessels. Ranges are available with storage; standard and convection oven bases; and can be used in stand-alone, multiunit and battery applications. Master Series charbroilers are suited for both production line and a la carte broiling. Six powerful

burners and long-life ceramic briquettes generate 90K BTUs of heat for even heat distribution and shorter cooking times. Designed for high-volume use, Master Series fryers quickly drive off water and steam. The centerline thermostat monitors oil temperature in precise one-degree increments.

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### Thunderbird Offers Wide Variety

Thunderbird's ARM-02 full gear driven mixer offers a 20-quart capacity with a powerful .75-hp motor. Measuring 520 x 530 x 800 mm, the product includes a dough hook, safety guard and attachment hub with optional accessories consisting of a meat and food chopper, vegetable slicer and 10-quart accessories. The TB-12GS stainless steel meat grinder is perfect for heavy-duty use in hotels, restaurants and commercial kitchens and cafeterias. Featuring a powerful energy-saving motor, precision gear drive and stainless steel food contact parts and durable, stainless steel housing. Designed for easy maintenance the grinder is available in 115V, 60Hz, single-phase or 230V, 50Hz, single-phase.

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### Kold-Draft Provides Quality Cubes

The Kold-Draft 350 Series "Classic" cuber produces up to 320-lbs. of ice per day, and is engineered with rugged unibody construction. Its time-proven design ensures reliable operation, greater water efficiency and maximum ice making capacity. Serviceability is from the front and the use of environmentally friendly

R-404a refrigerant offers added efficiency. Kold-Draft's GT Series Slimline cuber measures only 28 x 3/8-in. wide and is engineered and built to fit in small areas. The GT Series bins are available with storage capacities of 230 or 400-lbs.

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### Yfestos Pictograms Installed On Telkka

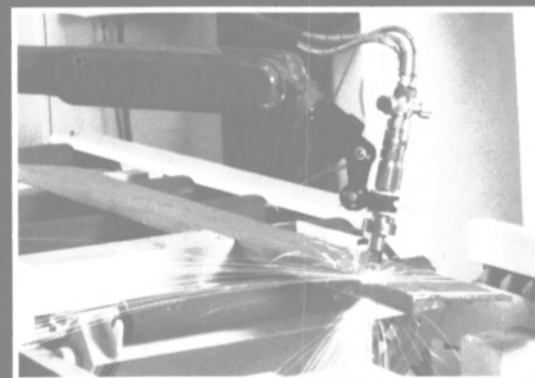
Produced to IMO specifications, the green luminescent Yfestos pictograms were installed onboard the Finnish patrol vessel Telkka. Constructed by Uudenkaupungin Tyovene oy, the vessel is the first to be equipped with luminescent and temperature-resistant Yfestos pictograms.

Manufactured to indicated escape routes, the advised direction to walk and rescue equipment, the pictograms are either screen-printed on aluminum or screen-printed stickers. If a fire should occur, the density of the fumes will make it virtually impossible to see illuminated emergency exit signs, which are generally situated above doorways. In order to better assess an emergency situation, Yfestos markings are positioned at an appropriate height effectively marking a safe way to exit.

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## Electronics Update

# Coastal AIS Stations with Radars: High-Efficiency Monitoring Facility

Coastal AIS are shipboard-transponder-based systems for monitoring vessel traffic in the coastal waters. Starting from 2002, there will be mass introduction of transponders on all the ships of above 300 tons. Every several seconds such transponders automatically transmit their carriers' static and dynamic data.

An AIS built into a VTMS is the most efficient. These systems complement each other superbly. VTMS provides a raw radar picture that, however, has some disadvantages. The detection range is rather short, especially for smaller targets; with intensive sea or rain clutter the target may not be detected; targets behind the islands or

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river turns are not visible; target's maneuver is not instantaneously detected due to the filtering and smoothing algorithms, etc. While the transponder, being a transmitter and providing practically online data on the gyro course and log speed, is virtually free of these disadvantages. Besides, it enables automatic identification of targets, which VTMS cannot do.

If AIS station alone is installed on the coast, it is unaware of transponderless objects within its responsibility area. If an AIS is used as part of VTMS, having detected a transponderless target on the radar, the operator should enquire about its name, draft, size, etc., whereafter the incorporated AIS can broadcast this data for all the ships within the responsibility area. This would provide a partial solution for ships without transponders. Unfortunately there will still be problems with such object's calculated course and speed that will differ from the actual ones. On the Swedish coast only 35 AIS stations are installed. But this does not mean that there are 35 VTMS. Thousands of coastal AIS stations will possibly be installed worldwide to provide services to the Navies, Coast Guards (CG), maritime administrations and port authorities. But without primary radar information, the use of coastal AIS is not as efficient as it could be. It is only a target's echo that will help to detect and identify a transponderless target.

Transas Marine offers an inexpensive solution for the problem of combining the primary and secondary radar information with transponder information on an electronic chart. The company has developed a RadarIntegrator Board which is connected to any existing radars (including old analog radars), digitizes raw radar information; regardless of the operator it extracts and tracks up to 512 targets, records all the target data and entire raw radar picture from each antenna revolution onto the disk during a month's time, enables playback of any time fragment. Such board operates in a standard PC using PCI bus.

If an existing coastal monitoring station already has a radar (VTMS, CG, Naval or any other surveillance station), it is basically a matter of putting next to it a standard PC with the RadarIntegrator and appropriate software, which is linked to the radar and coastal AIS transponder. This means a highly efficient upgrade for thousands of existing radar surveillance stations. The technology of manufacturing radar antenna systems and transceivers has undergone practically no changes in the last 30 years. This is why it is worthwhile to upgrade even old radar surveillance stations whose antenna systems are not yet outdated and whose obsolete displays

will in this case be replaced with a modern computer.

If an AIS station has no radar, it is desirable to install an inexpensive ship radar transceiver with a 12-ft. antenna. In this case the RadarIntegrator Board will control the radar transceiver. Clearly, in case of a shipboard transceiver installation, such system cannot claim to be a VTMS station. But what you get is

a very good AIS station. The radar target echo accuracy will be inferior to than in the VTMS due to the antenna size, but in an AIS this is secondary information which is only required for detecting and identifying transponderless targets.

With the coastal AIS station without radar, the responsibility area loses its significance, as it is only objects with operating transponders that are moni-

tored. Such objects are inherently law-abiding. Objects that have no desire to be monitored, e.g., all kinds of transgressors, will simply switch the transponder off. It is only by comparing the raw radar information with the transponder information that we can achieve efficient surveillance.

by Captain E. Komrakov, Director of Navigation Product Unit, Transas Marine



**Control Units**

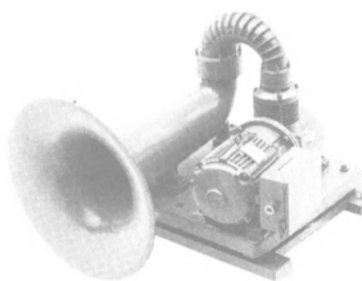
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Kahlenberg Signals were developed to withstand the punishing use of commercial and military service. Their durability has been demonstrated over decades of service on ocean-going vessels ranging from naval warships to commercial vessels. Military specifications have required extensive testing for many of these whistles and the accessories supplied with them, which have proven the exceptional qualities of Kahlenberg design and manufacturing.

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### Model S-203C S-203 CHT

For vessels over 75 meters in length, this design allows both whistles to exceed 143 dB (1/3 octave band). The S-2036 and S-203 CHT are virtually maintenance free. Durability is ensured by the use of bronze and marine aluminum construction materials through out. For the most extreme cold weather operation, Model S-203 CHT (shown) includes a thermostatically controlled, heated enclosure for both the combination manual/electric valve, and the horn sounding body.

# Supporting The Technical Revolution

*While electronic manufacturers are quickly rolling out more and more advanced gadgetry, one company finds that its customer support growth was equally important.*



Recent trends in the shipping industry are changing how suppliers of marine equipment handle customer support. With more standardized equipment, the availability of increasingly sophisticated marine electronic systems, smaller crews and tighter deadlines, shipping companies have come to expect a higher grade of customer support available all over the world, year round. "We're seeing a demand for better, faster and comprehensive global service," said **Dag Pettersen**, president customer support for Kongsberg Norcontrol AS, a leading provider of marine navigation and control systems for the shipping industry. "Everything has to be done yesterday."

While today's advanced equipment is more reliable and requires fewer spare parts than ever before, the smaller crews combined with the more sophisticated systems has raised the demand for software assistance and frequent applications upgrades. Lastly, the tighter sailing deadlines, make shipping companies expect twenty-four hour service, seven days a week, 365 days a year, wherever they are.

Indeed, marine system problems seldom occur at convenient times. "All our equipment problems seem to happen on Friday evening," said **Tor Hagen**, purchasing manager for Wilhelmsen Marine Services AS, "and we don't like to wait until Monday for spare parts."

Hagen notes that many suppliers do offer customer service on weekends and holidays, but such access doesn't help if spare parts aren't available until the following week.

For Hagen, customer support is an essential component when choosing a marine systems supplier. "We look for availability, quality and service," Hagen said. "We chose Norcontrol as much for their cutting-edge control systems as for their comprehensive customer support program."

Developing such a program is expensive and time consuming, but Pettersen is convinced that Norcontrol's reputation for effective customer support wins contracts, and ensures contract renewals. That may help explain why Norcontrol has been quick to adapt to new market demands. "After listening to our customers," says Pettersen, "we have adjusted our support program to reflect our customers' demand for global access to support and parts."

Kongsberg Norcontrol has invested heavily in a network of stations and agents located in ports around the world that can provide support and spare parts to their customers year round. Since 1995, the company has more than doubled the number of service stations and agents around the world and plans to expand further, especially in the U.S.

For all their global ambitions, Kongsberg Norcontrol

is determined to maintain high quality support staff. Today's shipping markets often use multi-lingual crews, so Norcontrol's staff must also be able to communicate effectively in local languages. These experienced technicians must also be available 24 hours a day, which is why Norcontrol representatives can access client information on the company computer network from home, via Internet. Furthermore, the newest generation of the company's products can be remotely diagnosed from shore via wireless data communication, which ensures the crews direct on-line support around the clock. Pettersen said the biggest problem he has filling orders off-hours isn't availability of staff or spare parts, but transportation. Many transportation companies don't deliver on weekends, often forcing Norcontrol customer support staff to improvise. Indeed, Norcontrol representatives are sometimes called upon to take spare parts by cab to airports for delivery to ports around the world.

With about 20 percent of Kongsberg Norcontrol's workforce involved in customer support and new local stations opening all over the world, Pettersen says the company will be able to meet rising demand for global customer service. What is good customer service? Pettersen answers: "You can't guarantee you'll never make mistakes, but you can guarantee you'll fix them."

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## Where Businesses And Consumers Can Mix

In today's competitive and bustling marketplace of Internet technology, users expect to accomplish daily tasks with just one click of a mouse. While many companies have begun to lean this way, the maritime industry has joined the ranks of various other Internet sites with the recent strategic alliance of Marex.com and Boatscape.com.

It was a combination that was likely to meld well...a rookie company that is known as the largest business-to-business (B2B) e-commerce company (Marex.com), and an online destination that provides community, information and e-commerce to the recreational boater (Boatscape.com). Together, these two companies will be able to provide users with the utmost in comprehensive

e-commerce solutions for the marine industry. With Miami, Fla.-based Marex.com focusing on the business-to-business aspect, Boatscape.com, located on Boston's Back Bay, will take on the reigns of the business-to-consumer aspect in the alliance. In an announcement made at a press conference at New York's Marriott Marquis Hotel, on January 10, the two companies formalized their agreement, as well as outlined the specific services that will be provided by each company. While they are combining their respective sales and marketing forces as part of this strategic alliance — they are not in effect, merging together as one company. Rather, they will be able to provide customers from both ends of the spectrum with a valuable

online service, which until about a year or so ago, was virtually non-existent.

"We feel that Boatscape.com is doing the best of attracting and serving the needs of marine consumers online. As a result of our relationship with them, we'll now be able to provide marine companies with end-to-end e-commerce solutions," said **David Schwedel**, president and CEO of Marex.com.

Boatscape's president and co-founder, **Jay Wilkins**, is optimistic about joint collaboration as well.

"We are extremely enthusiastic about this agreement," stated Wilkins. "We are very confident that the strategic alignment of our companies will enable us to better and more completely service the entire marine industry."



Schwedel and Wilkins initially met last year when they were speaking on an e-commerce panel at last year's IMTEC show in Orlando, Fla. It was there — when after discussing the future of the e-commerce industry and how they could further its services — both began to explore the idea of forming the current alliance.

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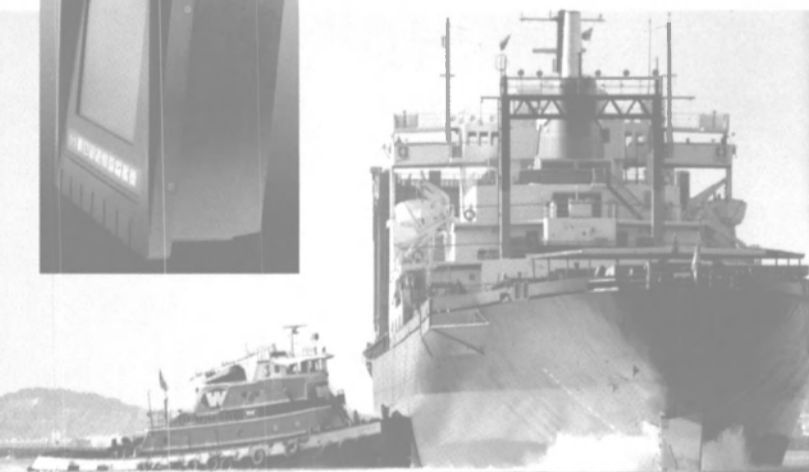
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## Cadkey 99 Offers Powerful Features



Cadkey packaging features an image of the Devil Cat, a class of vessels developed by Incat.

Cadkey has released Cadkey 99, a major version of its flagship mechanical PC-CAD product available for Windows 95/98/NT 4. Cadkey 99 delivers product features designed for interoperability excellence, such as the introduction of powerful solid body healing

and tolerant edge functionality. With an abundance of enhancements and solid modeling capabilities, including wireframe, solid and sheet metal bending, the Cadkey data translation lineup now offers a new high-speed, one-pass IGES translator and a new Parasolid® file for XT files. The product will also include a free bonus CD worth more than \$225 for customers with current AUCs (Annual Update Contracts). Cadkey 99's interoperability tools - body healing and tolerant edge features - both of which advance Cadkey's interoperability are equally impressive. The body healer functions as a repairer of the most common problems with imported 3D models, such as missing and duplicate surfaces, while the tolerant edge functionality selectively loosens tolerances at small "leaks" in an imported 3D model. The function also assigns special new properties to these areas. Using a new visual feedback tool that highlights areas where modeling operations fail, Cadkey 99 also includes advances in blending, sweeps and extrudes, and shelling.

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## American Maritime Safety Concludes Joint Venture

American Maritime Safety (AMS) has wrapped a joint venture agreement with the University of New Orleans' Gulf Coast Region Maritime Technology Center to promote a technologically driven maintenance and reliability software program to commercial ship operators in the U.S. and abroad. The two organizations spent more than six years developing Ram/Shipnet, which encompasses layered databases that process performance information on vessel equipment failure.

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## BT Unveils E-Commerce Site

Known as mE-World, BT launched this innovative PC-based e-commerce environment for the merchant marine industry at the Europort Exhibition this past November. Mobile electronic world (mE-World) puts a powerful suite of information, messaging, tracking and transaction services readily available with the click of a computer mouse.

In response to ever-changing situations within the competitive merchant marine industry, the comprehensively developed mE-World carries all the essential data and tools combined in the user's PC or laptop, thus improving the quality, speed and commercial outcomes of the management process.

The front-end to mE-World is an additional development - a full-time desktop - mE-Desk, which brings together all the functions of a fleet management office within a desktop environment. This is accomplished by delivering all the power of

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get the marine industry on the web at [www.marinelink.com](http://www.marinelink.com)

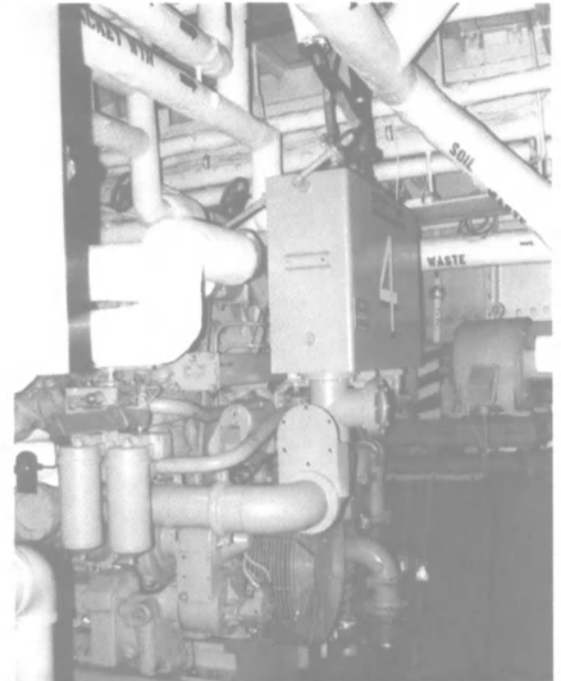


**TUG BALLISTICS - DISPLACEMENT:** 1,235 tons standard; **LENGTH:** 195 feet waterline, 205 feet overall; **BEAM:** 38-1/2 feet; **DRAFT:** 15-1/2 feet; **PROPULSION:** diesel-electric (4 Caterpillar D399 diesel engines); 3000 shp; 1 shaft; **SPEED:** 16.5 knots; **RANGE:** 15,000 n. miles at 8 knots, 6,500 n. miles at 15 knots.

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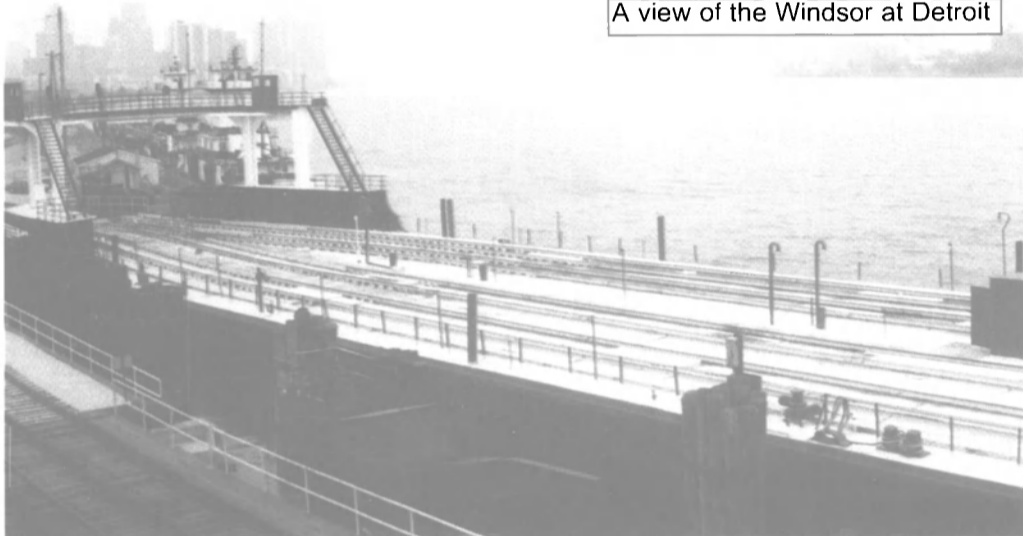
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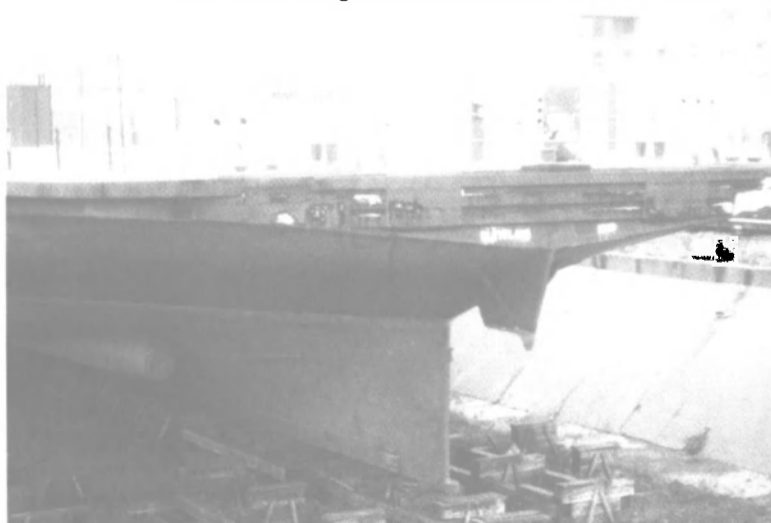
A view of the Windsor at Detroit



**WINDSOR, US 230113:** 358'x 65.1'x 19.4' Steel. 3131 GT; **BUILT:** Toledo, Toledo Shipbuilding Co., Hull No.183; **CAPACITY:** Four tracks, 28 cars. **\$400,000** each OBO  
**All Three Barges Are Located in Toledo, Ohio**



**ROANOKE, US 229316:** 369' x 57.3' x 20.3' Steel. 3327 GT; **BUILT:** Manitowoc, Manitowoc Shipbuilding Co. as Car Ferry, City of Flint 32; **CAPACITY:** Four tracks, 26 cars. **\$400,000** each OBO



Rail Barge MANITOWOC being repaired and ABS load line being established on the dry dock in December of 1994.  
 Barge MANITOWOC'S Hull is in great condition.



**MANITOWOC, US 225671:** 358' x 65.1' x 19.4' Steel. 3093 GT; **BUILT:** Manitowoc, Manitowoc Shipbuilding Co., Hull No.222; **CAPACITY:** Four tracks, 27 cars. **\$400,000** each OBO.  
**All Three Barges Are Located in Toledo, Ohio**

# Finnish Innovation Ascends New Heights

The Finnish shipbuilding industry has been in a state of flux for much of 1999 and entering 2000, with the Kvaerner shipbuilding pullout dominating the headlines. But while the search for new owners of the company's yards in Finland has kept the boardrooms busy, the business of pulling in valuable new orders to keep the facilities busy and building top-quality ships has not missed a step. The big and modern shipyards in Helsinki and Turku are world-renowned for the production of high-value, technically advanced ships, and this reputation and accrued expertise will surely remain well after the Kvaerner nameplate comes down.

Whereas Kvaerner's exit from shipbuilding has been top news throughout the year, foreign investment and ownership within Finland is hardly a new topic. By virtue of its company's advanced engineered solutions, Finnish companies are increasingly attractive to companies seeking the best. And Finland is not immune to the natural progression of consolidation currently reshaping the international maritime business, as large, well-financed industrial companies continually seek to fortify their respective positions as a one-stop-shop.

The amount and quality of marine technology emanating from the confines of the Finnish border is really quite amazing, particularly when one considers that the country's estimated population in 1999 was just more than five million. However, necessity being the mother of invention, Finland is surrounded by waters - waters which at times pose some of the more severe maritime challenges found anywhere in the world - and maintaining links with the world 365 days per year is vital to maintaining the Finnish economy. Thus Finnish companies have vast experience in building advanced ships and marine equipment systems that help to effec-

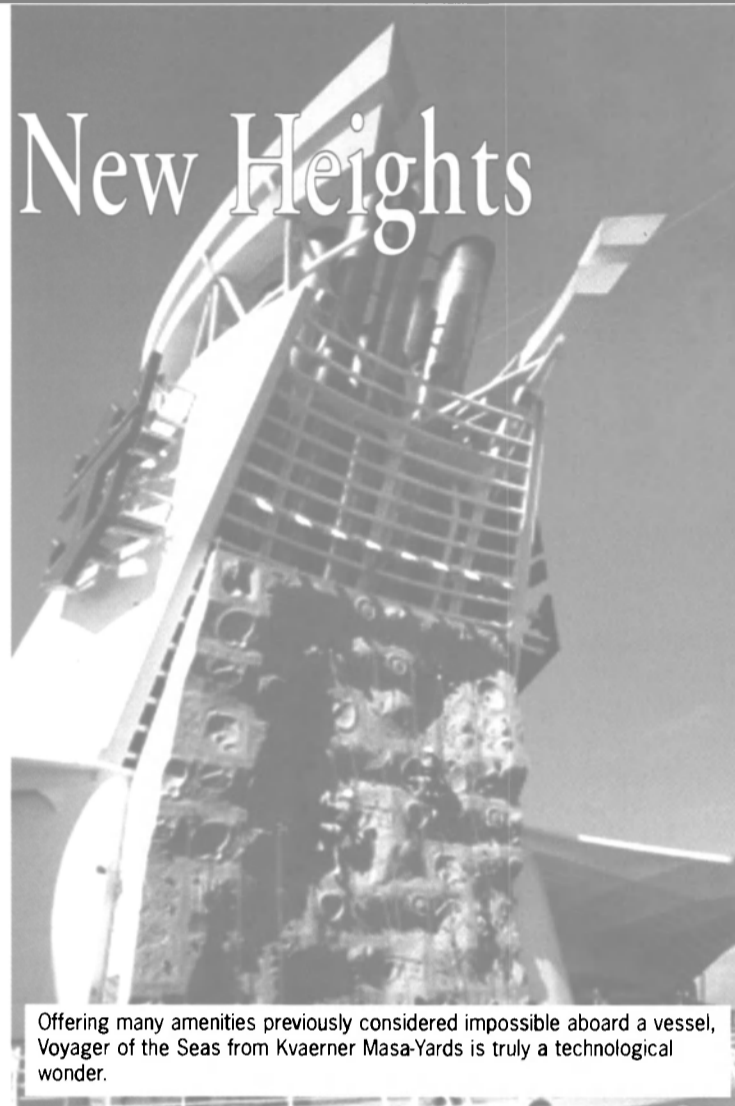
tively tame most conditions Mother Nature has to offer. Notably, advances in rough weather specialty vessels such as icebreakers; high value niche market ships such as LNG carriers and cruise ships; and ship systems such as podded propulsion have vaulted Finnish companies to a commanding position in the world maritime markets.

## KMY: Building The Biggest Ever

The 137,200-gt cruise ship, whose towering superstructure (see photo, right) and an air draft of 208-ft. (63.5-m) belies a relatively tender draft of just over 28-ft. (8.8-m), marks a new highpoint in the industry's unerring endeavors to foster long-term sustainable business development in the seagoing leisure sector.

Although the shipbuilding price from Kvaerner Masa-Yards was around \$500 million, about seven times the current cost of a VLCC, Royal Caribbean estimates that its overall project expenditure in bringing Voyager of the Seas to the market has been closer to \$700 million. The 75,600-kW primary power concentration engendered by Wartsila 46-series diesel machinery, whereby six 8-cylinder engines drive the main gensets, testifies to Finnish strengths in medium-speed engine design and manufacturing. Voyager of the Seas serves as a powerful reminder of overall Nordic maritime industrial capabilities.

Quality and contractual performance have long been



Offering many amenities previously considered impossible aboard a vessel, Voyager of the Seas from Kvaerner Masa-Yards is truly a technological wonder.

the watchwords of Kvaerner Masa-Yards (KMY) and its forebears. The shipbuilder's track record in meeting delivery undertakings has been reinforced by its delivery of the latest, seminal vessel on schedule.

The size of the shipboard community at any time during the course of her seven-day voyages in the Western Caribbean is startling, whether judged by the lower-

## AKER FINNYARDS

Based in Rauma, Aker Finnyards recent history is indicative of the changes, which continue to sweep the Finnish maritime scene. Finnyards is owned 100 percent by Norwegian interests, part of Aker Yards, an international shipbuilding group comprising Aker Finnyards together with a German and two Norwegian shipyard groups. Aker Yards is owned by Aker RGI. Aker Finnyards' main activities are construction of specialized ships, vessels for oil and gas production and heavy offshore structures. Aker Finnyards' ownership is 100 percent Norwegian.

While the shipyard's reign under Norwegian rule is relatively short, its experience and accrued expertise spans many decades and includes more than 1,500 ships built — both long series and extremely demanding one-offs. Deliveries include fast ferries, car-passenger ferries, cruise liners, scientific research vessels, RoRo vessels, ice breakers and naval craft. The yard is also well suited for handling various types of offshore constructions in its huge 853 x 279 ft. (260 x 85 m) drydock, with 300 tons lifting capacity and 600 tons transport capacity. In the graving dock it is possible to build vessels up to 150,000-dwt. Aker Finnyards and the Greek G A Ferries recently signed a letter of intent for the building of a new car-passenger ferry for short international routes and Greek domestic traffic. The LOI also includes an option for another vessel. G A Ferries, which operates 10 vessels, intends to go public in Athens this year.

The vessel - to be delivered in spring 2001 - will measure 492 x 82 ft. (150 x 25 m) and be propelled by four diesel engines totaling 50,000 kW, providing a speed of 29 knots.



NB 432 Hovercraft

The company solidified its reputation further in 1999 with delivery of Norstream, a 11,500-dwt RoRo carrier for Dutch company Bore Stream BV. The vessel runs a regular service between Continental Europe and the UK, on the route Zeebrugge - Teesport, operated by P&O North Sea Ferries. Designed mainly for transporting trailers, trucks and containers, it is designed for fast loading and unloading, and is equipped with two stern ramps. It measures 590 x 82 ft. (180 x 25.2 m), and is powered by two medium-speed diesel engines to a speed of 20 knots. Earlier in the year the company demonstrated its naval building prowess with a project to build a fast hovercraft for the Finnish Navy. The joint venture by Aker Finnyards and composite expert FY-Industries won the contract to build the fast hovercraft, to be delivered in September 2001. It is a prototype for a future series of fast combat vessels. The contract involves hovercraft technology transfer to Finland from the U.S. in connection with offset arrangements. The fundamental air cushion vehicle techniques tested in the U.S. will be used to help the designers in Finland to fulfill the requirements of the Finnish Navy for the year-around operation in the harsh coastal conditions. The price of the vessel is more than \$12.1 million.

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Maritime Reporter/Engineering News



Finnyards MD **Kari Airaksinen** oversees a shipyard capable of building a diversity of vessels, from the NB 432 Hovercraft to multipurpose icebreakers and the world's most complex aluminum catamarans. Airaksinen points out that it is possible to build vessels up to 150,000 dwt in Aker Finnyard's 260 x 85 m drydock.

bed passenger capacity measure of 3,138 or maximum of 3,840, together with up to 1,180 crew.

This ship has occupied some of the best minds in interior design as well as some of the most innovative minds in naval architecture. It furthermore denotes the attainment of a new milestone in the passengership domain as regards marine engineering technology, expressed in her refined diesel-electric power and propulsion system incorporating a triple Azipod configuration. Voyager of the Seas is emphatically also a new showcase for the concept of redundancy, applied to the main ship-board operating systems, and signifying central concerns with issues of reliability and safety.

#### Power of the Pod

The creation and integration of podded propulsion systems - arguably one of the most innovative maritime technological advances ever - emanates wholly from the Finnish maritime cluster of shipbuilders, marine equipment suppliers and technology innovators. The Finns, with a long track record in thruster technology, were the leaders in the podded drive concept, first applied in the form of a 1.5-MW Azipod unit to a Finnish waterway service vessel in 1991. The most widely employed system to date, Azipod was originated by ABB Industry and Kvaerner Masa-Yards (KMY), but Italian shipbuilder Fincantieri is also a shareholder today in the system's proprietary company.

The growing uptake of integral electric-driven, podded propulsors in the most capital-intensive sector of the cruise shipping industry, has forever altered the established position of conventional propulsion systems in an important segment of the market. Having established a foothold in the offshore sector, the concept will undoubtedly find increasing application with the next upswing in investment by the offshore oil and gas industry.

The relative paucity of orders for podded drives in areas where precision handling is paramount, as with icebreakers, cablesips, ferries and specialized tankers, belies the extent to which such systems are being written into draft proposals or discussed at the project planning stage. The concept is especially apposite to vessels with varying service profiles, particularly where high maneuverability is required.

The long-term sales impact of the industrial commitment from the design engineering and manufacturing side cannot be understated. In each case, podded propulsors are the products of pairings entailing major players in propulsion and electrical engineering, entailing direct or indirect links with leading shipbuilders, in certain instances.

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## Finnish Maritime Report

As a progression on thruster technology, the basic principle is that the conventional shafting, propeller and rudder system is replaced with a 360-degree rotatable thruster unit also encapsulating the electric motor. Space savings are thereby achieved within the hull, while the efficiency losses from reduction gearing, long shaftlines, rudders, stern

thrusters and also brackets and bossings are eliminated.

The first cruise ship application of podded electric drive was Carnival's 70,400-gt Elation, commissioned in early 1998 and fitted with two 14-MW, Finnish-developed Azipod propulsion units. Current newbuild references include the entire Carnival group pro-

gram, Royal Caribbean's prestigious Project Eagle series, as well as Hapag-Lloyd's Europa, all at KMY yards.

As a measure of its influence, the Azipod system figures in each of the substantial number of cruise ship newbuilds currently in hand and on order at KMY. By mid-1999, confirmed orders for the device had totaled 40 units of an aggre-

gate 487,000-kW, including a total of 29 in 13 cruise ship applications.

The adaptability of the Azipod technique is implicit in a design range, which extends from just 500-kW to approximately 25-MW.

The flexibility and power of the system was clearly pointed out during sea trials of Royal Caribbean's Voyager of the Seas the world's largest cruise ship which is equipped with three 14-MW pods. During trials, the vessel topped out at 17 knots ... backwards!

### Wartsila NSD

Wartsila NSD is a perennial powerhouse for shipboard power needs. A dominant force in the many markets it serves, the company is the major player in the medium speed diesel engine market, with an estimated 28 percent of market share, as well as in the low-speed market, where its Sulzer engines dominate.

Owned by Finnish engineering group Metra, the company has led a wave of marine propulsion consolidations in recent years, most notably with the New Sulzer Diesel acquisition of a few years ago. But while much of the focus has been on consolidations, one of the company's more notable hook-ups has been dismantled, as it announced that it and co-owner Cummins Engine Company would split their 50/50 joint venture Cummins Wartsila in early 2000. In announcing the split-up, Metra said the portion of the venture to be transferred to its engine building division Wartsila NSD would generate net sales of about \$133.5 million this year, or about two-thirds of Cummins Wartsila's business volume.

Splitting the venture, which was formed in 1995, will reportedly cost about \$20.6 million. Despite the extra one-off cost, full-year 1999 earnings of Metra's biggest division Wartsila NSD will improve on 1998, but will reportedly still be in the red.

The split up was reportedly to allow the two companies to focus on the engines that best suited their core businesses, to achieve synergies and improve profitability. Wartsila NSD will take over the manufacture, sales and service of the CW200 and CW220 diesel engines, and a plant at Mulhouse, France, and Cummins would take responsibility for the CW170 and CW180 engines and a factory at Davenport in England.

Wartsila NSD would also take charge of global service for engines made by the joint venture's predecessor, SACM Diesel, and the manufacture and servicing of UDX engines. The operations transferred to Wartsila NSD would be merged into the company's French subsidiary.



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*Using the model proposed by Gerry Miller, CPE, "The Triangle of Effectiveness," the factors affecting the probability of human error will be discussed with the focus on recent work and solutions attendees may use to effect similar improvement.*

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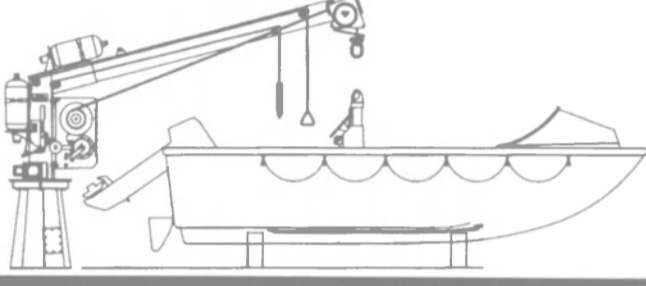

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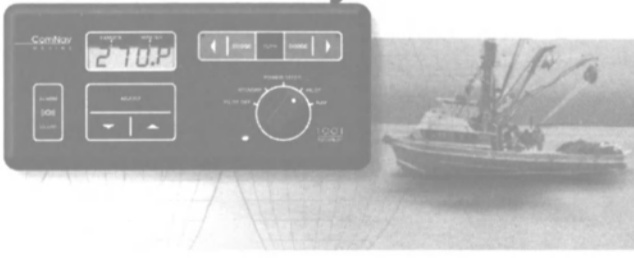
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## Keeping Machinery Spaces Safe

Fire in the engine room is one of the largest causes of ship casualties around the world, a fact highlighted in a recent Salvage Association annual review. Finland's Marioff Oy — a well-regarded supplier of fire suppression systems — now offers a dedicated HI-FOG water mist fire protection system for ship's engine rooms. The supplier of water mist fire protection systems for ships is gearing up for unprecedented demand for its tailor made HI-FOG local application system following the May 1999 meeting of IMO's Maritime Safety Committee.

Following this meeting, IMO requires, in addition to the main ship system, that the engine rooms of most ships be fitted with a water based local application fire fighting system. IMO's latest circular covers the following ships:

- new passenger vessels over 500-grt by July 2002
- new cargo ships over 2,000-grt by July 2002
- existing passenger ships over 2,000-grt by October 2005

"Marioff's solutions will prove most attractive for shipowners," believes Dr. Maarit Tuomisaari, Marioff's Research & Development Manager. "Our innovative, yet simple GPU is ideal for this application as it requires no external power. The system can be activated immediately with no danger to personnel, so extinguishing will normally be very fast. I believe that the use of our system will make primary gaseous systems redundant."

Alternatively, the HI-FOG local application system can operate with one of Marioff's other pump units, using either electric pumps or diesel-driven ones. These are usually selected when the ship is also protected by a sprinkler system. The diesel-driven pump is typically used on retrofits, without sufficient electric power. One of the latest vessels to feature a HI-FOG system in its engine room is the world's largest passenger ship, the 142,000-grt cruise ship Voyager of the Seas. Delivered recently from Kvaerner Masa-Yards New Turku Shipyard in Finland to Royal Caribbean International, this 1,020 ft. (311 m) long giant features 300 sprinklers in its machinery spaces, providing total fire protection for the vessel's diesel-electric prime movers and auxiliaries. In addition the accommodation, public and service areas are covered by a complete HI-FOG sprinkler system. The remaining two vessels in this series, Explorer of the Seas and Adventure of the Seas, feature similar HI-FOG fire protection.

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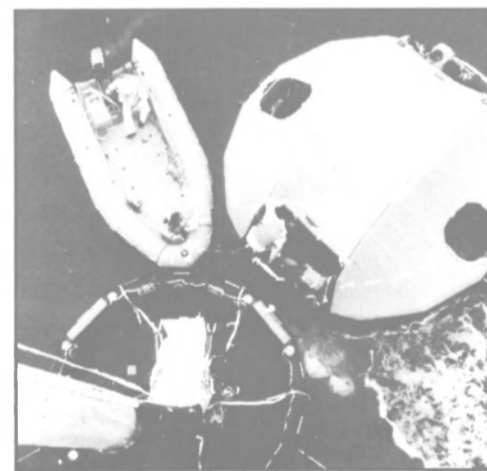
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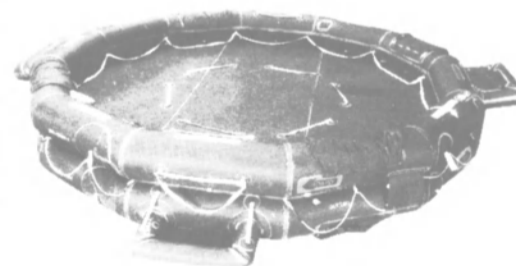
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# Kvaerner Masa-Yards Delivers

Despite a year of turmoil spurred by its parent company's withdrawal from ship-

building, Kvaerner Masa-Yard's Helsinki shipyard continued to build on its world renowned tradition of delivering some of the finest cruise liners ever

built. In mid-November, Costa Atlantica, newbuilding 498, was launched. The 84,000-gt cruise ship is scheduled for

delivery to Costa Crociere S.p.A. in June 2000. The 2,680-passenger ship provides the latest in amenities to ensure the cruise boom continues, including that fact that 80 percent of all staterooms are outside, while 70 percent of all staterooms boast a balcony.

The ship features a diesel-electric machinery arrangement, powered by six Wartsila NSD 9L46D diesel engines, which produced a cumulative 62,370 kW. The propulsion unit consists of two azimuthing electric Azipod propulsion units, with a power of 17.6 MW each, driving the ship to a service speed of 22 knots. In addition, the ship has three 1.91 MW tunnel thrusters in the bow.

The Turku yard - which last October delivered Royal Caribbean's Voyager of the Seas, the world's largest cruise ship - subsequently floated out the second ship in the mammoth new series, Explorer of the Seas, just two weeks later. Explorer, which is due for delivery in the autumn of 2000, will be followed by the third ship in the series, Adventurer of the Seas, in the spring of 2002.

Powered by six Wartsila NSD 12V46C engines and propelled by three 14MW Azipod propulsion units, the 3,840 passenger, 1,020-ft. (311.1 m) ship travels at a service speed of 22 knots.

#### Costa Atlantica Main Particulars

GT	84,000
Length, o.a.	959.6 ft. (292.5 m)
Breadth, max	127.3 ft. (38.8 m)
Breadth, dwl	105.6 ft. (32.2 m)
Draft, dwl	25.5 ft. (7.8 m)
Draft, scantling	26.2 ft. (8 m)
Passenger capacity, lower bed	2,114
Passenger capacity, max	2,680
Passenger staterooms	1,057
Passenger staterooms, outside	845
Crew capacity	902
Speed, service	22
Main engines	Wartsila NSD
Propulsion units	Azipod
Classification	RINA
Delivery	June 2000

#### Finnish Companies Collaborate On Manufacturing

In mid-January, Finnish companies Wartsila NSD Finland Oy, PPTH-Norden Oy and UWIRA Oy signed a letter of intent to establish the feasibility of transferring the manufacture of welded components and pipework for Wartsila NSD engines to PPTH-Norden and UWIRA. The transfer would apply to Wartsila NSD Finland's welded components and pipe factory close to Vaasa. The factory, which has 70 employees, supplies components for engines manufactured in Finland. PPTH-Norden's expertise lies in welded plate structures, and is a leading steel constructor in Nordic countries. UWIRA concentrates on piping.

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## Record Trade Surplus Boosted By Shipsales

Finland posted a record monthly trade surplus for October, boosted by a major deal by one of its shipyards and accelerating economic recovery. The customs board's preliminary data for October showed a trade surplus of a record \$1.4 billion, with exports up 14 percent year-on-year at \$4.1 billion and imports up six percent at \$2.7 billion. October saw the departure from Finland of Voyager of the Seas, the world's largest cruiser ship.

It was built by Kvaerner's Masa-Yards for Royal Caribbean.

Economists said that despite this one-off item, the data added to evidence from figures in the past few months indicating that the economy was back on track after being hit by the Russian crisis and a global economic slowdown last autumn. In September, Finnish exports grew eight percent after a flat August and a seven percent fall in July. September industrial production increased by 5.2 percent, 2.1 percent in August and 3.9 percent in July. Growth was also driven up by export revenues from the booming technical products industry, which is led by telecommunications equipment maker Nokia.

## Neptun Maritime Earnings Drop

Finnish passenger ferry operator Neptun Maritime — controlled by Sea Containers — recently reported the following earnings (million USD unless stated):

	1999 Jan-Sept	1998 Jan-Sept
Net sales	410	451.5
Operating profit	40	30.9
Non-recurring items' at operating level	3	nil
Profit after fin items	16.4	4.1 (loss)
Earnings per share (thousands)	267	144 (loss)

## MaK Now Offering Post-Sales Service

MaK Motoren GmbH & Co. signed a contract with Alstom U.K., manufacturer of Napier turbochargers, regarding the take-over of all service activities on MaK engines equipped with Napier turbochargers. Following this take-over, MaK is now offering for various engine series full service from a single source, both for engine and turbocharger, allowing for direct contact for all issues regarding operation, spare parts supply, maintenance, servicing and repair.

Napier Turbochargers have been in successful use for several years on various MaK engine series such as 6/8/9 M 32, 9 M 453 C, 6 M 552 C, and selected M 551 engines.

Circle 1 on Reader Service Card

February, 2000

## Allied Systems Delivers SOLAS Approved Davit

Allied Systems of Sherwood, Ore. recently tested and delivered its premiere SOLAS certified rescue boat davit. Since supplying almost 200 similar davits to a variety of U.S. and foreign governmental agencies, Allied is in preparations to offer boat davit systems to the global commercial sector.



Designated Model D-6000S, the recently certified unit has a 6,000-lb. rated SWL. Allied is currently finalizing

a lower capacity, less expensive, 3,200-lb. SWL rated unit for smaller vessel or platform applications. The company has also developed its own constant-tension winch system for added safety in high sea state operations.

Factory loaded and tested, the Allied units, which require three-phase electrical supply only, are complete and ready for operation.

Circle 2 on Reader Service Card

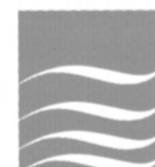


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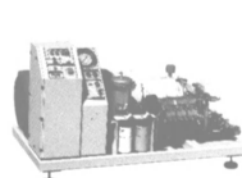


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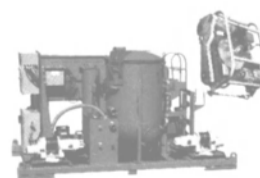
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## Fugro To Supply GDPS Service

Fugro SeaSTAR (U.K.) has been granted orders to provide differential GPS services and systems for two new 109,000-grt vessels being constructed for Princess Cruises. Equipped to carry 3,300-passengers, hull numbers 6050 and 6051 are currently being built at the Fincantieri yard in Monfalcone, Italy, and are scheduled for delivery in April 2001 and January 2002. SeaSTAR is a

marine DGPS subscription service that transmits continuous real-time DGPS correction data worldwide via satellite.

Circle 4 on Reader Service Card

## GDHS Launches Friobox Express

Dubbed as the world's new way to "keep the temperature controlled" for perishable goods in transit, GDHS has

launched Friobox Express — the world's only flat packed temperature control unit. In development for approximately three years, Friobox Express is comprised of revolutionary flat packed, environmentally friendly, temperature control boxes for the transportation of chilled or frozen products.

The product has been stringently tested by the prestigious IBMB institute in Germany, to ensure that it performs to

the rigorous standards set down by the transport industry. GDHS states that Friobox Express offers unique features to all those involved in the shipment of temperature sensitive products.

Maintenance of stable chilled and frozen temperatures for 96 hours, even with an ambient temperature of 30 degrees-C/86 degrees-F, completely non-hazardous, non-toxic and fully recyclable, thus eliminating the problems associated with traditional hazardous cooling agents, and is the only solution that comes flat packed and vacuum-sealed, thus minimizing space occupied in storage and shipping.

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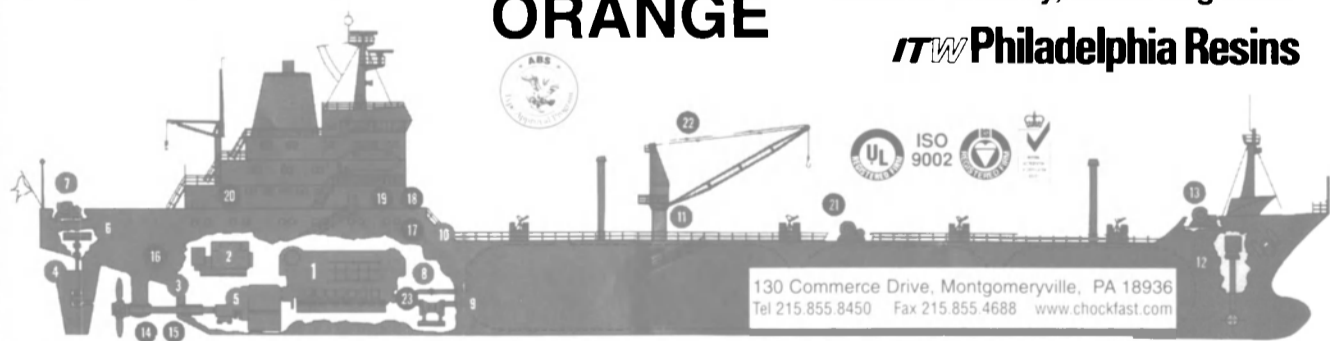
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## Fishers Reaches Breakthrough In Side Scan Sonars

J.W. Fishers Mfg., specialists in high tech underwater search equipment, are now offering a computer hardware/software package for their side scan sonar systems. The sonars transmit a sonar beam from transducers mounted on each side of the towfish. The sonar beams then sweep under the water's surface, reflecting any objects situated there. Sonar beam transmission frequency determines the range and resolution — low frequency giving longer ranges — high frequency offering higher resolution.

The new computer hardware and software offered by Fishers lets their side scan systems output to both a high resolution 17-in. wide thermal printer, as well as a computer — providing the best of both worlds. The computer system then gives the side scan operator a variety of options for displaying and enhancing the sonar image.

Circle 39 on Reader Service Card

## Chang And Bray Receive 1999 Connie Awards

The 1999 Containerization & Intermodal Institute's Connie Awards were presented to Evergreen Group chairman, Dr. Yung-fa Chang and J. Robert Bray, executive director of the Virginia Port Authority at an industry-wide luncheon at the Marriott World Trade Center in New York.

## Bureau Veritas Acquires UIL And Neptunus

Bureau Veritas (BV), has agreed to the acquisition of Unicon International and Neptunus, the San Francisco-headquartered groups, which specialize in intermodal equipment and cargo management services for the International transportation and logistics industries.

This will allow BV to broaden its client base and its service offering to the industry.

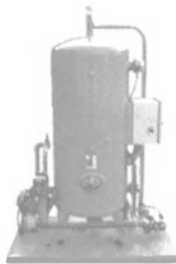
## MJP Waterjets Elects Bicoastal Agents

Resulting from the altered structure in the waterjet market, the collaboration between MJP Waterjets and Bird Johnson (BJCO) has concluded.

This past December 1999, MJP stated its appointment of two new U.S. bicoastal sales and service agents: Sound Propeller Services, Seattle on the west coast, and MCR Engineering Co. in North Attleboro in the east.

## Marinfloc® Introduces Sludge Dewatering Unit

Known for its emulsion breaking bilge water cleaning systems, Marinfloc® has added a new member to its product range — a sludge dewatering unit (SDU).



Tested onboard M/S Atlantic Compass and M/S Boheme, Marinfloc's sludge unit reportedly reduces water contents of the sludge water by up to 85 percent — significantly reducing costs to the shipowner. First results onboard the two test vessels have shown a reduction of water in sludge water by about half.

Circle 7 on Reader Service Card

## Con-Tech Hosts Nigerian Teams

Con-Tech Power Systems, Inc. and Con-Tech Automation & Control, Inc. hosted an inspection and test team from Nigeria for product demonstration and testing. Con-Tech Power Systems supplied a total ship services automation system and a power distribution system to Anatron Corp. of Holland. The system will be installed on the Nigerian vessel, NNS Ofiom - a 20-year-old LST Landing Craft. Ofiom is the first of a vessel trio earmarked for automation system retrofitting by the Nigerian Navy. Set for a March 2000 installation, the system was shipped in December.

Circle 40 on Reader Service Card

## Delepine Elected VP At Aker

Aker Engineering has appointed Yves Delepine vice president of naval architecture and marine engineering. Delepine, who has more than 20 years of experience in the offshore industry, has been with Aker for the past 12, coordinating various front end engineering design studies and participating in the execution of FPSO and Spar projects. He was also instrumental in the Liuhua FPSO projects from conception through construction, and spent two years on the King field development project.

## Marex.com Adds To Sales Staff

Marex.com, one of the largest e-commerce companies serving the marine

industry, has designated **Michael Bell** as vice president of sales.

Bell, who joined Marex from the healthcare industry, will implement and oversee the company's sales and member support organizations as it quickly expands into new areas of e-commerce for the marine industry.

Former marketing executive, **Todd Tamcsin**, joined Marex.com as vice president of marketing. Tamcsin previ-

ously worked for various agencies that serves marine accounts, and also spent five years as southeast sales manager for *Boating Magazine*.

## Briggs Retires From Matson Navigation

**Ronald F. Briggs**, general manager, engineering and fleet maintenance, took an early retirement from Matson Navi-

gation company on January 1. Briggs, who had been with the company for 22 years, held a career that encompassed many significant accomplishments, not only with Matson, but for the U.S. Merchant Marine as a whole.

Briggs holds a B.S. in Engineering and an M.S. in Naval Architecture from the University of California Berkeley. He has been a member of SNAME since 1970.

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## People & Company News

### Schoellhorn-Albrecht Supplies Deck Equipment

Schoellhorn-Albrecht delivered two of the largest high holding power anchors for installation onboard USNS Charlton — the fifth of seven Sealift New Construction ships. Built by NASSCO, the vessels are part of the Strategic Sealift



Schoellhorn-Albrecht's custom built hydraulic proof test machine, and were designed, manufactured and tested to comply with ABS rules for High Holding Power anchors. Featuring forges

Program. The AC-14 Type anchors were proof tested to 272,000-lbs. on

shanks, cast flukes and custom swivel shackles to suit the vessel's unique anchor handling system, the anchors also boast a custom epoxy paint system.

Schoellhorn-Albrecht has also delivered to NASSCO the ninth and 10th of a series of 14 accommodation ladders to be installed aboard Charlton. Measuring 76 ft., they are among the longest single

span accommodation ladders to be manufactured. Comprised of TIG welded 6061-T6 aluminum, the ladders also have folding self adjustable handrails.

Circle 8 on Reader Service Card

### Band, Lavis & Assoc. Appoints Senior Engineers

Band, Lavis & Associates has elected Alan Becnel and John Purnell as senior engineers. Prior to their appointments, Becnel and Purnell were with the Propulsion Department of the Naval Surface Warfare Center, Carderock Division. They also hold the designation as the design team responsible for design and development of the cavitating inducer waterjets for the continuing Marine Corps Advanced Amphibious Assault Vehicle Program.

### Transocean Completes Sedco Forex Merger

Transocean Offshore has completed its merger with Sedco Forex on December 30, which was spun off from

### Golden Ocean Reaches Agreement; Announces Resignation

Golden Ocean Group Limited has come to an agreement in principle with holders of more than 40 percent in principal amount of its 10 percent senior notes due 2001. In accordance with this agreement in principle, the company, as well as two intermediate holding company subsidiaries filed a petition on January 14 for reorganization with the U.S. Court. It is expected that a pre-negotiated plan based on the agreement in principle will lead to a restructured balance sheet and reduction of debt.

The general economic terms of the agreement in principle involve: the exchange of the company's presently outstanding senior notes in the total principal amount of approximately \$291 million, for new notes in the total principal amount of \$100 million; the cancellation of present equity and issuance of 88 percent of the new common shares to holder of the senior notes with the balance going to the company's management; and the guarantee of the new notes by Golden Ocean's vessel owning subsidiaries, which would also continue to perform their obligations under loan agreements, shipbuilding contracts and charters.

Golden Ocean also announced that Fred W.Y. Cheng has resigned as chairman and CEO of the company. Cheng, the architect of the company's major VLCC newbuilding program is departing the company to pursue new business interests.

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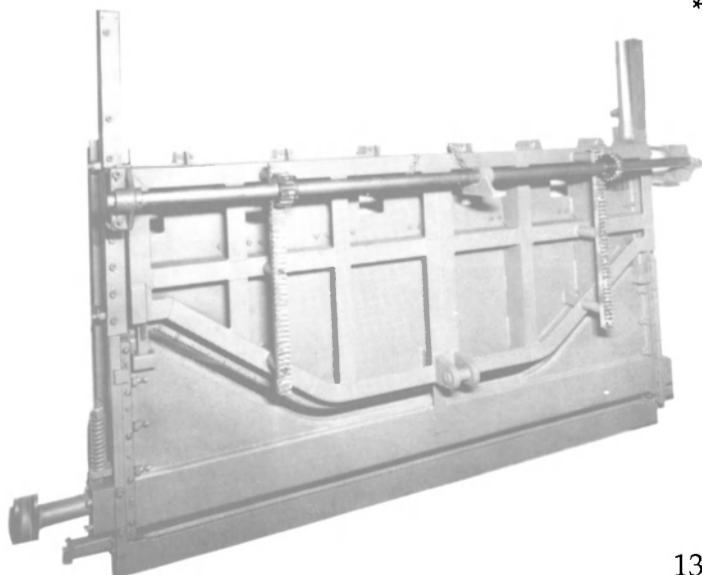
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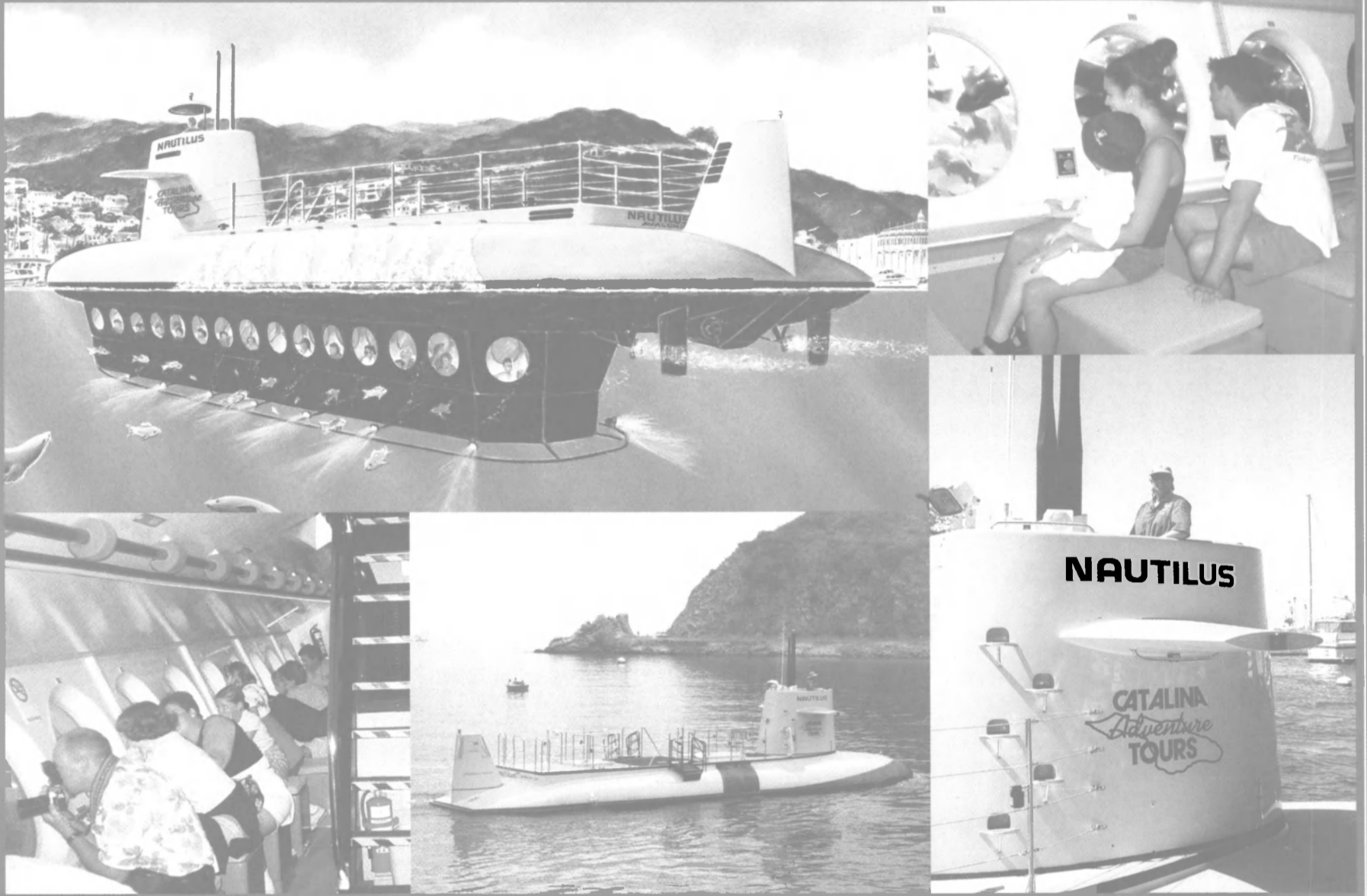
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Schlumberger Limited. Transocean Sedco Forex is now designated as the world's largest offshore drilling contractor and third largest oilfield services company in terms of equity market capitalization, based on closing prices of the merger date.

In the merger, about 109.6 million ordinary shares of Transocean Offshore are being issued to stockholders of Schlumberger. Following the merger, Schlumberger stockholders hold about 52 percent of the approximately 210.1 million outstanding shares of Transocean Sedco Forex.

### UKHO Appoints New Board Director

The United Kingdom Hydrographic Office (UKHO) in Taunton has elected **Bob Moss** as director of marketing, following the retirement of **Ian Harkness**, who had spent three years in the position. Moss, who joined UKHO in December 1999, previously served as commercial director of Bank Line, operator of multi-purpose vessels serving the South Pacific Islands.

### Napier's SM Coating Series Offers Safe Removal

Designed to open the pores of the coating system, allowing the product to penetrate to the substrate, the SM series formulation then destabilizes the bond - releasing the coating from the underlying surface. The coating can then be removed with ease via water blasting with minimal pressure, or by hand in sensitive areas. However, some coatings such as polyurethane can be vacuumed or squeezed off the substrate. A simplified cleanup allows for dramatically lowered costs, while coating removal can be completed anywhere, thus reducing the need for protective equipment,

ventilation or breathing gear.

The SM series has been developed to remove protective coatings including linear and crosslinked polyurethane's, solvent and water borne epoxy primers. From a shipyard standpoint, beneficial features include no fear of toxic, hazardous chemicals impacting the environment, workers or any substrate.

Circle 83 on Reader Service Card

### GD Appoints Welch As Snr. VP

General Dynamics (GD) has named **John K. Welch** as senior vice president of the corporation and head of the marine systems group, which includes all of the company's shipbuilding and marine service operations. Welch will report to **Nicholas D. Chabraja**, GD chairman and CEO, at the company's Falls Church, Va. headquarters.

Welch, who has been a vice president of the corporation and president of the company's Electric Boat business since 1995, will succeed **James E. Turner, Jr.**, president and COO of GD, who has headed up the group for the past five years. The company announced that Turner plans to retire on January 15, and that it does not intend to name a new president. In addition, **Michael W. Toner** will take over Welch's position as president of Electric Boat, Groton, Conn. Toner, who has been a senior vice president of Electric Boat since 1998 will continue to report to Welch.

### STN Introduces New Speed Log

STN Atlas Marine Electronics has introduced a new integrated satellite navigation and speed log system with combined 24-channel GPS-Glonass positioning. Providing simultaneous or separate position and speed calculations via GPS, Differential GPS and/or Glonass satellites, the Debeg Satlog 4124 provides worldwide positional and

## Furuno Introduces CH-37 Sonar

New from Furuno is CH-37, the world's only phased array sector scan sonar. Measuring 15-in., this high-performance daylight viewing unit allows the operator to choose from forward, vertical or searchlight scan modes. Incorporating Furuno's phased array technology, CH-37 scans a full 360-degrees in just 8.6 seconds on the 1,500 ft. range. The product features echoes in eight or 16 colors on a high-resolution CRT, offering unsurpassed visibility. Displaying clear underwater images in full-circle, searchlight, vertical fan or 3D bottom profile graphics, an external monitor can also be connected to CH-37 with an optional video output interface board. Available in 60, 113 or 162 kHz frequencies, CH-37 offers 12 range scales from 100 to 6,000 ft. (20 to 1,000 fathoms) when operating in full circle mode.



The CH-37 by Furuno - the world's only phased array sector scan sonar.

Circle 52 on Reader Service Card

speed accuracy of 15 m and 0.2 knots, respectively; corresponding Differential mode accuracies, derived from an integral multitrack differential beacon receiver, are 1 m and 0.1 knots.

The product is designed for any type of marine navigation operation as well as specialist applications such as hydrographic surveying, buoy positioning and oceanographic research. The system can also be used to support docking maneuvers by additionally calculating and displaying rate-of-turn and athwart speed at stern. A measured mile function for calibration of connected speed logs in addition to displaying distances traveled per day, leg or total voyage is also present. Safety functions include a man-overboard alert supported by integrity monitoring and external alarm facilities.

Circle 42 on Reader Service Card

### Marshall Islands Now Offers Cost Free Registration

Announced per International Registries (IRI), the administrator for the Republic of the Marshall Islands corporate and maritime programs, all vessels registering under the Marshall Islands flag between now and June 30, 2000 will be able to do so free of registration, documentation and mortgage recordation fees, as well as annual tonnage tax, marine inspection and marine investigation, and international participation fees.

IRI also stated that the annual tonnage tax was lowered from \$.25 to \$.20 per gross ton. This conversion to a net tonnage tax base results in a 50 percent reduction in the early tonnage tax for vessels currently registered or planning future registration under the Marshall Islands flag.

### Cortland Cable Announces U.S. Navy Contract

Cortland Cable Company, supplier of custom engineered mechanical and electro-mechanical cables and ropes, was granted a contract by the U.S. Navy for the production of components for the Navy's submarine fleet. With total contract value exceeding \$3 million, Cortland is scheduled to commence the supply of parts by the end of the first quarter, running for an additional four years.

Production will occur in the Cortland, N.Y. facility, while various components will be sent from other central N.Y. companies.

Circle 84 on Reader Service Card

### Coflexip Continues Fleet Modernizing

Coflexip Stena Offshore has sold its vessel — CSO Installer — to Global Marine Systems Limited. A former flexible pipe installation vessel, Installer will be converted into a telecommunication cable lay vessel for Global Marine Systems. Sold by the CSO Group as part of its modernization program, the fleet

currently consists of 15 construction and installation vessels. Coflexip's modernizing strategy has led it to the construction and launching of CSO Deep Blue, which will enter service beginning 2001 at record depths of 2.5 km.

### New Drydock Christened in CA

Congresswoman Nancy Pelosi, in

conjunction with San Francisco Drydock, S.F. Maritime National Parks Service and the Port of San Francisco, held a renaming and christening ceremony on January 12 for Eureka - the port's newest floating drydock at Pier 70.

With Congresswoman Pelosi's assistance, the Port was granted a surplus Navy drydock at a discounted rate of \$95,000, which was named in honor of the S.F. Maritime National Parks' Ser-

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vice historic ferry vessel, Eureka. The new mid-sized drydock will be utilized by the San Francisco Drydock to repair various smaller vessels such as ferries, coast guard cutters and small- to-medium-size commercial ships.

### Raytheon Completes Bridge System Installation

Raytheon Marine, provider of marine

electronics, has installed its newest electronic bridge system on the 164 ft. (50 m) yacht Invader, a private yacht currently performing its maiden voyage from Italy to California. Built at the Codecasa shipyard in Viareggio, Italy, Invader's new electronic bridge system is comprised of various Raytheon marine navigation products including S-band and X-band Pathfinder®/ST MK Radar Systems and the Standard 20 Dig-

ital Gyro Compass. All components are designed specifically for high seas shipping and merchant vessels, and are utilized in Raytheon's Integrated Bridge Systems that are classified according to DNV (Watch 1 Certification).

Circle 43 on Reader Service Card

### Leica Supplies Offshore Fleet

Leica has delivered eight MX 480 of its professional chart navigators for the

fleet of offshore supply vessels operated by Hornbeck Offshore, Mandeville, La. The equipment was sold and installed by Leica dealer Frank L. Beier Radio Company of New Orleans. Each of the systems includes dual Leica MX 412B DGPS navigation receivers linked to a ruggedized PC-based chart plotter. Complete with built-in differential beacon receivers, the two independent DGPS receivers are designed to provide integrity monitoring with automatic switchover in the case of a failure or error.

Circle 53 on Reader Service Card

### Victaulic Reorganizes Marketing Services Group

Victaulic has reorganized its marketing services department with the appointment of **Scott Frey** as manager and **Mark Longenbach** as assistant manager. In addition, **Robin Porter** has been promoted to creative services supervisor. **Gilbert Greene**, who had served as the company's marketing services manager for more than 30 years retired in January.

### Moran Adds To Greenwich And Port Arthur Locations

Moran Towing Corporation has elected **Bart J. Turecamo, Jr.** to the position of assistant vice president of sales at the company's Greenwich headquarters. In his new position, Turecamo will report to Captain **James B. Murray**, vice president of sales, and will assist him in the direction of sales and marketing activities for Moran. **Stephen M. Kelly** has been promoted to assistant vice president, Moran Towing of Texas. Mr. Kelly will work with the vice president and general manager in the operation and management of Moran's offshore tug and barge fleet.

### Electro-Coal Appoints New Directors

Electro-Coal Transfer has named **Jonathan Red** as director of sales and marketing. Prior to joining the company in 1997 as director of financial services, Red, who was promoted to director of operations in 1999, was the director of maintenance and material for the Naval Surface Reserve Force in New Orleans.

Replacing Red's former position will be **Layne Bennett**, an 18-year veteran at Electro-Coal.

### Soundcoat Receives ISO 9002

The Soundcoat Company has been granted ISO 9002 registration from Underwriters Laboratories (UL), at its Deer Park, N.Y. facility. The company, which manufactures noise and vibration control products, began the registration process in 1998. UL performed an on-

Maritime Reporter/Engineering News



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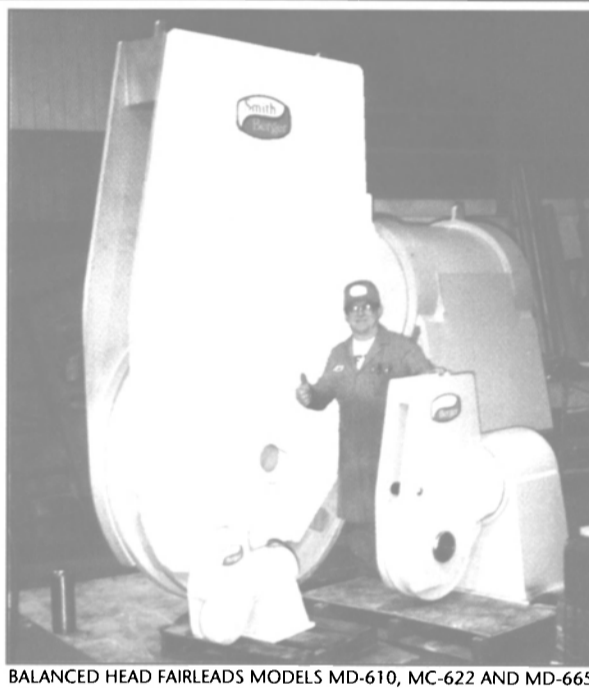
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site assessment, as well as an examination of documented procedures and a survey of the company's overall operations.

Circle 97 on Reader Service Card

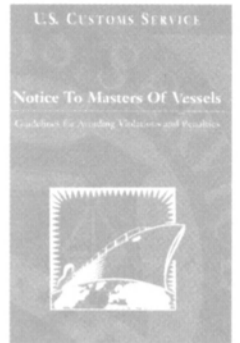
### ASA Pushes For 300-Vessel Navy

The American Shipbuilding Association (ASA), led by president, **Cynthia L. Brown**, has reiterated its existing need for increased naval ship construction now to ward off the natural progression of the U.S. fleet below the 300-vessel level. The fact that the fleet has lessened by almost half from 600 ships in 1987 to 324 today is only part of the problem, according to Brown, who says that procurement levels from DoD over the past seven years is, in essence, a budget for a 200-vessel fleet.

ASA reasons that the build level must return to at least 12 vessels per year (as opposed to the six to seven vessels per year ordered over the past seven years) to maintain an adequate balance.

Guidelines for Avoiding Penalties.

This brochure, which outlines the penalties that vessel masters or owners may face if they or their crew commit violations, also describes the precautions and documentation necessary to avoid such penalties. Up to five copies of this publication can be obtained by writing to:



Customs Service, P.O. Box 7407, Washington, D.C. 20044. The brochure is also available at [www.customs.gov](http://www.customs.gov)

### Cahouet Retires From USEC

USEC announced that **Frank Cahouet** has retired as a member of the board. Cahouet, who has been a member of the board since the company was privatized in July 1998, resigned on January 15. He also recently retired from the positions of president, chairman and CEO of Mellon Bank Corporation.

### Volvo Penta Opens Premiere Plant For The Millennium

Volvo Penta opened a plant on January 8, which will serve as the company's assembly plant for diesel engines and generator-pacs in Wuxi, located about 100 km west of Shanghai, China.

An investment amounting to more than \$9 million, Volvo Penta is financing 70 percent, while Wuxi Diesel Engine Works is picking up the remaining 30 percent. In addition, Volvo Penta has invested a further \$1 million into the training of technical staff and the transfer of management know-how.

The assembly plant will initially be home to the assembly and distribution of both Volvo Penta diesel engines and gen-pacs for industrial applications.

Circle 96 on Reader Service Card

### Ramco To Benefit From Heavy Fuel-Burning

Ramco Group of India has placed an order for 16 generating sets based on MAN B&W Diesel, Holeby type L/23/30H medium speed engines for supplying power at six of its factories. The new GenSets will replace run-down high-speed diesel installations.

The delivery, which will be made this year, will encompass 10 type 6L23/30H GenSets, each rated at 770 kW, and six type 7L23/30H GenSets, each of 900 kW.

Circle 87 on Reader Service Card

### U.S. Customs Revises Publication 581

The U.S. Customs Service has published the revised edition of Publication 581: Notice to Masters of Vessels:

### DFDS Seaways Orders Fast Rescue Boat

Danish ferry operator DFDS Seaways has ordered Dolphin Safe Rescuer for their fleet of RoRo passenger vessels from Sea Safe Boats Sweden. DFDS has selected the Dolphin Safe Rescuer, which meets all IMO requirements coming into force prior to July 1, 2000, for its maneuverability, quick and safe rescuing, and superior protection for crew and rescued passengers. Approved by Lloyd's Register of Shipping, Dolphin Safe Rescuer meets requirements as a combined fast rescue boat/lifeboat for 18 persons. The propulsion system is comprised of a diesel and a waterjet.



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## Aker To Construct Car-Passenger Ferry

Aker Finnyards and the Greek G A Ferries have signed a letter of intent for the building of a new car-passenger ferry for short international routes and Greek domestic traffic. The letter also includes an option for another vessel.

The new vessel, which will be delivered in spring 2001 will boast a length of 492 ft. (150 m) and a beam of 82 ft. (25 m). Propulsion by four diesel engines totaling 50,000 kW will provide a speed of 29 knots.

G A Ferries, operator of 10 vessels, intends to go public in Athens this year.

## North Florida Shipyards Awarded MarAd Contract

American Overseas Marine Corporation (AMSEA), on behalf of MarAd, has granted North Florida Shipyards (Jacksonville), a contract to modify deck spaces of M/V Cape Wrath.

With work encompassing the removal of six movable decks, and one fixed deck, three new fixed decks will be fabricated by the yard's affiliate — North Florida Shipbuilding — and installed in the cargo spaces. Additional modifications will be performed on fire stations, vent systems, lighting and hydraulic systems to serve the new deck areas.

Circle 55 on Reader Service Card

## Rolls-Royce Wins \$1 Million Contract

Syncrolift Inc., a Rolls-Royce company, has won a contract worth more than \$1 million to supply Ocean Marine LLC, a subsidiary of Marine Hydraulics Intl. (MHI), with a Syncrolift® at its new facility, currently being built in Portsmouth, Va.

MHI's premiere Syncrolift will lift luxury yachts measuring up to 235 ft. (71.6 m), and weighing up to 1,230 tons for repair and dry storage. With a 210 x 40 ft. platform, the shiplift will be paired with a 100-ton Travel Lift, utilizing eight specially refurbished 240-ton hoists. Scheduled for an April 2000 commission, the project also includes a marina with 130 wet slips and 320 dry boat storage slots.

Circle 56 on Reader Service Card

## NASSCO Lands First Phase Of Ship Conversion

National Steel and Shipbuilding Company (NASSCO), a General Dynamics Company, received \$2 million for the first phase of an estimated \$25 million contract to convert a U.S. Navy Strategic Sealift Program vessel to meet the readiness capabilities of the U.S. Marine Corps. Included in Phase I will be the development of design changes, materi-

al specifications, as well as the planning for the Phase II conversion effort, effective immediately. The vessel set for conversion — USNS Soderman — is scheduled to arrive at NASSCO during the summer of 2000, and is expected to finish on March 1, 2001.

The conversion encompasses added living quarters for 50 additional personnel, changing of the stern ramp to an in-water ramp and upgrading of the helicopter landing deck to an all-weather

flight deck.

Circle 57 on Reader Service Card

## Tarbit Selects Schilling Monovec Rudder

The Dordecht-based De Biebosch yard in the Netherlands has ordered a Schilling Monovec rudder from Hamworthy KSE for a 4,500-dwt tanker currently under construction for Swedish Tarbit Shipping. Enhanced maneuver-

ability provided by the one-piece Schilling design offers the potential to upgrade operational flexibility aspects — particularly at slow speeds.

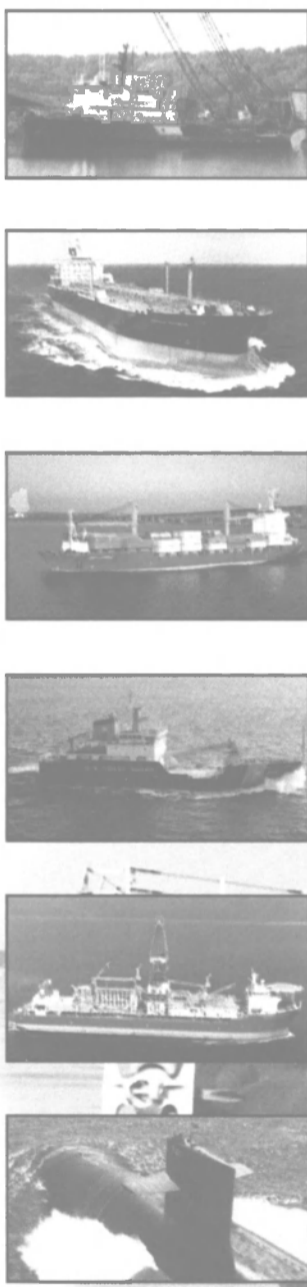
In addition, Hyundai Heavy Industries of Korea has ordered a single screw Schilling Monovec rudder from Hamworthy for a 7,800 cu. m LPG Carrier it is constructing for Norwegian owner Navion.

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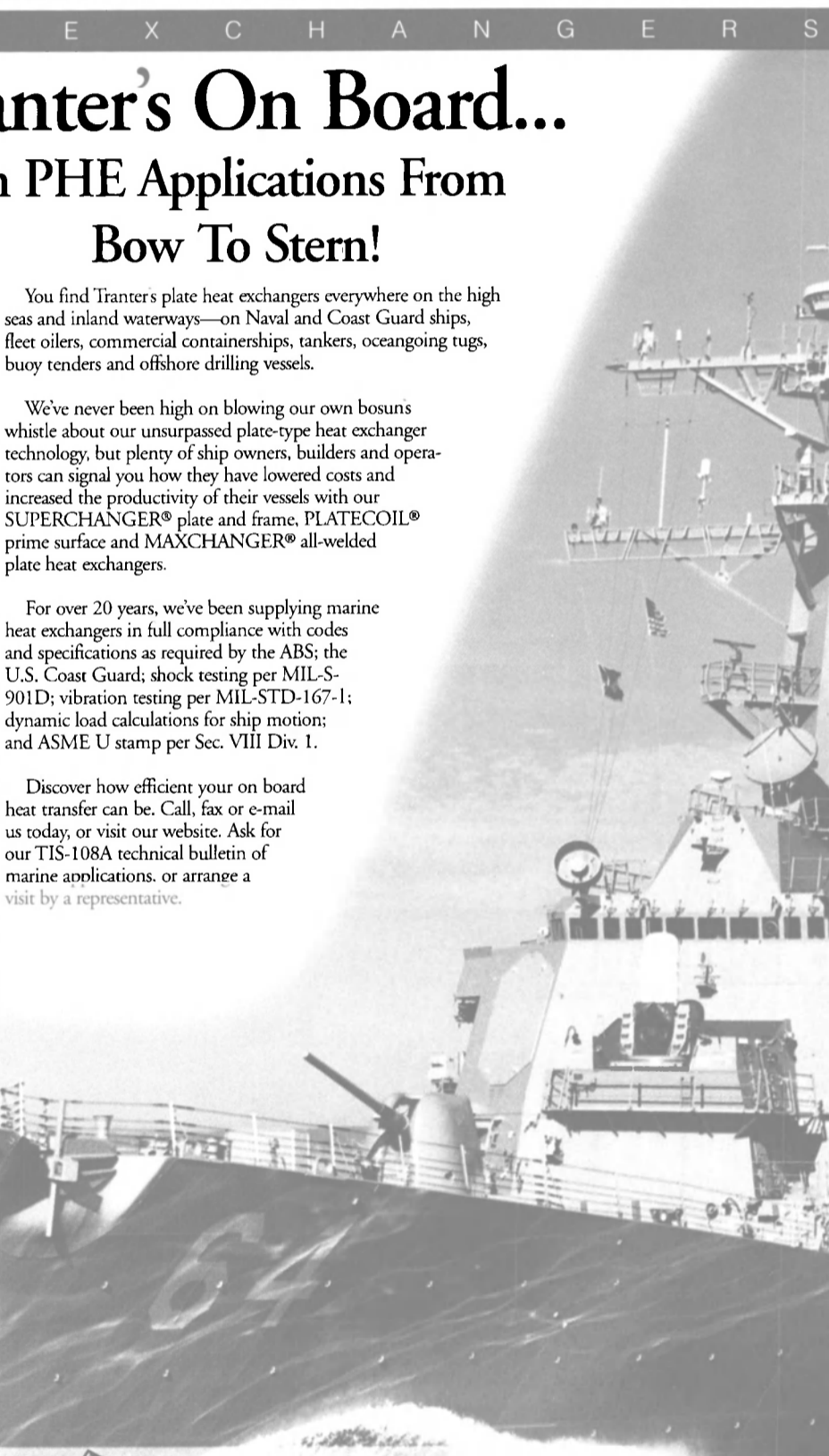



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H E A T   ▲   E X C H A N G E R S

## Derecktor Shipyard Wins Contract For Two Pilot Boats

Derecktor Shipyards signed a contract with the New York/New Jersey Sandy Hook Pilots Association for the construction of two all aluminum fast pilot boats. The two vessels will be built according to plans by Camarc Small Craft Designs of Worthing, U.K. in Derecktor's Mamaroneck, N.Y. facility. Delivery is scheduled for fall 2000.

### Main Particulars

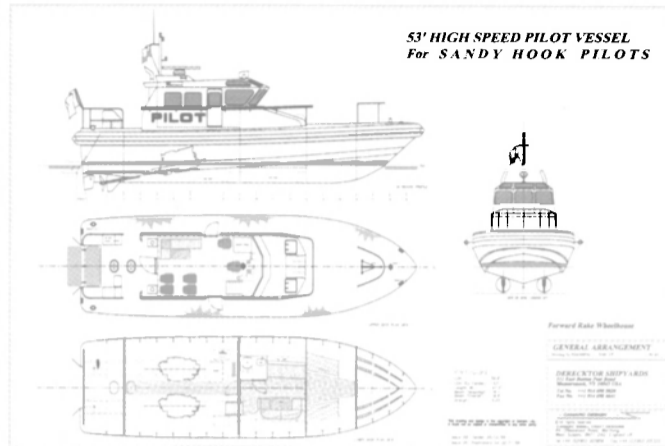
Builder	Derecktor Shipyards
Main Engines	2 x Detroit Diesel 8V2000
Length, (o.a.)	56 ft. (17 m)
Beam, (molded)	16 ft. (4.8 m)
Beam, (o.a.)	19 ft. (5.7 m)
Draft	5 ft. (1.5 m)
Fuel capacity	1,500 gallons (5,600 l)
Water capacity	25 gallons (100 l)
Complement	10
Full Load Displ	27 ton
Speed	25 knots

The Sandy Hook Pilots serve the port of New York, the busiest commercial port in the U.S. They operate four boats from a stationary mother ship anchored near Ambrose Lighthouse in open waters and in a rough environment.

"The Sandy Hook Pilots wanted a safe, reliable boat with superior ride comfort," said **Gavin Higgins**, general

manager of Derecktor Shipyards. "We focused on a design that would give them great safety features in an extremely robust construction while affording a very smooth ride. The Camarc boat answers all these points and the Pilots were very impressed with its sea-keeping abilities during a recent test run on a sister-ship in a gale off the coast of Nova Scotia."

The clean and modern look of the new boats is due in part to the new fendering system, which ensures great durability together with very high impact resistance. The continuous fender is cleaner than traditional tires and also safer because it avoids dangerous "hanging up." Other safety features include:



heated decks and handrails, forward raked windows on bridge for maximum visibility of deck area and of boarding pilots, port and starboard side doors for direct exit of pilot from the shelter of the deckhouse to the ship's boarding ladder.

The structural design is based on Lloyds Register of Shipping Special Service Craft Rules and American Boat and Yacht Council Rules (ABYC) will be used for all the onboard systems. The hull design is an advanced double chine hull, with full skeg on the propellers, developed in conjunction with U.K. towing tank facilities since 1983. Derecktor plans to use scantlings well in excess of the rule requirements in order to obtain maximum hull strength and to exceed its minimum designed service life of 15 years.

Circle 107 on Reader Service Card

## Flender Werft Delivers RoRo Sporneborg



The first of a trio of three RoRo vessels built by Flender Werft Aktiengesellschaft was delivered to owner Wagenborg Scheepvaart B.V.

Named Sporneborg, the vessel will be utilized by Finnish-Swedish forestry product group StoraEnso operating between the ports of Gothenburg and Zeebrugge. Specifically, heavy paper and cardboard supplies will be carried in StoraEnso's Cargo Units (SECU), which are specially fabricated tall containers measuring 45 x 12 x 12 ft. (13.8 x 3.6 x 3.6 m), exceeding the conventional 40 ft. (12.1 m) container. The Dutch-flagged vessel, which was constructed under the rules and regulations of BV, is powered by a long-stroke cross-head Wartsila diesel engine with an output of 10,920 kW at 135-rpm.

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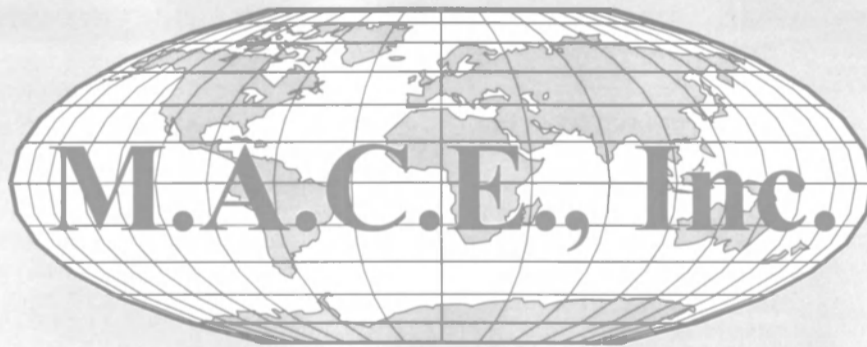
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## New & Notable

# Gladding-Hearn to Deliver Largest Incat Fast Ferry

by Chris Palermo,  
managing editor, *MarineNews*

Gladding-Hearn Shipbuilding, The Duclos Corporation, has begun construction of a new all-aluminum catamaran, which will join three other high-speed ferries built by the shipyard for Boston-based Boston Harbor Cruises. Measuring 142.6 ft. (43.4 m) on the deck, 39 ft. (11.8 m) abeam and carrying 500 passengers, the new vessel will be the largest Incat-designed fast ferry in the country, said shipyard officials. Delivery is scheduled for next June.

Designed for commuter service, whale watching and passenger coastal excursions by Australia-

based Incat Designs, the ferry's stylish lines resemble a modern megayacht. The architectural style was deliberate, says **Peter Duclos**, who heads the shipyard's business development.

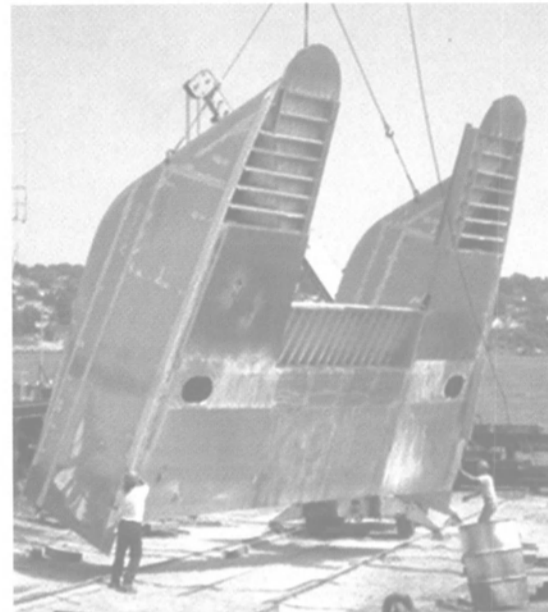
"The owner plans to charter the boat for coastal cruises, and therefore, wanted an especially distinctive design, which also optimizes the use of functional space" he says.

The vessel's forward windows, for example, are vertical to allow for more interior space than sloped forward windows generally found on most fast ferries today. The open stairway to the upper deck — the centerpiece of the main cabin — offers passengers a greater sense of

openness. Each cabin also includes three heads, lounge area, a cocktail and food-service bar, and upholstered seating and tables, which can be rearranged for private parties.

Powered by four Caterpillar 3512B diesel engines, each delivering 1,950 hp and driven by Kamewa A56 waterjets through ZF BW 465D gearboxes, the vessel is expected to reach a top speed of 37 knots when fully loaded. It is equipped with a Maritime Dynamics active motion-control system.

Bow section of a new all-aluminum catamaran under construction at Gladding Hearn Shipbuilding. The 142.6-ft. (43.4 m) vessel will be the largest Incat-designed fast ferry in the country.



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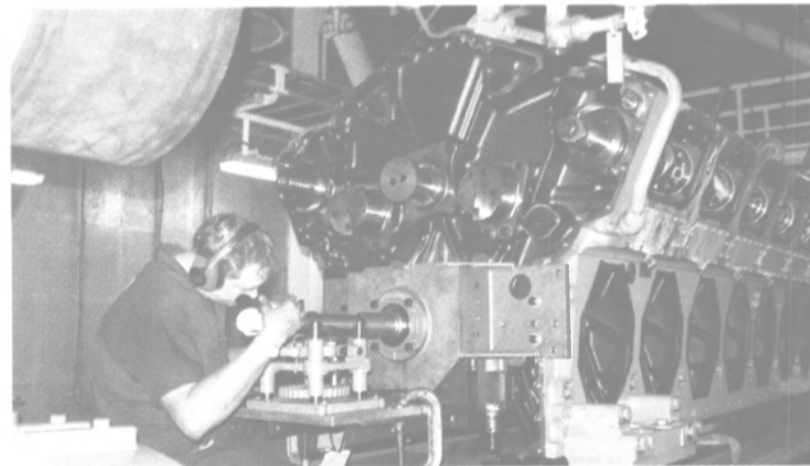
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**KVH TracVision**



Gladding-Hearn is home to some of the most advanced ferry construction in the U.S.

A motion sensor actuates a computer in the wheelhouse to adjust the large trim tabs, thus reducing the motion on the vessel as much as 60 percent, providing passenger comfort and minimal loss of speed in rough seas.

The company is building the vessel in modules, which Duclos says is the more modern way to construct a vessel. In addition to the obvious benefits - such as an approximate 25-30 percent reduction in delivery time, Duclos says the fact Gladding-Hearn can even build these vessels is benefit enough to build vessels in modules.

"Building the vessel in modules allows smaller yards to build bigger vessels," he says. "There's only one place big enough in our yard to build a vessel of this size, and that's outside. Since the modules are built inside, ultimately, only six weeks of the construction cycle is spent outside, as compared to traditional shipbuilding, where the vessel is built one piece at a time, for a full year, all outside."

Additionally, he says, building vessels in modules provides Gladding-Hearn the opportunity to build "semi-custom vessels at production rates."

#### Vessel Specifications

Length:	146.5 ft. (44.6 m)
Width:	39 ft. (11.8 m)
Draft:	6 ft. (1.8 m)
Air Draft:	43 ft. (13.1 m)
Gross Tonnage:	<100 U.S. Regulatory
Deadweight (design):	54.4 metric tons
Passenger Capacity:	500 total, 381 inside
Fuel Capacity:	4,400 gallons
Fuel Consumption:	362 gph
Main Engines:	(4) Caterpillar 3512B, 1,950 Bhp each
Reduction Gears:	(4) ZF BW 465D
Water Jets:	(4) KaMeWa A56
Ride Control:	Maritime Dynamics Trim Tabs
Engine Controls:	KaMeWa
Steering Controls:	KaMeWa
Generators:	(2) Caterpillar 3304 105kW each
Coatings:	U.S. Paints AwlGrip
VHF Radio:	(2) Furuno 2610
Radar:	(2) Furuno FR 8051
GPS:	Northstar 951XD DGPS
Air Conditioning:	York 30 tons
Seating:	Turnbull, Inc.
Speed:	38 knots, fully loaded
Fuel Consumption:	363 Gph or .020 gal/passenger/mile
Range at Full Power:	450 nautical miles

According to Duclos, there is no hard-and-fast rule for determining which ships will be built in modules. It's certainly not a question of length, he says. After all, the company doesn't build its 75 ft. (22.8 m) pilot boats in modules, but did construct a 70 ft. (21.3 m) tug-boat in five modules a few years ago. Rather, he says, it depends upon the shape.


"We build in modules when it makes sense," he says.

In this particular case, the catamaran will be built in six major modules - five comprising the hull, and one for the superstructure. Six weeks before delivery, the pieces - all pre-outfitted and painted - will begin to be assembled.

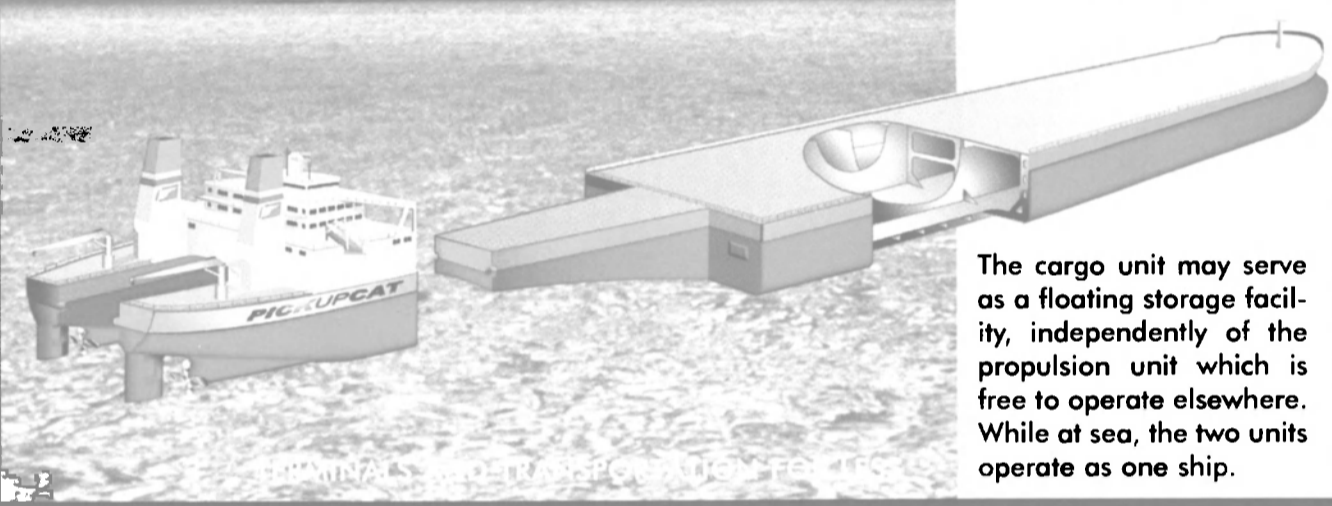
"The whole idea is to get the outfitters into the job sooner," he says.

"Traditionally, the hull is built, then the superstructure, then it's all welded up. Then, the pipefitters and carpenters and electricians and outfitters are brought in. But, by then, the area is all closed in; they're basically working in a shoebox.

"Building in modules, we're able to spread the project out, so people aren't working on top of each other. Another



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benefit is, with the superstructure not yet sitting on top of the hull, those workers aren't working high off the ground."

The premise is something called Zone Outfit Logic Technology (ZOLT), which essentially allows the outfitters to perform their job duties sooner in the process. The modules are constructed and outfitted simultaneously, and then everything is assembled and dropped in at the end of the process.

"What's helped us the most with that is computer lofting," Duclos says. "You can define pieces separately from other pieces, with a lot more accuracy than previously available."

The company uses CADKey — an off-the-shelf program, and has a dedicated design staff of eight people utilizing a healthy mix of computer and paper for specifications.

"We don't use the computer for every-

thing, we use it when it makes sense," says Duclos. "In the end, you don't need fancy programs to do fancy things."

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## Bollinger Launches Ocean Intervention II

Bollinger Shipyards began the new millennium with the christening and launching of Ocean Intervention II on



Built for Oceaneering International by Bollinger Shipyards, Ocean Intervention II was christened on New Year's Day.

New Year's Day. Measuring 254 x 54 x 19 ft. (77.4 x 16.4 x 5.7 m), the 4,000-hp multi-service vessel (MSV) built for Oceaneering International is scheduled for a spring 2000 delivery.

Christened by **Mary Schmidt**, wife of **Jack Schmidt**, Oceaneering's on-site construction project manager, Ocean Intervention is designed for deepwater installation work. The vessel differs from conventional offshore vessels with its nearly flat bottom and two large bowthrusters. The flat bottom was designed to allow for easier operation of remotely operated vehicles (ROV), and other equipment from the vessel's forward and aft 18 x 18 ft. moonpools. Main elements of the vessel's dynamic positioning system, are its 6.5 ft. bowthrusters, which aid in meeting with the ABS DPS-2 certification.

Developing a total of 5,470 EkW from two CAT 3516B and 3508 generators, the diesel-electric SCR driven vessel's propulsion will be provided by two 2,000-hp-DC Aquamaster azimuthing thrusters (Z-drives). Two Kamewa bowthrusters will aid maneuverability, while a fully redundant Kongsberg Simrad dynamic positioning system will control all the significant elements that will hold the vessel in position during operating sea conditions.

Circle 51 on Reader Service Card



## SeaArk Delivers Commander To Passaic Valley

SeaArk Marine of Monticello, Ark., delivered its 27 ft. (8.2 m), all-welded aluminum Commander model to the Passaic Valley Sewerage Commissioners of Newark, N.J.

Named R.V. Passaic River, the vessel will be utilized for water quality sampling and general environmental clean-up work in the Passaic River and in Newark Bay — in addition to utilization for educational purposes. The vessel

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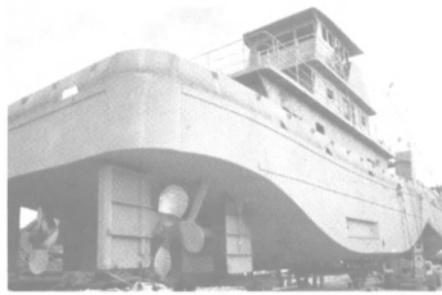


boasts a deep-vee hull, which provides proven performance and a smooth, dry ride, as well as SeaArk's standard 25 ft. (7.6 m) hull stretched to 27 ft. (8.2 m), allowing additional room for equipment on the recessed rear deck. A fully enclosed and insulated cabin was also extended to house two bench seats/storage boxes and a worktable, as well as two pilot seats. Standard equipment that is present on all SeaArk Commander models, include heavy duty three-in. D-shaped rubber bumper, three heavy duty 2.5-in. mooring bits, foam flotation and navigation lights. Electronics include Ritchie lighted compass, two Jabsco floodlights and Raytheon radar.

Outfitted and equipped with a 500-lb. capacity lifting davit with winch, removable tow post and shore power package, Passaic Valley's SeaArk is powered by twin 225-hp Johnson Outboard engines able to reach speeds of more than 52-mph during builder's trials.

Circle 21 on Reader Service Card

## LaForce To Construct Pushboat



Industry veteran towboater Autry Dufrene of Belle Chasse, La. has contracted the Bayou La Batre, Ala. LaForce Shipyard. Measuring 74 x 28 ft. (22.5 x 8.5 m), the 1,600-hp pushboat houses "a semi-camber" design from keel to the chine on the underside of the aft hull.

Scheduled for delivery sometime during February, the vessel's power will be provided by a pair of Cummins 12-cylinder KTA38 MO engines developing 800-hp each. The engines will be linked to Twin Disc MG-5301 gears with a

6.39:1 ratio turning 74 x 60-in. propellers.

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## U.S. Navy Christens First Ship Of The Millennium

Two of U.S. Transportation Command's subordinate commanders joined forces to christen the Navy's premiere vessel of the new millennium — USNS Pililau. The 950 ft. (289.5 m) vessel, which was christened on January 8 at Litton Avondale Industries in New Orleans, will be the 15th in a series of 20 new, large, medium speed RoRo vessels constructed for the Military Sealift Command. Large cargo spaces and multiple ramps allow the rapid movement of large quantities of military equipment on an International basis. Named for Pfc. Herbert Pilila'au, a Medal of Honor recipient in the Korean War who was killed on September 17, 1951 during heroic combat, the vessel will be delivered in early 2001.

## Davenport Enters Service For Army Corps



The 59 ft. (18 m) inland river towboat Davenport, built by Marine Builders

The USACE received a new tool for dam construction, repair and bank re-vestment work — the 59 ft. (18 m) inland river towboat Davenport. Constructed by Marine Builders, Utica, Ind., the vessel entered service on the Upper Mississippi River system in December 1999. The steel-hulled vessel was designed by the Army Corps' Marine Design Center, and is equipped with a galley and crew's quarters with accommodations for four.

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Richard's Galley Supply, in Louisiana, offers hundreds of products for the commercial marine industry. The one-stop facility provides food service equipment and supplies, janitorial, linen, paper products, flatware, china and glassware. Other products include commercial dryers, toasters, yogurt machines, steamtables, fryers, warewashing machine, beverage dispensers and food disposal units. The company is also available for design consultation, with experience in passenger vessels, bars, galleys and offshore living quarters. The company has the latest in equipment and technology for custom fabrication of stainless steel, wood, brass or glass.

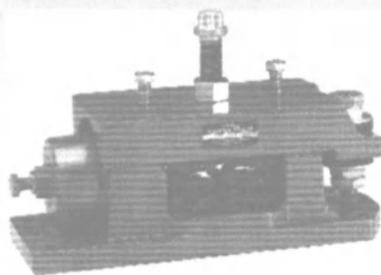
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### Isolators for High Loads

Available from Lo-Rez Vibration Control, the BR4-TLS isolator incorporates a limit stop to prevent excessive vertical motion and rocking motion of isolated equipment in ships. It is a useful isolator where high lateral loading of stationary equipment may occur due to wind. The neoprene bumpers can be easily adjusted to accommodate the actual working height of the isolator. Special thrust carrying devices permit the isolators to carry full thrust load without "locking up" so they are capable of providing effective isolation of the engine-generated vibration over the entire speed range.

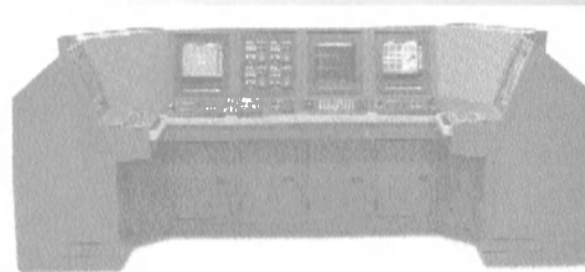
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### Vessel Management System

The VMS5000 vessel management system, from Nautronix, encompasses the monitoring and control functions of all shipboard systems into one integrated vessel management system. The integrated alarm, monitoring and control system can be configured to meet the requirements of any vessel type or shipboard application, including tank level gauging, ballast control, propulsion monitoring and control, power management system and engine monitoring.

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### Litton Marine Introduces Virtual Reality

Litton Marine Systems presented Design Vision 1.0, a new design tool for creating and evaluating integrated bridge system (IBS) designs. An advanced computer-aided design (CAD) software program, Design Vision permits the designer to construct a three-dimensional (3D) model of the bridge layout, and evaluate different configurations.

The program walks the user through each step of defining the basic bridge parameters and placing various components. The designer can then select one of six predefined bridge layouts — including a DnV Watch 1 configuration, or can create a custom layout from a comprehensive library containing 3D images of the various subsystems and components.

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### Racorder's Marine Black Box

Racorder connects to a marine radar system and records the radar picture. The device works with raster scan radars to record the image on the radar screen. Using regular VHS video tapes, one tape speed of 11.1 mm/sec. is available, which provides more than six hours of recording time on a standard T120 video cassette. An internal clock system superimposes date and time on the recorded video. Provision is made to display additional text, such as the name of the vessel.

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### C-Map's CM93 Format for ECDIS

The CM93 database is intended for use on advanced electronic charting and navigation systems, such as ECDIS. It's also a suitable basis for use on vessel tracking systems, port VTS, military 3C (command, control and communication) and combat systems. The object catalog contains not only all the S57 defined objects classes, but also 12 special elements to cope with non-international charts.

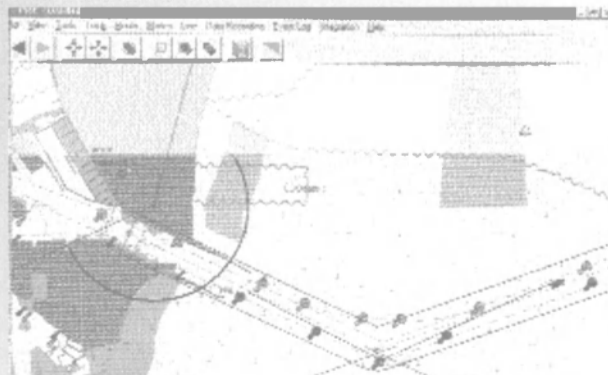
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### New Chart Navigation System

Leica's new MX480 Professional Chart Navigation System integrates the MX412B DGPS navigator with a high quality chart plotter. With tight integration, users accurately see the vessel's position on a highly detailed chart. Users are not limited to one type of chart; the system can display vector style C-Map CM93 or BA-ARCS, NOAA and NDI raster charts.

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### TV-At-Sea System

With five sizes of stabilized DBS antenna systems to choose from, users can select the system ideal for the vessel, sailing area and budget. Sea Tel TV-At-Sea systems will work with RCA, Sony, Dish Network and many other satellite television receivers. All Sea Tel systems accommodate multiple satellite receivers.

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### Multi-Purpose Cleaner

TC-1, available from Marine Plastic Lumber, was developed for use in the highly regulated world of marine transportation. As a universal cleaner, TC-1 was able to do the work of several job site cleaners. Using a double-synthesis reaction, carriers, drivers and surfactants are allowed to coexist in solution until they contact hydrocarbon compounds. A blend of terpene distillate and several surfactants, each with a different polar charge, are hydrated and carefully balanced to a pH of 8.5. The final outcome is a group of distinct surface active agents that are able to atomically bind with oils and greases without binding to each other.

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Fax: 011-603-731-7899

## Telenor Satellite Services AS

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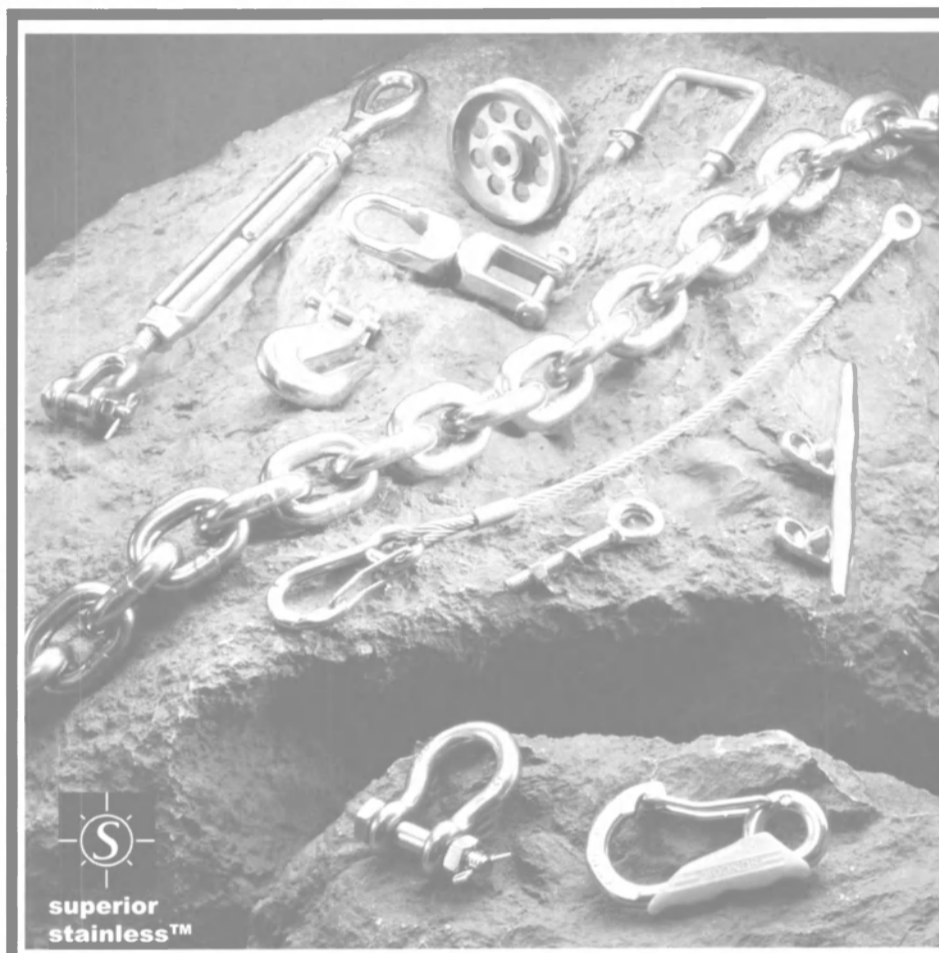
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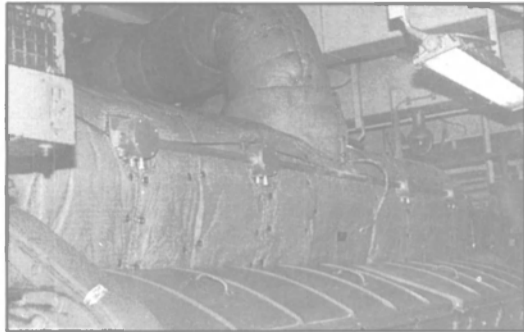
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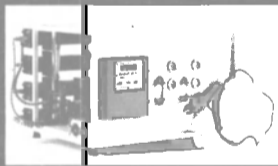
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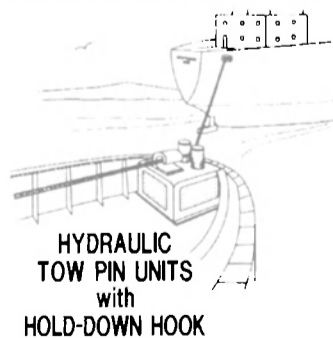


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# NavCom Selection Guide

The following is a product cross reference to the preceding NavCom directory, providing manufacturer name and country. While many companies have international organizations, space does not permit the listing of every office. Contact the number listed to find an office or supplier near you.

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Bayou Marine Electronics — U.S.  
Boatrac Inc — U.S.  
Coastel Communications — U.S.  
Consumers Marine Electronics Inc. — U.S.  
Cyber-Marine.com — U.S.  
DeHart Marine Electronics — U.S.  
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Furuno U.S.A. — U.S.  
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Landsea Systems, Inc. — U.S.  
Litton Marine Systems — U.S.  
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Marine Electronics Solutions — U.S.  
Mobile Telesystems, Inc. — U.S.  
Moody Marine Electronics — U.S.  
Naval Electronics Inc — U.S.  
Racal-Decca Marine — United Kingdom  
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Si-Tex Marine Electronics Inc — U.S.  
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Starlink — U.S.  
Thrane & Thrane — Denmark  
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Benmar Marine Electronics — U.S.  
ComNav Marine — Canada  
Consumers Marine Electronics Inc. — U.S.  
Coretec Inc. — Canada  
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DeHart Marine Electronics — U.S.  
Frank L. Beier Radio Inc — U.S.  
Frontrics Inc — U.S.  
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Boatrac Inc — U.S.  
Consumers Marine Electronics Inc. — U.S.  
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Stratos — U.S.  
Waterway Communications System Inc — U.S.

### COMMUNICATION SECURITY

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Boatrac Inc — U.S.  
Frank L. Beier Radio Inc — U.S.  
Henschel — U.S.  
International Communications Group Inc. — U.S.  
L.F. Gaubert & Co., Inc. — U.S.  
Landsea Systems, Inc. — U.S.  
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## Product Finder

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 Global Communications Solutions — U.S.  
 Globe Wireless — U.S.  
 Henschel — U.S.  
 Hose-McCann — U.S.  
 ICG Satellite Services — U.S.  
 ICO Global Communications Services — U.S.  
 Icom America Inc. — U.S.  
 International Communications Group Inc. — U.S.  
 Japan Radio Co Ltd — U.S.  
 Kelvin Hughes Ltd. — United Kingdom  
 KVH Industries Inc — U.S.  
 Mackay Communications, Inc. — U.S.  
 Marine Electronics Solutions — U.S.  
 Marine & Industrial Electronics — U.S.  
 Maritime Telecommunications Network — U.S.  
 Moody Marine Electronics — U.S.  
 Newmar — U.S.  
 O'Gara Satellite Systems — U.S.  
 Radio Holland USA BV — U.S.  
 S.P. Radio AS — Denmark  
 Seacoast Electronics — U.S.  
 Singapore Telecommunications Ltd — Singapore  
 Stratos — Canada  
 Stratos — U.S.  
 TradeWinds Call Center — Canada  
 Waterway Communications System Inc — U.S.

### COMMUNICATIONS SYSTEMS

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 Cyber-Marine.com — U.S.  
 DCS Marine Data — U.S.  
 Earmark — U.S.  
 Frank L. Beier Radio Inc — U.S.  
 Furuno U.S.A. — U.S.  
 G.A. International Electronics of Florida Corp. — U.S.  
 Global Communications Solutions — U.S.  
 Globe Wireless — U.S.  
 Henschel — U.S.  
 Hose-McCann — U.S.  
 ICG Satellite Services — U.S.  
 International Communications Group Inc. — U.S.  
 IPS Marine — U.S.  
 Japan Radio Co Ltd — U.S.  
 Kelvin Hughes Ltd. — United Kingdom  
 Kongsberg Norcontrol AS — Norway  
 KVH Industries Inc — U.S.  
 L.F. Gaubert & Co., Inc. — U.S.  
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 Litton Marine Systems — U.S.  
 Marine Electronics Solutions — U.S.  
 Maritime Telecommunications Network — U.S.  
 Moody Marine Electronics — U.S.  
 Northern Airborne Technology — U.S.  
 O'Gara Satellite Systems — U.S.  
 Radio Holland USA BV — U.S.  
 S.P. Radio AS — Denmark  
 Sea Inc — U.S.  
 Sea-Trac Offshore Services — U.S.  
 Seacoast Electronics — U.S.  
 SGC — U.S.  
 Sigma Marine — U.S.  
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 Stratos — U.S.  
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 International Industries Inc. — U.S.  
 Kelvin Hughes Ltd. — United Kingdom  
 Kongsberg Norcontrol AS — Norway  
 KVH Industries Inc — U.S.  
 Litton Marine Systems — U.S.  
 Marine Electronics Solutions — U.S.  
 Moody Marine Electronics — U.S.  
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 Radio Zeeland Group — Netherlands  
 Raytheon Marine Co — U.S.  
 Sea-Trac Offshore Services — U.S.  
 Seacoast Electronics — U.S.  
 Sigma Marine — U.S.  
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 World Trade Network Ltd — U.S.  
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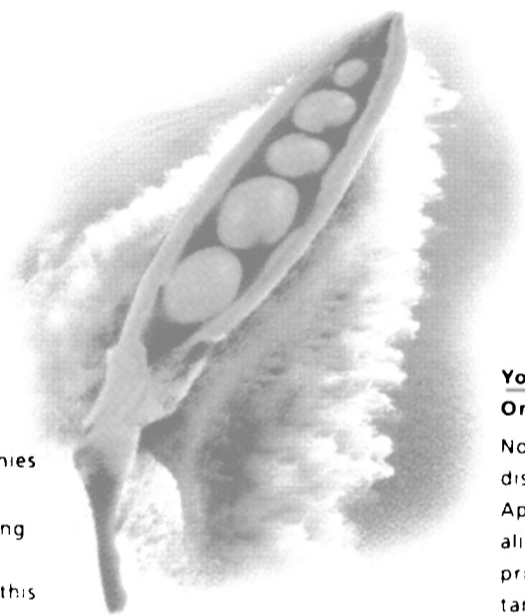
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S.P. Radio AS — Denmark  
Sea Inc — U.S.  
Sea-Trac Offshore Services — U.S.  
Seacoast Electronics — U.S.  
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Frank L Beier Radio Inc — U.S.  
Henschel — U.S.  
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Consumers Marine Electronics Inc. — U.S.  
Cyber-Marine.com — U.S.  
Frank L Beier Radio Inc — U.S.  
Furuno U.S.A. — U.S.  
G.A. International Electronics of Florida Corp. — U.S.  
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Furuno U.S.A. — U.S.  
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Cyber-Marine.com — U.S.  
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Moody Marine Electronics — U.S.  
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Northstar Technologies — U.S.  
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Scientific Maritime Services — U.S.  
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Advanced Marine Technology — U.S.  
Bayou Marine Electronics — U.S.  
Boatrac Inc — U.S.  
Carlisle & Finch — U.S.  
Consumers Marine Electronics Inc. — U.S.  
Coretec Inc. — Canada  
Cyber-Marine.com — U.S.  
Electronic Marine Systems Inc — U.S.  
Frank L Beier Radio Inc — U.S.  
Henschel — U.S.  
Kelvin Hughes Ltd. — United Kingdom  
Kongsberg Norcontrol AS — Norway  
Litton Marine Systems — U.S.  
Marine Electronics Solutions — U.S.  
Nautronix Inc. — U.S.  
OSL - Offshore Systems Ltd — Canada  
OSL - Offshore Services — U.S.  
Seacoast Electronics — U.S.  
Sigma Marine — U.S.  
Southeast Circuits — U.S.  
Starlink — U.S.  
Waterway Communications System Inc — U.S.

## NAVIGATIONAL CHARTS

Advanced Marine Technology — U.S.  
Anritsu Corp — Japan  
Boatrac Inc — U.S.  
C-Map Commercial Ltd. — U.S.  
Cyber-Marine.com — U.S.  
DeHart Marine Electronics — U.S.  
Electronic Marine Systems Inc — U.S.  
Frank L Beier Radio Inc — U.S.  
Kelvin Hughes Ltd. — United Kingdom  
Kongsberg Norcontrol AS — Norway  
Litton Marine Systems — U.S.  
Magellan Systems Corp — U.S.  
Marine Electronics Solutions — U.S.  
Moody Marine Electronics — U.S.  
Negron Marine Consultants — U.S.  
Norcontrol Seacraft AS — Norway  
OSL - Offshore Systems Ltd — Canada  
PinPoint Systems International — U.S.  
Racal-Decca Marine — United Kingdom  
Radio Holland USA BV — U.S.  
Raytheon Marine Co — U.S.  
Seacoast Electronics — U.S.  
Si-Tex Marine Electronics Inc — U.S.  
Sigma Marine — U.S.  
Southeast Circuits — U.S.  
Starlink — U.S.  
Waterway Communications System Inc — U.S.

## NAVTEX RECEIVERS

Bayou Marine Electronics — U.S.  
Consumers Marine Electronics Inc. — U.S.  
Cyber-Marine.com — U.S.  
Frank L Beier Radio Inc — U.S.  
Furuno U.S.A. — U.S.  
G.A. International Electronics of Florida Corp. — U.S.  
I.T.S. Marine Electronics — U.S.  
Japan Radio Co Ltd — U.S.  
Lokata Ltd. — United Kingdom  
Marine Electronics Solutions — U.S.  
Moody Marine Electronics — U.S.  
Radio Holland USA BV — U.S.  
S.P. Radio AS — Denmark  
Sea-Trac Offshore Services — U.S.  
Seacoast Electronics — U.S.  
Sigma Marine — U.S.  
Southeast Circuits — U.S.  
World Trade Network Ltd — U.S.

## RADAR

Advanced Navigation Systems, Inc. — Canada  
Alaska Diesel Electric — U.S.  
Anritsu Corp — Japan  
Atlas Elektronik of America — U.S.  
Barco Display Systems — U.S.  
Bayou Marine Electronics — U.S.  
Consumers Marine Electronics Inc. — U.S.  
Cyber-Marine.com — U.S.  
DeHart Marine Electronics — U.S.  
Frank L Beier Radio Inc — U.S.  
Frotronics Inc — U.S.  
Furuno U.S.A. — U.S.  
G.A. International Electronics of Florida Corp. — U.S.  
I.T.S. Marine Electronics — U.S.  
Japan Radio Co Ltd — U.S.  
Kelvin Hughes Ltd. — United Kingdom  
Koden Electronics Co. — U.S.  
Kongsberg Norcontrol AS — Norway  
L.F. Gaubert & Co., Inc. — U.S.  
Litton Marine Systems — U.S.  
Mackay Communications, Inc. — U.S.  
Marine Electronics Solutions — U.S.  
Marine & Industrial Electronics — U.S.  
Moody Marine Electronics — U.S.  
Norcontrol Seacraft AS — Norway  
PinPoint Systems International — U.S.  
Racal-Decca Marine — United Kingdom  
Racor — U.S.

Radio Holland USA BV — U.S.  
Raytheon Marine Co — U.S.  
Sea-Trac Offshore Services — U.S.  
Seacoast Electronics — U.S.  
Semco Marine Inc — U.S.  
Si-Tex Marine Electronics Inc — U.S.  
Sigma Marine — U.S.  
Simrad North America Inc — U.S.  
Southeast Circuits — U.S.  
Tribar Industries — Canada  
Waterway Communications System Inc — U.S.  
World Trade Network Ltd — U.S.

## RADAR - ARPAS

Bayou Marine Electronics — U.S.  
Consumers Marine Electronics Inc. — U.S.  
Cyber-Marine.com — U.S.  
Frank L Beier Radio Inc — U.S.  
Furuno U.S.A. — U.S.  
G.A. International Electronics of Florida Corp. — U.S.  
Japan Radio Co Ltd — U.S.  
Kelvin Hughes Ltd. — United Kingdom  
Kongsberg Norcontrol AS — Norway  
Litton Marine Systems — U.S.  
Marine Electronics Solutions — U.S.  
Moody Marine Electronics — U.S.  
Radio Holland USA BV — U.S.  
Sea-Trac Offshore Services — U.S.  
Seacoast Electronics — U.S.  
Sigma Marine — U.S.  
Southeast Circuits — U.S.  
Waterway Communications System Inc — U.S.  
World Trade Network Ltd — U.S.

## RADIO EQUIPMENT

American Radio Corp. — U.S.  
Bayou Marine Electronics — U.S.  
Consumers Marine Electronics Inc. — U.S.  
Cyber-Marine.com — U.S.  
DeHart Marine Electronics — U.S.  
Earmark — U.S.  
Frank L Beier Radio Inc — U.S.  
Furuno U.S.A. — U.S.  
G.A. International Electronics of Florida Corp. — U.S.  
I.T.S. Marine Electronics — U.S.  
Icom America Inc. — U.S.  
Japan Radio Co Ltd — U.S.  
Kelvin Hughes Ltd. — United Kingdom  
Kongsberg Norcontrol AS — Norway  
L.F. Gaubert & Co., Inc. — U.S.  
Mackay Communications, Inc. — U.S.  
Marine Electronics Solutions — U.S.  
Mobile Telesystems, Inc. — U.S.  
Moody Marine Electronics — U.S.  
Northern Airborne Technology — U.S.  
Pains-Wessex Safety Systems — U.S.  
Radio Holland USA BV — U.S.  
Raytheon Marine Co — U.S.  
S.P. Radio AS — Denmark  
Sea-Trac Offshore Services — U.S.  
Seacoast Electronics — U.S.  
Sigma Marine — U.S.  
Southeast Circuits — U.S.  
Standard Communications — U.S.  
Techsonic Industries — U.S.  
Waterway Communications System Inc — U.S.  
World Trade Network Ltd — U.S.

## RADIO TELEPHONES

Bayou Marine Electronics — U.S.  
Consumers Marine Electronics Inc. — U.S.  
Cyber-Marine.com — U.S.  
Earmark — U.S.  
Frank L Beier Radio Inc — U.S.  
Furuno U.S.A. — U.S.  
G.A. International Electronics of Florida Corp. — U.S.  
I.T.S. Marine Electronics — U.S.  
International Communications Group Inc. — U.S.  
Japan Radio Co Ltd — U.S.  
Kongsberg Norcontrol AS — Norway  
Marine Electronics Solutions — U.S.  
Moody Marine Electronics — U.S.  
Northern Airborne Technology — U.S.  
Radio Holland USA BV — U.S.  
S.P. Radio AS — Denmark  
Sea Inc — U.S.  
Sea-Trac Offshore Services — U.S.  
Seacoast Electronics — U.S.  
SGC — U.S.  
Si-Tex Marine Electronics Inc — U.S.  
Sigma Marine — U.S.  
Waterway Communications System Inc — U.S.  
World Trade Network Ltd — U.S.

## RADIO TRAFFIC ACCOUNTING

Frank L Beier Radio Inc — U.S.  
International Communications Group Inc. — U.S.  
Japan Radio Co Ltd — U.S.  
Mackay Communications, Inc. — U.S.  
Marine Electronics Solutions — U.S.  
Radio Holland USA BV — U.S.  
S.E. Morsviazspudnik — Russia  
Seacoast Electronics — U.S.

## SATCOMS AND SATNAVS

AT&T Mobile Satellite Services — U.S.  
Bayou Marine Electronics — U.S.  
Beijing Marine Communications and Navigation Company — China  
Boatrac Inc — U.S.  
BT Inmarsat — United Kingdom  
Cellnet Corp — U.S.  
Comsat Mobile Communications — U.S.  
Consumers Marine Electronics Inc. — U.S.  
Cyber-Marine.com — U.S.

DCS Marine Data — U.S.  
France Telecom — France  
Frank L Beier Radio Inc — U.S.  
Furuno U.S.A. — U.S.  
G.A. International Electronics of Florida Corp. — U.S.  
Global Communications Solutions — U.S.  
I.T.S. Marine Electronics — U.S.  
ICO Global Communications Services — U.S.  
Inmarsat — United Kingdom  
Iridium N.A. — U.S.  
Japan Radio Co Ltd — U.S.  
Kelvin Hughes Ltd. — United Kingdom  
Kongsberg Norcontrol AS — Norway  
KVH Industries Inc — U.S.  
Landsea Systems, Inc. — U.S.  
Mackay Communications, Inc. — U.S.  
Marine Electronics Solutions — U.S.  
Maritel — U.S.  
Moody Marine Electronics — U.S.  
Nera Satcom — Norway  
Norwegian Cable Systems — Norway  
O'Gara Satellite Systems — U.S.  
OTE SA — Greece  
PTT Telecom — Netherlands  
Radio Holland USA BV — U.S.  
S.E. Morsviazspudnik — Russia  
S.P. Radio AS — Denmark  
Sea Inc — U.S.  
Sea-Trac Offshore Services — U.S.  
Seacoast Electronics — U.S.  
Sigma Marine — U.S.  
Singapore Telecom USA — U.S.  
Skandinavisk Teleindustri SKANTI AS — Denmark  
Station 12 — Netherlands  
Stratos — Canada  
Stratos — U.S.  
T-Mobile — Germany  
Telekom Malaysia Berhad — Malaysia  
Telesra Mobile Satellite — Australia  
Telstra Mobile Satellite & Radio Services — Australia  
Thrane & Thrane — Denmark  
Trimble Navigation Ltd — U.S.  
Videsh Sanchar Nigam — India  
Waterway Communications System Inc — U.S.  
Westinghouse Wireless Solutions — U.S.  
World Trade Network Ltd — U.S.

## SONAR

Bayou Marine Electronics — U.S.  
Consumers Marine Electronics Inc. — U.S.  
Cyber-Marine.com — U.S.  
Frank L Beier Radio Inc — U.S.  
Furuno U.S.A. — U.S.  
Henschel — U.S.  
I.T.S. Marine Electronics — U.S.  
International Industries Inc. — U.S.  
Japan Radio Co Ltd — U.S.  
L.F. Gaubert & Co., Inc. — U.S.  
Litton Marine Systems — U.S.  
Marine Electronics Solutions — U.S.  
PinPoint Systems International — U.S.  
Radio Holland USA BV — U.S.  
Raytheon Marine Co — U.S.  
Sea-Trac Offshore Services — U.S.  
Seacoast Electronics — U.S.  
Sigma Marine — U.S.  
Techsonic Industries — U.S.  
Waterway Communications System Inc — U.S.  
Wesmar — U.S.  
World Trade Network Ltd — U.S.

## TELECOMMUNICATIONS

Alden Electronics — U.S.  
Atlas Elektronik of America — U.S.  
Boatrac Inc — U.S.  
Consumers Marine Electronics Inc. — U.S.  
Cyber-Marine.com — U.S.  
DCS Marine Data — U.S.  
DeieSat Deutsche Telekom Gedellschaft fur Satelliten — Germany  
Frank L Beier Radio Inc — U.S.  
Furuno U.S.A. — U.S.  
G.A. International Electronics of Florida Corp. — U.S.  
Global Communications Solutions — U.S.  
Henschel — U.S.  
Hose-McCann — U.S.  
ICG Satellite Services — U.S.  
ICO Global Communications Services — U.S.  
International Communications Group Inc. — U.S.  
Japan Radio Co Ltd — U.S.  
KVH Industries Inc — U.S.  
L.F. Gaubert & Co., Inc. — U.S.  
Mackay Communications, Inc. — U.S.  
Marine Electronics Solutions — U.S.  
Maritime Telecommunications Network — U.S.  
Mobile Telesystems, Inc. — U.S.  
Northern Airborne Technology — U.S.  
O'Gara Satellite Systems — U.S.  
Pains-Wessex Safety Systems — U.S.  
Radio Holland USA BV — U.S.  
Sea Inc — U.S.  
Sea Tel Inc — U.S.  
Sea-Trac Offshore Services — U.S.  
Seacoast Electronics — U.S.  
Sigma Marine — U.S.  
Singapore Telecommunications Ltd — Singapore  
Southeast Circuits — U.S.  
Stratos — Canada  
Stratos — U.S.  
Telenor Satellite Services AS — Norway  
Thrane & Thrane — Denmark  
TradeWinds Call Center — Canada  
Trimble Navigation Ltd. — U.S.  
Waterway Communications System Inc — U.S.  
Westinghouse Electric Corp. — U.S.

## New Shipyard Orders

Available on-line at: [www.marinelink.com](http://www.marinelink.com)

Ferlship is a strategic consultancy highly specialized in market researches guided to the shipping industry. For additional information, please contact Ferlship (a: Pza. Sta. M<sup>a</sup> Soledad Torres Acosta, 2. 2<sup>o</sup> C. 28004 Madrid, Spain, Tel. : +34 91 531 01 78 . 689 01 45 66; Fax: +34 91 531 01 78\* e-mail: [ferlship@iies.es](mailto:ferlship@iies.es) (Prices are in U.S. Dollars)

OWNER OPERATOR	SHIPYARD	TYPE	No	DWT	DELIV	MUSS
SINCERE SHIPPING	DAEWOO	BULK CARRIER	2	173,000	02	72
TAI CHONG CHEANG STEAMSHIP	DAEWOO	BULK CARRIER	1	173,000	01	35
VALLES STEAMSHIP CO	IMABARI SHIPBUILDING	BULK CARRIER	1	172,000	801	38.6
SAFETY MANAGEMENT OVERSEAS	JING JIANG	BULK CARRIER	2	76,000	01	46.4
SAFETY MANAGEMENT OVERSEAS	TSUNEISHI	BULK CARRIER	2	76,000	01	46.4
ALCYON SHIPBROKING & TRADING	NAMURA DOCK	BULK CARRIER	1	74,000	02	
UGLAND GROUP	TSUNEISHI	BULK CARRIER	2	52,000	01 02	37
GOLUMAS	SPLIT	BULK CARRIER	3	51,000	02	60
UBT	SANOYAS CORP.	BULK CARRIER	1	48,000	01	20
MEDITERANSKA PLOVIDBA	SPLIT	BULK CARRIER	1	42,000		19
D'AMICO SOC DI NAV	SHANGHAI EDWARD	BULK CARRIER	2	34,000		40
SINCERE SHIPPING	KANDA SHIPBUILDING CO.	BULK CARRIER	2	28,200	01 02	32
OAK MARITIME	DAEWOO	BULK CARRIER	2	173,000	02	70
D'AMATO DI NAVIGAZIONE	HUDONG SHIPYARD	BULK CARRIER	1	74,500	00	20.5
PASHA HAWAI TRANSPORT LINE	HALTER MARINE INC.	CAR CARRIER	1			80
EUROPEAN NAVIGATION	SPLIT	CHEMICAL TANKER	3	45,000		
HACHIUMA KISEN	SHIN KURUSHIMA	CHIP CARRIER	1	0	401	
KAWASAKI KISEN KAISA (K-LINE)	SHIN KURUSHIMA	CHIP CARRIER	1		801	
KAWASAKI KISEN KAISA (K-LINE)	HYUNDAI HEAVY INDUSTRIES	CONTAINER	5	0	01 02	300
KAWASAKI KISEN KAISA (K-LINE)	IMABARI SHIPBUILDING	CONTAINER	3	0	01 02	168.75
NORDCAPITAL	SAMSUNG	CONTAINER	2	0		120
US INTERESTS	SHANGHAI EDWARD	CONTAINER	2	0		28
P&O	CHANTIERS DE L'ATLANTIQUE	CRUISE SHIP	2	0	1002 603	700
NORWEGIAN INTERESTS	SOLSTRAND	FISHING	1	500	01	
NORWEGIAN INTERESTS	RODMAN POLYSHIPS	FISHING	2	0	00	
SPANISH OWNER	BARRERAS	FISHING	1	0	01	
ULVAN REDERI	QING SHAN SHIPYARD	GENERAL CARGO	1	1,200	01	
RIVER LINE	CESKOSLOVENSKA	GENERAL CARGO	2		00	
OLYMPIA MARITIME	SHIN-A SHIPBUILDING	LOG CARRIER	3	28,000	01	45
MITSUBISHI CORP.	MITSUBISHI H.L.	LPG	1		01	68
SCHONING	TILLE SCHEEPSBOUW	MULTI-PURPOSE	2	3,300	00	
ITALIAN NAVY	FINCANTIERI	OCEANOGRAPHIC	1		02	67
GRIMALDI	NUOVI CANTIERI APUNIA	PASSENGER	2	0	02 03	
ITALIAN COAST GUARD	CANTIERI NAVALE RODRIQUEZ	PATROL	25		01 02	78.8
CERES HELLENIC (G.P. LIVANOS)	HYUNDAI HEAVY INDUSTRIES	PRODUCTS TANKER	1	71,050	01	30
ITOCHU CORP.	ONOMICHI	PRODUCTS TANKER	1	46,000	101	
EASTERN MED MAR	SPLIT	PRODUCTS TANKER	2	45,000		
COGEMA	DAEDONG SHIPBUILDING	PRODUCTS TANKER	2	35,000	01	48
VAN OMMEREN	FERUS SMIT	PRODUCTS TANKER	2	6,950	01	
TOTEM OCEAN TRAILER EXPRESS	NASSCO	RoRo	2	22,675	02	300
LOEWES (HELLESPOINT STEAMSHIP)	DAEWOO	TANKER	2	442,500	01	180
PAPACHRISTIDIS	SAMSUNG	TANKER	2	300,000	01 02	138
DUBAI PORTS AUTHORITY	DUBAI DRYDOCKS	TUG	1	220	00	

## ABS OIL TESTING SERVICES

(Summary of Fuel Oil Samples analyzed at select ports, December 1999)

ABS Oil Testing Services is recognized as a global leader in the provision of quality, professional and practical fuel management, fuel analysis and consultancy programs for the marine, offshore and power generation industries.

	D@15C	V@50C	MCR%	ASH%	H2O%	S%	V	NA	AL+SI	TSP%
<b>BALBOA, PANAMA</b>										
AVERAGE	977.6	320.9	13.5	0.06	0.26	2.46	171	12	15	0.02
MAX	988.2	388	16.5	0.08	0.5	3.87	277	23		0.06
<b>BERGEN, NORWAY</b>										
AVERAGE	966.4	311.7	6.8	0.01	0.05	2.8	73	6	9	0.01
MAX	966.8	326	7	0.02	0.05	3.52	104	8		0.01
<b>BUENOS AIRES, ARGENTINA</b>										
AVERAGE	949.4	180.2	9.3	0.02	0.11	0.71	26	17	20	0.02
MAX	964.7	277	12.3	0.03	0.2	1.08	82	36		0.05
<b>CEUTA, SPAIN</b>										
AVERAGE	981.8	224.8	15.2	0.05	0.54	2.86	205	27	21	0.03
MAX	988.3	382	17.8	0.07	0.95	3.11	284	53		0.04
<b>DUBAI, UAE</b>										
AVERAGE	975	332.6	14.5	0.09	0.23	2.99	99	29	16	0.03
MAX	989.7	371	17.8	0.39	0.5	3.44	150	54		0.07
<b>DURBAN, SOUTH AFRICA</b>										
AVERAGE	990.4	150.8	18.1	0.04	0.06	3.29	148	14	20	0.08
MAX	991	179	19.7	0.08	0.1	3.58	180	14		0.17
<b>GIBRALTAR, SPAIN</b>										
AVERAGE	913.4	336.1	14.8	0.04	0.2	2.83	147	25	21	0.03
MAX	993.4	377	18	0.09	0.85	3.45	232	47		0.08
<b>GOTHENBURG, SWEDEN</b>										
AVERAGE	983.7	304.4	14.3	0.04	0.13	2.51	142	22	28	0.66
MAX	990.4	369	16.7	0.07	0.5	2.86	210	44		9
<b>HOUSTON, TX</b>										
AVERAGE	988.8	263.5	16	0.05	0.19	3.24	136	9	19	0.02
MAX	998.6	405.4	18.4	0.11	1.3	4.05	250	74		0.09
<b>JEDDAH, SAUDI ARABIA</b>										
AVERAGE	948.1	168.7	10.6	0.03	0.12	2.69	31	26	4	0.01
MAX	949.7	178.3	10.8	0.05	0.2	2.77	35	30		0.01
<b>LOS ANGELES, CA</b>										
AVERAGE	957.2	281.7	11.1	0.06	0.28	1.83	154	16	19	0.07
MAX	996.3	624	14.9	0.4	0.8	2.43	305	30		0.97
<b>MARSEILLE, FRANCE</b>										
AVERAGE	983.8	173.3	13.3	0.03	0.06	2.51	81	22	20	0.02
MAX	989.5	206	14.3	0.06	0.1	2.88	118	40		0.03
<b>MELBOURNE, AUSTRALIA</b>										
AVERAGE	977.9	203.2	10.3	0.02	0.26	3.28	46	14	19	0.02
MAX	984.9	285	11.9	0.03	0.7	3.47	62	21		0.03
<b>MOBILE, AL</b>										
AVERAGE	985.6	259.2	14.1	0.04	0.1	3.13	120	23	10	0.01
MAX	992.9	332	16.1	0.06	0.15	3.77	148	29		0.02
<b>MONTREAL, CANADA</b>										
AVERAGE	981.7	293.9	14.1	0.04	0.11	1.33	86	8	28	0.05
MAX	991.7	400.5	17.6	0.09	0.2	1.78	142	19		0.1
<b>NEW ORLEANS, LA</b>										
AVERAGE	986.4	271.8	15.2	0.04	0.15	3.46	135	24	17	0.04
MAX	990.7	380.4	18	0.07	0.4	4.07	297	56		0.24
<b>NEW YORK, NY</b>										
AVERAGE	988.3	287.2	14.1	0.06	0.31	2.85	204	14	25	0.05
MAX	992.1	385.4	17.7	0.09	0.7	9	296	40		0.1
<b>NORFOLK, VA</b>										
AVERAGE	980.1	272	10.2	0.05	0.16	2.47	153	11	24	0.05
MAX	991.3	342.2	10.9	0.06	0.3	3.23	241	15		0.07
<b>PHILADELPHIA, PA</b>										
AVERAGE	967.4	250.2	13.5	0.07	0.36	2.77	223	15	16	0.05
MAX	995.4	354.4	16.8	0.15	1.5	3.18	339	33		0.09
<b>PIRAEUS, GREECE</b>										
AVERAGE	967.7	301.6	10.7	0.03	0.1	3.01	116	16	18	0.06
MAX	990	372	18.9	0.06	0.35	4.04	204	43		0.7
<b>PORTLAND, OR</b>										
AVERAGE	987.7	313.7	13.4	0.03	0.19	1.88	51	7	27	0.02
MAX	989.9	341.1	17.1	0.04	0.3	3.18	117	7		0.02
<b>ROTTERDAM, NETHERLANDS</b>										
AVERAGE	994.5	374.5	14.5	0.03	0.32	2.86	107	15	25	0.03
MAX	1008.7	479	19.4	0.06	1.7	3.84	190	75		0.11
<b>SAN FRANCISCO, CA</b>										
AVERAGE	984.8	271.4	12.6	0.04	0.14	2.18	96	21	14	0.03
MAX	995	375	17.9	0.07	0.3	3.16	150	74		0.05

## Recent Ship Sales

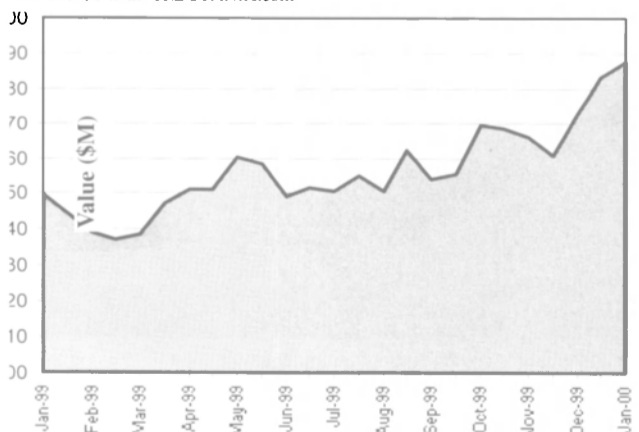
Information courtesy of Shipping Intelligence and Reuters. Shipping Intelligence can be reached at 25 W. 43rd St., New York, NY 10036; Tel: 212-997-0966; Fax: 212-997-1105; e-mail: [SPL@PANIX.com](mailto:SPL@PANIX.com)

5-Jan	Bulker	Diane Green	1982		2.54
5-Jan	Bulker	Sea Challenger	1985	42,842	8.7
5-Jan	Bulker	Kavako	1975	65,003	\$150/ldt
5-Jan	Bulker	Aggeliki P	1975	54,440	\$156.50/ldt
5-Jan	Bulker	Atlas	1984	17,249	12.5 en-bloc
5-Jan	Bulker	Prudence	1984	17,297	12.5 en-bloc
5-Jan	Bulker	Magic One	1983	17,069	12.5 en-bloc
5-Jan	Bulker	Clipper Arita	1984	17,777	14.5 en-bloc
5-Jan	Bulker	Clipper Antares	1986	17,777	14.5 en-bloc
5-Jan	Bulker	Clipper Mandarin	1985	17,247	14.5 en-bloc
5-Jan	Container Vessel	Trsat	1981	19,945	2.1.
5-Jan	RoRo	Porgy	1978	28,000	14 en-bloc
5-Jan	RoRo	Bess	1979	28,000	14 en-bloc
5-Jan	Tanker	World Prologue	1985	29,990	6.5
5-Jan	Tanker	Red Wing	1976	141,178	\$132/ldt
5-Jan	Tanker	Athenian Friendship	1977	112,745	\$136/ldt
5-Jan	Tanker	Arcadia	1977	337,800	\$139/ldt
5-Jan	Tanker	Nordic Liberita	1980	69,118	private terms.
10-Jan	Bulker	Jag Manek	1981	64,183	5.6
10-Jan	Bulker	Griffin Sun	1984	30,650	6.3
10-Jan	Tanker	Colorado	1980	86,648	4.7
10-Jan	Tanker	Berge Big	1975	37,500	\$135/ldt
10-Jan	Tanker	Sally Stove	1977	128,358	\$136/ldt
10-Jan	Tanker	Concordia C	1976	130,498	\$155/ldt
10-Jan	Tanker	Odense Maersk	1985	50,600	10.5**including 12 months timecharter back.
11-Jan	Tanker	Equity	1985	12,784	6.5
11-Jan	Bulker	Balaji Diplomat	1979	35,157	17 en-bloc
11-Jan	Bulker	Balaji Premium	1982	36,206	17 en-bloc
11-Jan	Bulker	Balaji Vintage	1983	37,497	17 en-bloc
11-Jan	Container Vessel	Pavel Mizikevich	1989	8,717	private terms
11-Jan	Container Vessel	Kirishima	1993	59,567	private terms**** including 3 years timecharter
back					
11-Jan	RoRo	Carlina	1976		18.4625158/ldt

## Index 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.

Information courtesy of Shipping Intelligence. 25 W. 43rd St., New York, NY 10036; Tel: 212-997-0966; Fax: 212-997-1105; e-mail: [SPL@PANIX.com](mailto:SPL@PANIX.com)



# BUYERS 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 Buyers Directory Section, contact Angela Criscola at (212) 477-6700.

## AIR CONDITIONING AND REFRIGERATION -

Repair & Installation, Equipment & Services  
ABB Flakt Marine, Box 1043, S-436 21 ASKIM SWEDEN  
Adrick Marine, 81 Mahan St., West Babylon, N.Y. 11704  
Bailey Refrigeration Co., 2323 Randolph Ave., Avenel, NJ 07001  
Carrier Transicold, P.O. B. 4805, Syracuse, NY 13211  
Quality Refrigeration, 533 N. Fries Ave., Wilmington, CA 90744  
Stork Canada, 47 boul. Marie-Victorin, Candiac, Quebec, Canada. JSR 1B6

## AIRHORNS/SIGNALING EQUIPMENT

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

## ALARMS, FACTORY MUTUAL-APPROVED

Datastar Marine Products Inc., Unit 100 18 Gostick P.  
N. Vancouver, Canada V7M3G31  
SELCO 353 A Asbury Commons Dr., Atlanta, GA 30338

## ALIGNMENT SYSTEMS

FCS, Inc., 22 Main Street, Centerbrook, CT 06409

## ALUMINUM BOATS

American Eagle Mfg., P.O. Box 597, La Conner WA 98257

## ANCHORS AND CHAINS

All Alpha Int'l., Inc. P.O. Box 498985 Cincinnati, OH 45249  
Crandall Dry Dock Engineers Inc. P.O. B. 505804, MA 02150  
G.J. Wortelboer Jr. BV, P.O.B. 5003, 3008 AA Rotterdam, Nether  
Schoellhorn-Albrecht, 575-105 Rudder Rd. St 63026,  
St. Louis, MO 63116  
Washington Chain Inc., Box 3645, Seattle, WA 98124  
Waterman Supply Co., P.O. Box 596, Wilmington, CA 90748  
Willem Pot, P.O.B. 29102, 3001 GC Rotterdam

## ASSOCIATION

Marine Machinery Assoc., 2300 Clarendon Blvd.,  
Arlington VA 22201

## AUCTIONEERS

Plant & Machinery, P.O. Box 19100, Houston, TX 77224  
MACI Auctioneers, 2334 Willis Rd., Richmond, VA 23230  
EG&G Services, 3702 Pender Dr. Ste 400, Fairfax, VA 22030

## AUTOMATION SYSTEMS

Tano Corp., 5700 Citrus Blvd., Suite E, New Orleans, LA 70123

## AUTOPILOT SYSTEMS

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

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

Raytheon Marine Co., 676 Island Pond Rd., Manchester  
NH 03109

## BALLAST

Ballast Technologies, 4620 S. Coach Dr. 85714, Tucson, AZ  
Redland Genstar Inc., Executive Plaza IV, Hunt Valley, MD  
10912-1031

## BASKET STRAINERS

Beard Industries Inc. 601 Benton Kelly St., Shreveport,  
LA 71106-7198

## BATTERY CHARGERS

Schaefer, Inc., 200 Butterfield Dr. Ashland, MA 01721

## BEARING—Rubber, Metallic, Non-Metallic

Blohm & Voss Industries GmbH, P.O. B. 112289, D-2042  
Hamburg 1, GERMANY  
Craft Bearing Company, Inc., 2506 58th St., Hampton, VA 23661  
U.S.A. Repts: Simplex-Turmar Inc., P.O. B. 675, Tonawanda,  
NY 14151

Raiko Ltd., Loudwater, High Wycombe, Bucks

Hamshire ENGLAND HP109QV

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

Orion Corp., 1111 Cedar Creek Rd., Grafton, WI 53024

Orkot Inc., 2535 Prairie Rd., Unit D, Eugene, OR 97402

Orkot Composites Ltd., Broadmarsh Business Park,  
Rotherham S60 1BX

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

NTN Bearing, 1600 E. Bishop Court, Mt. Prospect, IL 60056

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

## BILGE SYSTEMS

Fast Systems, 3240 N. Broadway, St. Louis, MO 63147-3515

Neison Div., Exhaust & Filtration Sys., Hwy. 51 West, P.O.  
Box 428, Stoughton, WI 53589

## BLOCKS & RIGGING

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

## BOILERS

B&D Manne & Ind. Boiler, P.O. Box 71687, Charleston SC 29415

## BRIDGE WIPERS

n-Mar Systems, Yellowstone Street, Kenner, LA 70064

## BROKERS

151 Maritime Services, 34062 El Encanto/B, Dana Pt. CA  
92629

Captain Astad Company, Inc., P.O. Box 350486, Ft  
Lauderdale, FL 33335

Jack Faulkner, 2419 Caddy Lane, P.O. Box 371, Flossmoor  
IL 60422

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

## BULKHEAD SEALS/PANELS

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

Blohm & Voss Industrie GmbH, P.O. B. 100720, D-2000  
Hamburg 1, GERMANY

U.S.A. Repts: Simplex-Turmar Inc., P.O. B. 168, Little Neck,  
NY 11363-0168

Panel Specialists, Inc./Thermax, 3115 Range Rd., Temple, TX 76501

King Wholesale Supply, Co., Inc., P.O. Box 4002, New Orleans,  
LA 70178-4002

Rox Corp., 12402 E. 60th St., Tulsa, OK 74146-6922

Thermax, 3115 Range Rd., Temple TX 76501

## CABLE TRANSIT SYSTEMS

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

O-Z Gedney • Nelson Firestop, P.O. B. 726, Tulsa, OK 74101

Rox Corp., 12402 E. 60th St., Tulsa, OK 74146-6922

MCT Brattberg, 4407 Spring Cypress, Spring TX 77388

## CAD/CAM SYSTEMS

Albacore Research, 4196 Kashtan Place, Victoria, B.C. Canada  
V8X4L7

All Alpha Int'l., Inc. P.O. B. 498985, Cincinnati, OH 45249

Autoshop Systems Corp., #403, 611 Alexander St.,  
Vancouver, BC, Canada V6A1E

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

IMSA, 13 Jenkins Court, Suite 200, Durham, NH 03824

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

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

TIMSCO, P.O. B. 91360, Mobile, AL 36691

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

## CAPSTANS

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

## CARGO MONITORING & CONTROL SYSTEM

Ian-Conrad Bergan, Inc., 3409 Gulf Breeze Parkway,  
Gulf Breeze, FL 32561

Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017

## CHAINS

Columbus McKinnon Corp., 140 John James Audobon Pkwy,  
Amherst, NY 14228

New England Marine & Industrial, 200 Spaulding Turnpike,  
Portsmouth, NH 03801

Washington Chain, P.O. Box 3645, Seattle, Wa. 98124

## CHARGE AIR COOLERS

Crane Heatex, 17 Grandview Ave., W. Orange, NJ 07052

## CHEMICALS

Uniservice Americas, 57174 Hardin Rd., Slidell, LA 70461

Unitor Ship Service Inc., 2375 W. Esther St., Long Beach, CA 90813

## CLASSIFICATION SOCIETY

Det Norske Veritas, 70 Grand Ave., Riveredge, N.J. 07661

## CLEANING EQUIPMENT

Drew Marine, 1 Drew Plaza, Boonton, NJ 07005

## CLEATS

Washington Chain, P.O. Box 3645, Seattle, Wa. 98124

## CLUTCHES

Haley Clutch and Coupling Corp., 1820 Hwy. 1 North,  
Greenville, MS 38702

## COATINGS / CORROSION CONTROL / PAINT

Eureka Chemical Co., 234 Lawrence Ave.,  
South San Francisco, CA 94080

Corroseal Inc., 70 E. Sunset Way, #251, Issaquah, WA 98027

Flexible Decking, 2708 N. Australian Ave. Ste. 9, West Palm Beach,  
FL 33407

Mascoat Products, 3500 E. T.C. Jesler, Suite N, Houston TX  
77018

Nace Int'l., 1440 South Creek Dr., Houston, TX 77084

NoFire Technologies, 21 Industrial Ave., Upper Saddle River, NJ 07458

Enecon Corporation, 125 Baylis Rd., Melville, NY 11747-3800

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

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

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

Jergens Inc., 15700 S. Waterloo Rd., Cleveland OH 44110

Graco, Inc., P.O. Box 1441, Minneapolis, MN 55440-1441

Sherwin Williams, 101 Prospect Ave., Cleveland, OH 44115

Sigma Coatings, P.O. Box 816, Houston, TX 77029, 330  
Harvey, LA 70059

Atlantic Systems Supply Co., 1100 Adams St., Hoboken, NJ 07030

Sound Specialty Coatings Corp., P.O. Box 13160, Burton,  
WA 98103

TNO Institute of Industrial Technology, P.O.B. 3, 2600 AA  
Delft, Netherlands

Unitor Ship Services Inc., 2375 West Esther Street, Long  
Beach, CA 90813

Chlor-rid, P.O. Box 908, Chandler, AZ 85244

## COMMERCIAL DIVING COMPANIES

Cruzan Diver's Inc., 300 Strand St., Frederiksted Steroix, Virgin  
Islands 00840

## COMMUNICATIONS SERVICE

ICG Satellite Services, 8400 NW 52nd St., Suite 110,  
Miami, FL 33166

Maritime Telecommunications Networks, Inc., 8400 NW 52nd  
St., Suite 110, Miami, FL 33166

Ascom Tateco AB, Eppendorfer Weg 234, D-20251 Hamburg,  
GERMANY

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

Comsat Maritime Services, 6560 Rock Spring Drive, Bethesda, MD  
20817-1146

Watercom, 458 E. Park Place, Jefferson, IN 47130

## COMPOSITES PROCESSING

Composite Technology Consultants, Inc.  
12310 Northwinder Row, Bayonet Point, Fla. 34667

## COMPOUNDS

ITW Philadelphia Resins, 130 Commerce Dr., Montgomeryville, PA  
18936

## COMPRESSOR PARTS

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

## COMPUTER LOFTING

Barataria Lofting Co., Inc., 1616 Barataria Blvd., Ste. 4,  
Marrero, LA 70072

## COMPUTER / COMPUTER SOFTWARE

Autoshop Systems Corp., #403, 611 Alexander St., Vancouver,  
BC, CANADA V6A1E

Coastal Oceanographics, Inc., 11-G Old Indian Trail,  
Middlefield, CT 06455

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

Sener, C/Severo Ochoa, 4 Parque Tecnologico de Madrid,  
28760 Tres Cantos - Madrid SPAIN

Intecolor Corp., 2150 Boggs Rd., Deluth GA 30096

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

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

Azonix Corp., 900 Middlesex Tpke., Billerica, MA 01821

Proteus Engineering, 301 Pier One Rd., Stevensville, MD 21666

Information Management Consultants, Media House,  
Mann Island, Pier Head, Liverpool, England L31DQ

Spar Associates, 927 West St., Annapolis, MD 21401

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

## CONDENSERS/SEPARATORS

Beard Industries Inc., P.O. Box 31115, Shreveport LA 71130

## CONSULTANTS

Hornblower Marine, Pier 3 Ferryboat Santa Rosa, San Francisco,  
CA 94111

Coretec Inc., Prince Charles Bldg., 120 Torbay Rd., Suite E100,  
St. Johns, Newfoundland, Canada A1A 2GB

## CONSOLE - GMDSS

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

Raytheon Marine Co., 676 Island Pond Rd., Manchester  
NH 03109

## CONTROL SYSTEM - Monitoring/Steering

Control General Corporation, 2845 Hwy 311, Schriever, LA

Engine Monitor, Inc., 179 Hickory Ave. Harahan, LA 70123

Ian-Conrad Bergan, 3409 Gulf Breeze Pkwy, Gulf Breeze,  
FL 32561

MMC International, 60 Inip Dr., Inwood NY 11096

Robertson Marine Systems, 3000 Kingman St., Suite 207,  
Metairie, LA 70006

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

Escondido, CA 92029

Stork Kwant, P.O. Box 23, 8600 AA Snek, Netherlands

Kobell Mfg Co., Ltd., 8238-129 St. Surrey, B.C. V3W0A6

Stork-Kwant BV, P.O.B. 23, 8600 AA Snek, Netherlands

Prime Mover Controls, 3600 Gilmore Way, Burnaby  
V5G 4R8 Canada

Raytheon Marine Co., 676 Island Pond Rd., Manchester,  
NH 03109

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

AutoNav Marine Systems Inc., 55A Clipper St., Coquitlam,  
B.C., Canada V3K 6X2

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

Tano Corp., 5700 Citrus Blvd., Suite E, New Orleans, LA 70123

G.R. Bowler, 261 Lake Rd., Ontario, NY 14519

## CONVERSIONS & REPAIRS

Vancouver Shipyards, 50 Pemberton Ave., N. Vancouver, B.C.  
CANADA V7P 2R2

## COOLERS/FREEZERS

Western Engineers, 2112 SE 8th Ave., Portland, OR 97214

## CORDAGE

Yale Cordage, 26 Morin St., Biddeford, ME 04005

## COUPLINGS

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

Centa Corp., 815 Blackhawk Dr., Westmont, IL 60559

Haley Clutch and Coupling Corp., 1820 Hwy. 1 North,  
Greenville, MS 38702

Fetteroff Corp., P.O. Box 103, Skippack, PA 19474

Lo-Rez Vibration Control Ltd., 186 West 8th Ave., Vancouver,  
B.C. V5Y 1N2

American Vulkan, P.O. Drawer 673, Winter Haven, FL 33882

MMC Int., 60 Inip Drive, Inwood, NY 11096

Renold Hi-Tec, 512 W. Crescentville Rd. Cincinnati, OH 45246

## CRANE-HOIST-DERRICK-WHIRLEYS

Mapeco Marine Co. P.O. Box 4113, New Orleans, LA 70178

Holly Hoist Corp., P.O. Box 86, Ste. Clair Shores, MI 48080-0086

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

Marine Travelift, Inc., 49 E. Yew St., Sturgeon Bay, WI 54235

McElroy Machine & Mfg Co., Inc., P.O. Box 4454, Bloxi, MS  
39535-4454

Kroll Cranes, 17432 Chelmeater Hwy, New Orleans, LA 70129

Liebherr-Werk Nenzing GMBH, A-6710 Nenzig/Austria,  
Tschalenga 3, P.O.

## EXPANSION JOINTS

Silex Inc., 7850 Trannere Dr., Mississauga, Ontario L5S1L9  
Applegate Industrial, 1440 Government Street, Baton Rouge,  
LA 70802

## FAIRING COMPOUND

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

## FANS - VENTILATORS - BLOWERS

Dry Air Technologies 313 N. Oak St., Burlington, WA 98233  
Jon M. Liss Associates, Inc., 411 Borel Ave., San Mateo, CA  
94402

## FASTENERS

Jamestown Distributors, P.O. Box 348, Jamestown, RI 02835  
Superbolt, P.O.B. 683, Carnegie, PA 15106

## FENDERING SYSTEMS/BUOYS - Dock & Vessel

Plastic Pilings Inc., 1485 South Willow Ave., Rialto, CA 92376  
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241  
Duramax Marine, 16025 Johnson St., P.O. Box 67, Middlefield, OH  
44062-0067

Viking Fender Co., 1160 State St., Perth Amboy, NJ 08861  
Ultra Poly, Inc., 2926 South Steele St., Tacoma, WA 98409  
Urethane Products Corp., 17007 South Broadway, Gardena,  
CA 90248

Promar, 115 Industrial Blvd., Kearneysville, W. VA 25430  
Schuyler Rubber Co., 16901 Woodred Rd., Woodinville, WA  
98072

## FILTERS/FILTER SYSTEMS

Boil-Filter Corp., 15 Int'l Dr., E. Granby, CT 06026  
Luber-Finer, Inc., 200 South 4th St., Albion, FL 62806-1313

## FIN STABILIZERS

Blohm & Voss Industries GmbH, P.O. B. 112289, D-2042  
Hamburg 1, GERMANY

U.S.A. Repps: Simplex-Turmar Inc., P.O. B. 675, Tonawanda,  
NY 14151

Raifko Ltd., Loudwater, High Wycombe, Bucks  
Hamshire ENGLAND HP109QV

## FIRE & SAFETY PRODUCTS

Brookdale International, 1-8755 Ash St., Vancouver BC, V6P6T3  
Nautical Safety Products, P.O. Box 590462, Houston, TX 77259  
IMSSCO, 2040 Harbor Island Dr., Suite 201A, San Diego, CA,  
92101

Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA  
70807

Grinnell Fire Protection Systems, 835 Sharon Drive, Westlake,  
OH 44145

NoFire Technologies, 21 Industrial Ave., Upper Saddle River, NJ 07458  
Panel Specialists, Inc./Thermax, 3115 Range Rd., Temple,  
TX 76501

## FLUID HANDLING EQUIPMENT

Graco, Inc., P.O. Box 1441, Minneapolis, MN 55441

## FRESH WATER GENERATOR

Sasakura Engineering, 7-32 Takeshima, 4-chome, Nishiyodogawa,  
KY, Osaka555, Japan

## FUEL CONSERVATION

Instruments Computer & Controls, Inc., 70 South Bow Rd.,  
Hooksett, NH 03106

## FUEL DECONTAMINATION

Algae X Int'l, PO Box 4011, Ft. Myers Beach, FL 33932  
Fuel Dynamics, 707 Mullet Dr. #110, Cape Canaveral, FL 32920

## GALLEY EQUIPMENT

Cospolich Refrigerator Co., 949 Industry Rd., Kenner LA 70062  
Dutchess Baker's Machinery Co., 1101 John Ave., Superior WI 54880

Jamestown Metal Marine Sales, Inc., 4710 Northwest Second  
Ave., Boca Raton, FL 33431

Lang Manufacturing, 6500 Merrill Creek Pkwy, Everett, WA 98203  
Marine Accommodations, Inc., 3830 Williamsburg Park Blvd.,  
Building 7, Jacksonville FL 32257

Richard Galley Supply, PO Drawer 4035, Houma, LA 70361

## GANGWAYS, LADDERS

Nautical Safety Products, P.O. Box 590462, Houston, TX  
77259-0462

Schoellhorn-Albrecht, 575-105 Rudder Rd., St. Louis, MO 63026  
SlipNot Safety Flooring, 2545 Beaufait St., Detroit, MI 48207

Wooster Products Inc., 1000 Spruce St., P.O. Box 896,  
Wooster, OH 44691

## GASKETS/CLEATS

Harbor Industries, Inc., 9471 Baymeadows Rd. Ste 307,  
Jacksonville, FL 32256

## GEARS & GEAR REPAIR

Goltens - New York Corp., 160 Van Brunt St., Brooklyn,  
NY 11231

Haley Marine Gears International, Inc., 2600 N. Concord Belle  
Chasse, LA 70037

Nico Marine Specialties, 39 Louisiana St., West Wago, LA 70094  
The Falk Corp., PO Box 492, Milwaukee, WI 53201-0492

Marine Gears, P.O. Box 689, Greenville, MI 38702  
Centofanti Marine Systems, Inc., P.O. Box 660,  
West Elizabeth, PA 15088-0660

Cincinnati Gear Co., 5657 Wooster Pike, Cincinnati,  
OH 45227

## GENERATOR

Baylor Co., 500 Industrial Blvd., Sugarland, TX 77478  
Insulind Recycling B.V., Deccaweg 3, 1042 AT Amsterdam,  
NETHERLANDS

## GMDSS

International Communications, 813 Diligence Dr. Ste 120,  
Newport News, Va. 23606

Furuno USA, Inc., 271 Harbor Way, S. San Francisco, CA  
94080

Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017

## HATCHES AND DOORS

Schoellhorn-Albrecht, 575-105 Rudder Rd., St. Louis, MO 63026  
Railway Specialties Corp., 2979 State Rd., Bristol, PA 19007

Baier Hatch Co., 16901 Wood-Red Rd., Woodinville, WA 98072

## HEAT EXCHANGERS

Alfa-Laval Separation Inc., 955 Meams Rd., Warminster, PA 18974  
Computube (Britannia Heat Transfer) Ltd., 15-20  
Coleshill Industrial Estate, Station Road, Coleshill,  
Birmingham B46 1JP UK

Crane Heatex, 17 Grandview Ave., West Orange, NJ 07052  
Tranter, Inc., 1054 Claussen Rd., Augusta, GA 30907-3215  
Tranter, Inc., (Texas Div.) P.O. Box 2289, Wichita Falls, TX 76307

## HEAT TRANSFER FLUID

Paratherm Corp., 1050 Colwell Rd., Conshoocken, PA 19428

## HOISTS

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

## HOIST RINGS

Jergens, Inc. 15700 S. Waterloo Rd., Cleveland OH 44110

## HORNS/WHISTLES

Airchime Mfg. Co. Ltd., 5478 267th Street, Gloucester Industrial  
Estate, Langley, B.C. Canada V4W 3S8

Kahlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241  
Kockum Sonics, Inc., 933 Industry Rd., Ste105, Kenner, LA 70062

## HYDRAULICS

Dayton T. Brown, 555 Church St., Bohemia, NY 11716  
Engine Monitor, Inc., 179 Hickory Ave. Harahan, LA 70123  
Hamilton Jet, P.O. Box 709, Christchurch, NEW ZEALAND

Offshore Inland, Inc. 3521 Brookdale Drive, Mobile, AL 36618  
Ultra Hydraulics Limited, Cheltenham Road East, Gloucester,  
GL2 9QN, ENGLAND

Demaree Inflatable Boats, 410 Oak St., Friendsville, MD 21531  
Ocean Technical Services Inc., 1140 Peters Rd., Harvey, LA  
70058-1705

## HYDRAULIC TRAINING

Consolidated Fluid Power, 155 Wnght Ave., Dartmouth, N.S.  
Canada B4C 3M1

## INCINERATORS

Therm-Tec Inc., PO Box 1105, Tualatin, OR 97062

## INFLATABLES

Ocean Technical Services Inc., 1140 Peters Rd., Harvey, LA  
70058-1705

Zodiac of North America, P.O. Box 400, Thompson Creek  
Road, Stevensville, Sparks, MD 21152

## INSULATION

Blohm & Voss Light Insulation, Bartels & Laders GmbH  
Norderelbstrasse 1S, 20457 Hamburg GERMANY

Panel Specialists, Inc./Thermax, 3115 Range Rd., Temple,  
TX 76501

Insulations, Inc., 1101 Edwards Ave., Harahan, LA 70123  
Mascoat Products, 3500 E. T.C. Jester, Suite N, Houston, TX  
77018

Pacor, Inc., P.O. Box 107, Westville, NJ 08093x  
Superior Energies Inc., P.O. Drawer 386, Groves TX 77619

## INTEGRATED MONITORING SYSTEMS

Dalstar, Unit 100, 18 Gostick Place, N. Vancouver, BC  
Canada

## INTERIORS

Bauer Interiors, 733 Dante St., New Orleans, LA 70118  
Custom Ship Interiors, Inc., P.O. Box 882, Solomons, MD 20688

Hopeman Brothers, P.O. Box 820, 435 Essex Ave  
Waynesboro, VA 22980

Insulations, Inc., Rt. 5, 12360 Leisure Rd. Baton Rouge, LA 70807  
Jamestown Metal Marine Sales, Inc., 4710 NW Second  
Ave Boca Raton, FL 33431

Manne Accommodations, Inc., 3830 Williamsburg Park Blvd.,  
Building 7, Jacksonville FL 32257

Maritime Services Corp., 3457 Guignard Drive, Hood River, OR  
97031

## ISOLATORS

Lo-Rez Vibration Control, Ltd., 186 West 8th Ave., Vancouver,  
B.C. V5Y 1N2

## JET BOWTHRUSTERS

Thrustmaster of Texas, P.O. Box 840189, Houston, TX 77084-0189

JOINER - Watertight Door—Paneling—Ceiling System—Decking  
All Alpha Int'l, Inc., P.O. Box 498985, Cincinnati, OH 45249

Branton Inc., 1101 Edwards Ave., Jefferson, LA 70181  
CustomShip Interiors, Inc. P.O. Box 882, Solomons MD 20688

Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980  
Insulations, Inc., 1101 Edwards Ave., Harahan LA 70123

Manne Accommodations, Inc., 3830 Williamsburg Park Blvd.,  
Building 7, Jacksonville FL 32257

Maritime Services Corp., 3457 Guignard Drive, Hood River, OR  
97031

Panel Specialists, Inc./Thermax, 3115 Range Rd., Temple,  
TX 76501

Walz & Krenzer, 91 Willenbrock Rd., Unit B4, Oxford CT 06478

## KEEL COOLERS

R.W. Fernstrom & Co., 1716 Eleventh Ave., Menominee, MI  
49858

Kahlenberg Bros Co., P.O. Box 358, Two Rivers, WI 54241  
The Walter Machine Co., Inc., 84-98 Cambridge Avenue,  
Jersey City, NJ 07307

## LASER ALIGNMENT

Boland Industrial & Consulting Services, P.O.B. 91360, Mobile, AL  
36691

## LAUNDRY EQUIPMENT

Richard Galley Supply, PO Drawer 4035, Houma, LA 70361

## LIFEBOATS/RAFTS

American Eagle Mfg., Inc., 780 Peare Jensen Way, LaConner,  
WA 98257

DBC Manne Safety Systems, 12351 Bndgeport Rd., Richmond,  
B.C. CANADA V6V1J4

Norsale AS, P.O. Box 115, N-4818 Faervik, Norway  
Edgewater Machine & Fabricators, P.O. Box 358, Edgewater, FL  
32132-0358

Viking Life Saving Equipment, 1625 N. Miami Ave., Miami, FL 33136  
Willard Manne Co., Inc., 1250 N. Grove St., Anaheim, CA  
92806

Zodiac of North America, P.O. Box 400, Stevensville, MD 21666

## LIFEBOATS REPAIR

Nautical Safety Products, P.O. Box 590462, Houston, TX 77259  
Willem Pot, P.O.B. 29102, 3001 GC Rotterdam

## LIFESAING EQUIPMENT

MGI International, 119-225 West 1st St., North Vancouver  
B.C. CANADA

Steam Manufacturing, P.O. Box 1498, St. Cloud, MN 56302  
Viking Life Saving Equipment, 1625 N. Miami Ave., Miami, FL 33136

Zodiac of North America, PO Box 400, Thompson Creek Rd.,  
Stevensville, Sparks, MD 21152

## LIFT EQUIPMENT

JLG Industries, Inc., JLG Drive, McConnellsburg, PA 17233-9533

## LIFT EQUIPMENT TESTING

Water Weights Inc., 5139 Brooks St., Suite E, Montclair, CA 91763

LIGHTING SYSTEMS / EQUIPMENT  
ACR Electronics, Inc., 5757 Ravenswood Rd., Ft. Lauderdale,  
FL 33310-5247

Archway Manne, 4501 Swan Ave., St. Louis, MO 63110  
Golten Marine, 160 Van Brunt St., Brooklyn, NY 11231

Kockum Sonics, Inc., 933 Industry Rd., Ste105, Kenner, LA 70062  
Pauluhn Electric Mfg. Co., Inc. P.O. Box 53, Pearlman, TX 77588

Francis Searchlights/Slam Supply Co., 4415 6th N.W.  
Seattle, WA 98107

LIQUID OVERFILL PROTECTION SYSTEMS  
King Engineering Corp., P.O. Box 1228, Ann Arbor, MI 48106

## LOGISTICS

VL Logistics Consultants, Inc., 3420 Bienville Blvd., Ocean  
Sprngs, MS 39564

MACHINERY MAINTENANCE, REPAIR,  
OVERHAUL, AND TESTING

Goltens - New York Corp., 160 Van Brunt St., Brooklyn,  
NY 11231

Mackay Communications, 2721 Discovery Dr., Raleigh, N.C  
27604-1851

Maritime Power 200 Henderson St., Jersey City, NJ 07302

MANAGEMENT SYSTEMS & SERVICE  
Hornblower Marine, Pier 3 Ferroat Santa Rosa, San Francisco, CA  
94111

PCS Marine, 174 Colonnade Road S., Nepean, Ontario K2E715

MARINE ACCOMMODATIONS  
Marine Accommodations, Inc., 3830 Williamsburg Park Blvd.,  
Building 7, Jacksonville FL 32257

MARINE BUILDING SUPPLIES  
King Wholesale Supply, Co., Inc., P.O. Box 4002, New Orleans,  
LA 70178-4002

## MARINE CEILINGS

Hydro-Aluminium, Vik Verk, N-5880 VIK / SOGN, Norway  
Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA  
70807

Panel Specialists, Inc., 3115 Range Rd., Temple, TX 76501

MARINE CONSULTANTS  
PCS Marine, 174 Colonnade Road S., Nepean, Ontario K2E715  
Hornblower Marine, Pier 3 Ferryboat Santa Rosa, San Francisco,  
CA 94111

Boland Industrial & Consulting Services, P.O.B. 91360, Mobile, AL  
36691

Schoellhorn-Albrecht, 575-105 Rudder Rd., St. Louis, MO 63026

## MARINE DECKING & FLOORING

Hopeman Brothers, Inc., P.O. Box 820, Waynesboro, VA 22980  
E.H. O'Neil, 1405 Chippendale Rd., Lutherville, MD 21093

Insulations, Inc., Rt. 5, 12360 Leisure Road, Baton Rouge, LA 70807  
Polyspec Corp., P.O. Box 1600, Sapulpa, OK 74067

Flexible Decking, 2708 N. Australian Ave. Ste. 9, West Palm  
Beach, FL 33407

Lonseal Inc., 928 E. 238th St., Carson, CA 90742  
SlipNot Safety Flooring, 2545 Beaufait St., Detroit, MI 48207

## MARINE DRILLING & BLASTING

Marine Drilling & Blasting, Inc., P.O. Box 18098, Beverly Hills,  
CA 90209-4098

## MARINE ELECTRONICS

Frank L. Beier Radio, 2001 Ridgelaque Dr., Metairie, LA 70001  
Autronica USA, 234 Industrial Pkwy, Northvale, NJ 07647

Kockum Sonics, Inc., 933 Industry Rd., Ste105, Kenner, LA 70062  
Saab Manne Electronics AB, Box 13045, 402 51 Goleborg,  
SWEDEN

Marine Electric & Process Control, 3931 Leary Way NW, Seattle  
WA 98107

ACR Electronics, Inc., 5757 Ravenswood Rd., P.O. Box 5247  
Ft. Lauderdale, FL 33310-5247

Raytheon Manne Co., 676 Island Pond Rd., Manchester,  
NH 03109

Scandinavian Micro Systems, P.O. Box 155, N-1411,  
Kolbotn, NORWAY

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

Marine Electronics Solutions, Inc., 1522 Crabapple Cove  
Jacksonville, FL 32225

## MARINE EQUIPMENT

Plastic Pilings Inc., 1485 South Willow Ave., Rialto, CA 92376  
Waterman Supply, P.O. Box 596, Wilmington, CA 90748

Maritime Power Corp., 200 Henderson Str., Jersey City, NJ 07302  
Bohnet & Associates, 1150 Rule Rochelle, Sidel, VA 70458

Schoellhorn-Albrecht, 575-105 Rudder Rd., St. Louis, MO 63026  
Scardana Americas Bkg., 502 Empire St., Montreal,  
Greenfield Park, J4V1V7, Canada

MacGregor, 20 Chapin Road, Unit 1012, NJ 07058  
McElroy Machine, P.O. Box 4454, Biloxi, MS 39535-4454

Rasmussen Equipment Co., Inc., 8727 5th Ave. S.,  
PO Box 81206, Seattle WA 98108

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

Commercial & Marine Products, 3924 Forest Dr., #11, Columbia,  
SC 29204

## MARINE FINANCING

Debis Financial Services, 201 Merrit 7, Suite 70, Norwalk, CT 06856

## MARINE INSTRUMENTATION

Autronica USA, 209 Industrial Pkwy, Northvale, NJ 07647

## MARINE MEDICAL SUPPLIES

Fleet Medical Resources, P.O. Box 52048, New Orleans,  
LA 70152-0408

## MARINE SHAFTING

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

## MARINE SERVICES & EQUIPMENT

Kyodo U.S.A., E. 80. Rte. 4, The Atrium, Paramus, NJ 07644

## MARINE SURPLUS SALES

Defense Reutilization & Marketing Service, 2163 Airways  
Bld., Memphis, TN 38114

## MARITIME TRAINING & SCHOOLS

Calhoun MEBEA Engineering School, 27050 St. Michaels Road,  
Easton, MD 21601

GSI Marine, 4016 Strawberry Road, Suite B, Pasadena, TX  
77504-3050

Marine Safety Int'l., Manne Terminal Laguardia Airport, NY  
11371

## MECHANICAL PUMP SEALS

John Crane Marine, USA, 1536 Barclay Blvd, Bufalio Grove,  
IL 60089

## METERS

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

## MONITORS

Intercolor Corp., 2150 Boggs Dr., Deluth GA 30096  
Barco Int'l., 2558 Mountain Industrial Blvd., Tucker, GA 30084

## MONITORING SYSTEMS

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



ABB TURBOCHARGER, INC., 1460 Livingston Avenue, N. Brunswick, NJ 08902  
Aquamaster-Raum Ltd., Box 220, SF-26101, Rauma, FINLAND  
Kamewa America Inc., 106 Park Place, Suite 200, Covington, LA 70433, USA  
Kamewa AB, Box 1010, S-68129, Kristinehamn, Sweden  
Kamewa Finland Oh, "Aquamaster", Box 220, FIN-26101 Rauma, Finland  
Kawasaki Heavy Industries, Ltd., Tokyo Head Office, World Trade Center Bldg., 4-1 Hamamatsu-cho 2-chame, Minato-ku, Tokyo 105-6116 Japan  
Brunvoll A/S, P.O. Box 370, N-6401, Molde, Norway  
ZF Marine 3131 SW 42nd St., Ft. Lauderdale, FL 33112  
Caterpillar, 100 NE Adams Street, Peoria, IL 61629-2320  
Centa Corp., 8185 Cass Ave., Darien, IL 60561  
The Falk Corp., PO Box 492, Milwaukee, WI 53201-0492  
Fincantieri, Diesel Engines Div—GMT, Bagnoli della Rosandra 334, Trieste, ITALY  
GEC ALSTHOM Diesels Inc., 10801 Kempwood Dr. Ste 1, Houston, TX 77043-1412  
Gottens Worldwide, 160 Vanbrunt St., Brooklyn, NY 11231  
Harbormaster Marine Inc., 31777 Industrial Rd., Livonia, MI 48150  
Harrington Metal, 6720 124th Ave., Lenville, MI 49408  
Kahlenberg Bros. Co., P.O. Box 358, Two Rivers, WI 54241  
Krapp Mak., 7555 Danbro Crescent, Mississauga, Ontario, CANADA L5N 6P9  
LIPS B.V., P.O. Box 6, 5150 BB Drunen, The Netherlands  
Lohmann & Stolterfoht, P.O. Box 1860, D-58408 Witten, Germany  
Lo-Rep Vibration Control, 186 West 8th Ave., Vancouver, BC CANADA, V5Y 1N2  
Mapeco Inc., 91 Willenbrock Rd., Unit B4, Oxford CT 06478  
Markisches Werk, P.O. Box 1442, D-5884 Halver GERMANY  
MAN B&W Diesel, 17 State St., New York, NY 10004  
MAN B&W Diesel A/S, Ostervej 2, DK-4960 Holeby, DENMARK  
MAN B&W Diesel A/S, Alpha Diesel, Niels Juels Vej 15, DK-9900 Frederikshavn, DENMARK  
MAN B&W Diesel GmbH, Stadtbachstrasse 1, D-86153 Augsburg 1 GERMANY  
Orion Corp., 1111 Cedar Creek Rd., Grafton, WI 53024  
Oy Wartsila Ab, Vasa and Abo Divisions, P.O. Box 244, SF65100 Vasa, FINLAND  
Propulsion Systems Inc., 601 N.E. 26 Crt., Pompano Beach, FL 33064  
Karl Senner Inc., 25 W Third, Kenner LA 70062  
Schottel-Werft, Mainzer Strasse 99, D-56322 Spay/Rhein, GERMANY  
Schottel Inc., 500 Industrial Blvd., Sugar Land, TX 77478  
Siemens Electric Ltd., 1180 Courtney Park Rd., Mississauga, ONTARIO  
Stewart & Stevenson, 1400 Destrehan, P.O. Box 8, Harvey LA 70059-0008  
Thrustmaster of Texas, P.O. Box 840189-12227 IFM 529, Houston, TX 77284-0189  
Ulstein Bergen Diesel A/S, P.O. Box 924, N-5002, Bergen, NORWAY  
Ultra Hydraulics Limited, Cheltenham Road East, Gloucester, GL2 9QN, ENGLAND  
Voith Hydro Marine Technology, P.O.B. 1125, D89509, Heidenheim, GERMANY  
Marine Propulsion Inc., 1505 Corbin Ave., Hammond, LA 70403  
The Cincinnati Gear Company, 5657 Wooster Pike, Cincinnati, OH 45227  
Renold Hi-Tec, 512 W. Crescentville Rd., Cincinnati, OH 45246  
U.S. Rep: Voith Schneider America Inc., 121 Susquehanna Ave., Great Neck, NY 11021  
Schottel-Werft, Josef Becker GmbH & Co. KG, Mainzer Strasse 99, D-56322 Spay/Germany  
HRP, 432 Realty Dr., Dretna, LA 70056

**PUMP—Repair—Drives**  
Alfa-Tec, Inc., 4027 21st Ave. West, Seattle, WA 98199  
Scardana Americas Bkg, 502 Empire St., Greedfield Park, J4V1V7 Canada  
Advanced Environmental Systems, 2 Sutton Rd., Webster, MA 01570  
Gilkes, Inc., PO Box 628, Seabrook, TX 77586  
Hamworthy Marine, Inc., 1129 Hospital Dr. Ste 3C, Stockbridge, GA 30281  
Marine Electric & Process Control, 3931 Leary Way NW, Seattle, WA 98102  
Kraissl Co., 299 Williams Avenue, Hackensack, NJ 07061  
Vita Motivator, 566 Parker St., Newark, NJ 07104

**PURIFIERS**  
American Ship Repair, 1011 38th St., Brooklyn, NY 11219

**RADARS—ARPS**  
Furuno USA, Inc., 271 Harbor Way, S. San Francisco, CA 94080  
Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017

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

**REFRIGERATION COMPRESSOR REPLACEMENT PARTS**  
CMP Corporation, P.O. Box 15199, Oklahoma City, OK 73155  
Bailey Refrigeration, 2323 Randolph Ave., Avenel, NJ 07001

**RH PROPULSION**  
Boli Filter, 15 International Dr., East Granby, Ct., 06206  
Gottens, 160 Van Brunt St., Brooklyn, NY 11231

**RIGID INFLATABLE BOATS**  
Willard Marine, Inc., 1250 N. Grove St., Anaheim, CA 92806  
Zodiac of N. America Thompson Creek, P.O. Box 400, Stevesville, MD 21666

**ROPE—Manila—Nylon—Hawsers—Fibers**  
Phillystran, Inc., 151 Commerce Drive, Montgomeryville, PA 18936-9628  
Puget Sound Rope, 1012 Second St., Anacortes, WA 98221  
Pelican Rope Works, 4001 W.Carnegie Way, Santa Ana, CA 92704  
Rasmussen Equipment Co., P.O. Box 81206, Seattle, WA 98108  
Yale Cordage, 26 Morin St., Riddeford, Maine 04005

**ROTATING EQUIPMENT**  
FCS, Inc., 22 Main Street, Centerbrook, CT 06409

**ROV/LIGHTS/CAMERAS**  
Deep Sea Systems Intl, P.O. Box 622, Falmouth, MA 02541

**RUBBER FLOORING**  
Tufflex, Inc., 4521 West Crest Ave., Tampa, FL 33614

**RUDDER BEARINGS & BUSHES**  
Duramax Manne, 16025 Johnson St., P.O. Box 67, Middlefield, OH 44062-0067  
Thordon Bearings, Inc., 3225 Mainway, Burlington, Ontario Canada L7M 1A6

**SAFETY PRODUCTS**  
Brookdale International, 1-8755 Ash St., Vancouver BC, V6P6T3  
Viking Life Saving, 1625 N. Miami Ave., Miami, FL 33136  
Welin Lambie N.A., Inc., 18 Ridgeway Drive, Bridgewater Nova Scotia, Canada B4V 3V8  
New England Manne & Industrial, 200 Spaulding Tumpike, Portsmouth, NH 03801  
Nautical Safety Products, P.O. Box 590462, Houston, TX 77259

**SANITATION DEVICE—Pollution Control**

Alfa-Tec, Inc., 4027 21st Ave. West, Seattle, WA 98199  
Byrne, Rice & Turner, Inc., 1172 Camp Street, New Orleans, LA 70130  
Exceltech International Corp., 1110 Industrial Blvd., Sugarland, TX 77478  
Envirovac Inc., 1260 Turret Dr., Rockford, IL 61111  
Fast Systems, 3240 North Broadway, St. Louis, MO 63147  
AlfaTec, Inc., 4027 21st Ave. West, Seattle, WA 98199  
Microphor, 452 E. Hill Rd., Willits, CA 95490  
Owens Mfg., Hwy 92, Youngsville, LA 70592

**SATCOM**  
Motorola, 1500 Dundee Dr., Arlington Heights, IL

**SATELLITE COMMUNICATIONS**  
Boatrac, Inc., 10675 Sorrento Valley Rd., Ste. 200, San Diego, CA 92121-1609  
Furuno USA, Inc., 271 Harbor Way, S. San Francisco, CA 94080  
KVH Industries, Inc., 110 Enterprise Center, Middleton, R.I. 02842-5268  
ICG Satellite Communications, 8400 NW 52nd St., Suite 110, Miami, FL 33166  
Mackay Communications, 2721 Discovery Dr., Raleigh, N.C. 27604-1851  
Indium N.A., 8449 S.River Pkwy, Tempe, AZ 85284  
Norwegian Telecom, Postboks 6701 St. Olavs Plass, N-0130, Oslo, Norway  
PTT Telecom, Station 12, P.O. Box 30150-2500 JD The Hague, NETHERLANDS  
Radio-Holland USA, 8943 Gulf Freeway, Houston, TX 77017  
Raytheon Marine Co., 676 Island Pond Rd., Manchester, NH 03109  
Singapore Telecom, 15 Hill Street, Telephone House, 2nd Storey, Singapore 0617  
Telstra Mobile Satellite & Radio Services, 79 St. Hilliers Rd., Auburn NSW 2144, AUSTRALIA  
Magellan Systems, 960 Overland Court, San Dimas, CA 91773  
Stratos, 150 Metcalfe St., Suite 1900, Ottawa, Ontario K2P 1P1 Canada  
Comsat Maritime Services, 6560 Rock Spring Drive, Bethesda, MD 20817-1146  
Station 12, P.O. Box 30150, NL-2500 JD Den Haag, Netherlands

**SCARIFIERS**  
Desmond-Stephan, P.O.B. 30, Urbana, OH 43078

**SEALS**  
John Crane Marine, USA, 1536 Barclay Blvd, Buffalo Grove, IL 60089  
Blohm & Voss Industries GmbH, P.O. B. 112289, D-2042 Hamburg 1, GERMANY  
U.S.A. Reps: Simplex-Turmar Inc., P.O. B. 675, Tonawanda, NY 14151  
Duramax Marine, 16025 Johnson St., Middlefield, OH 44062  
Circle Seal Controls Inc., 2301 Wardlow Circle, P.O. Box 3300 Corona, CA  
Orkot Inc., 2535 Prairie Rd., Unit D, Eugene, OR 97402  
Orkot Composites Ltd., Bradmarsh Business Park, Rotherham S60 1BX

**SEATING**  
H.O. Bostrom Co. Inc., Progues Ave., Waukeshee, WI

**SEPARATORS—LUBE OIL/FUEL OIL**  
SOTECO, 278-16010 Ceranesi Genova, Italy  
American Ship Repair, 1011 38th St., Brooklyn, NY 11219

**SHAFT HORSEPOWER MEASURING SYSTEM**  
FCS, Inc., 22 Main Street, Centerbrook, CT 06409  
Instruments Computers & Controls, 78 Londonderry Tpk., Suite E 12 Hooksett, NH 03106

**SHAFT SEALS**  
Duramax Marine, 16025 Johnson St., Middlefield, OH 44062  
Blohm & Voss Industries GmbH, P.O. B. 112289, D-2042 Hamburg 1, GERMANY  
U.S.A. Reps: Simplex-Turmar Inc., P.O. B. 675, Tonawanda, NY 14151

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

**SHIP LIFTS**  
Synchrolift Inc., Two Datan Center, 9130 S. Dadeland Blvd., Miami, FL 33156-7850

**SHIPBOARD MANAGEMENT SYSTEMS**  
Spar Associates, 927 West St., Annapolis, MD 21401

**SHIPBOARD TESTING**  
Dayton T. Brown, 555 Church St., Bohemia, NY 11716

**SHIPBUILDING—Repairs, Maintenance, Drydocking**  
American Eagle Mfg., 780 Pearle Jensen Way, La Conner WA 98257  
Amfels, Inc., P.O. Box 3107, Brownsville, TX 78523  
Astilleros Espanoles, S.A. Ochandiano, 14-16 28023 El Plantio SPAIN  
Atlantic Marine, Inc., P.O. Box 3202, Mobile, AL 36652  
Atlantic Marine, Inc., 8500 Heckscher Dr., Jacksonville, FL 32226  
Avondale Industries Inc., P.O. Box 50280, New Orleans LA 70150  
Bender Shipbuilding & Repair, P.O. Box 42, Mobile AL 36601  
Bisso Manne Co., P.O. Box 4113, New Orleans, LA 70178  
Blount Marine, 461 Water St., Warren, R.I. 02885  
Bollinger Lockport & Larose, P.O. Box 250, Lockport, LA 70374  
Caridoc, P.O. Box 1147 Port Of Spain, Trinidad, W.I.  
Chns-Marine AB, P.O. Box 9025, S-2000 39, Malmö, SWEDEN  
Conrad Industres, 1501 Front Street, P.O. Box 790, Morgan City, LA 70381  
Eastern Shipbuilding Group, 2200 Nelson Street, Panama City, FL 32402  
Fincantieri SpA Cantieri Navali Italiani, Via Cipro 11, 16129 Genoa ITALY  
Gottens - New York Corp., 160 Van Brunt St., Brooklyn, NY 11231  
Gulf Coast Fabrication, Inc., P.O. Box 539, Lakeshore, MS 39558  
Hitotsubashi Chiyoda-Ku Tokyo 100 Japan  
In-Place Machining Co., Inc., 929 North Buffum Street, Milwaukee, WI 53212-3793  
Jacksonville Shipyards, 750 E. Bay St., Jacksonville, FL 32202  
Jeffboat, Inc., P.O. Box 610, Jeffersonville IN 47130  
Kawasaki Heavy Industries, Ltd., Tokyo Head Office, World Trade Center Bldg., 4-1 Hamamatsu-cho 2-chame, Minato-ku, Tokyo 105-6116 Japan

Leevac Shipyards, P.O. Box 1190, HWY 90 East, Jennings, LA 70546  
Lindenau GmbH, Skagerakruler 10, Postfach 9093 D-2300 Kiel, Friedrichsort GERMANY  
Mariso USA, Inc., 100 Davidson Ave., Somerset, NJ 08873  
Motor-Service AB, Box 2115, 144 04 Ronninge, SWEDEN  
Munson Hammerhead, 780 Pearle Jensen Way, La Conner WA 98257  
Newport News, 4101 Washington Ave., Newport News, VA 23607  
Peterson Builders, Inc., 101 Pennsylvania Ave., Sturgeon Bay, WI 54235-0650  
Thomas Marine, 37 Bransford Street, Patchogue, NY 11772  
Samsung Heavy Ind., 25, 1-ka, Bongrae-dong, Chung-ku, Seoul, Korea  
SeaArk, P.O. Box 210, Monticello RI 01655

SeaFab, P.O. Box 1651, 4111 Cedar St. Pascagoula, MS 39567  
Service Marine Industries, P.O. Box 3606, Morgan City LA 70381  
Southwest Marine, Foot of Sampson Street, P.O. Box 13008, San Diego, CA 92170  
Skipperliner Shipyards, 621 Park Plaza Dr. Dept 21, LaCrosse WI 54601  
Steiner Shipyards, Inc., P.O. Box 742, Bayou la Batre, AL 36509  
Swath Ocean, 979 G Street, Chula Vista, CA 92011  
Talleres Navales del Golfo, Islotte San Juan de Ulva S/N, 91800 Veracruz, Ver. Mexico  
Washburn Doughty, P.O. Box 296, E. Boothbay, ME 04544  
Westport Shipyards, P.O. Box 308, Westport, WA 98595  
Willard Manne, inc., 1250 N. Grove St., Anaheim, CA 92806  
Zodiac of North America Inc., Thompson Creek Rd., P.O. Box 400, Stevesville, MD21666  
Friede Goldman, 525 E. Capitol Street, Suite 402, Jackson, MS 39201  
Tampa Bay Shipbuilding, 1130 McClosky Blvd., Tampa, FL 33605  
Ocean Technical Services Inc., 1140 Peters Rd., Harvey, LA 70058-1705  
FirstWave/Newpark Shipbuilding, 2102 Broadway, Houston TX 77102  
Cascade General Inc., 5555 N. Channel Ave., Bld. 71, Portland, OR 97217  
Ocean Technical Services, 1140 Peters Rd., Harvey, LA 70058

**SHIPYARD / CABLES**  
American Shipyards Corp., One Washington St., POB 570, Newport, R.I. 02840-0943  
Anixter Wire & Cable, 2617 Edinboro Ave., Metairie, LA 70002

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

**SHOWERS AND FAUCETS**  
Scanmix Corp., 230 Bartlett St., Lewiston, ME 04240

**SHRINKWRAP CONTAINMENT**  
Hipp Plastic Wrap, 4070 Kearny Mesa Rd., San Diego, CA 92111

**SILENCERS**  
Silex Inc., 7850 Tranmere Dr., Mississauga, Ontario L5S1L9  
Applegate Industrial, 1440 Government Street, Baton Rouge, LA 70802  
Beard Industries Inc., P.O. Box 31115, Shreveport LA 71130  
Nelson Division, Exhaust & Filtration Systems, Hwy. 51 West, P.O. Box 428, Stoughton, WI 53589  
Houston Marine Training Services, 5728 Jefferson Hwy, New Orleans, LA 70123  
Applied High Technology, 4 Place Dee Commerce Brossard, Suite 201 Quebec Canada J4W-3B3  
Marine Safety, Marine Air Terminal, Laguardia Airport, NY 11371

**SIMULATION TRAINING**  
Ship Analytics, Inc., Rte. 2 & 184, N. Stonington, CT 06358  
Marine Safety, Marine Air Terminal, Laguardia Airport, NY 11371

**SKILLED LABORERS**  
Ameriforce, 650 E. 27th St., Jacksonville, FL 32206

**SOFTWARE**  
Autoshop Systems, Suite 312-611 Alexander St. Vancouver, BC V6A1E1

**SOUND CONTROL**  
Soundcoat, One Burt Dr., Deer Park, NY 11729

**STAIRMASTER SAFETY TREADS**  
SlipNots Safety Flooring, 2545 Beaufait St., Detroit, MI 48207  
Wooster Products, Inc., 1000 Spruce Street, Wooster, OH 44691

**STEERING GEAR/STEERING SYSTEMS**  
A. Van der Velden B.V. Rotterdam, P.O.B. 2061, 2930 AB Krimpen a/d Lek, NETHERLANDS  
Cunningham Marine Hydraulics Co., 201 Harrison St., Hoboken, NJ 07030  
Engine Monitor, Inc., 179 Hickory Ave., Harahan, LA 70123  
Summer Equipment, 24 West 4th Ave., Vancouver, B.C. V5Y1G3  
Kobei Manufacturing Co., Ltd., 8238-129 street, Surrey, B.C. V3W0A6  
Jastram Engineering, 485 Mountain Hwy N., North Vancouver, B.C. CANADA V7J 2L3

**STERN TUBE BEARINGS/ BUSHES**  
IHC Lagersmit, P.O. B. 5 - 2960 AA Kinderdijk - HOLLAND  
Blohm & Voss Industries GmbH, P.O. B. 112289, D-2042 Hamburg 1, GERMANY  
U.S.A. Reps: Simplex-Turmar Inc., P.O. B. 675, Tonawanda, NY 14151  
Railko Ltd., Loudwater, High Wycombe, Bucks  
Hamshire ENGLAND HP109QV  
Duramax Marine, 16025 Johnson St., P.O. Box 67, Middlefield, OH 44062-0067  
Thordon Bearings, Inc., 3225 Mainway, Burlington, Ontario Canada L7M 1A6  
Vesco Plastics, P.O. Box 40647, Cleveland 2022, South Africa

**STERN TUBE SEALS**  
Blohm & Voss Industries GmbH, P.O. B. 112289, D-2042 Hamburg 1, GERMANY  
U.S.A. Reps: Simplex-Turmar Inc., P.O. B. 675, Tonawanda, NY 14151  
Duramax Marine, 16025 Johnson St., P.O. Box 67, Middlefield, OH 44062-0067  
IHC Lagersmit, P.O. B. 5 - 2960 AA Kinderdijk - HOLLAND  
John Crane Manne USA, 1536 Barclay Blvd., Buffalo Grove, IL 60089

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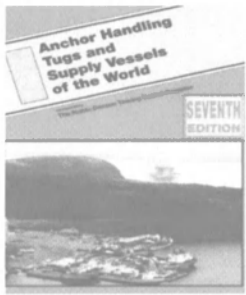
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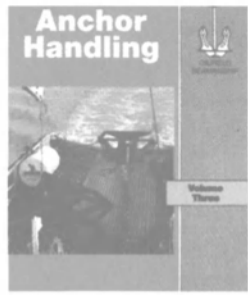
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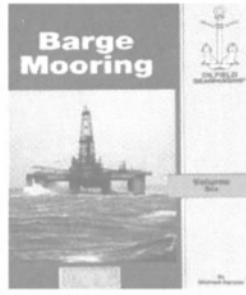
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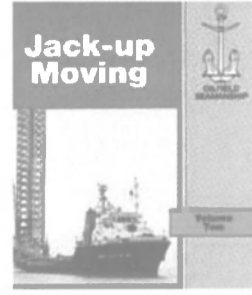
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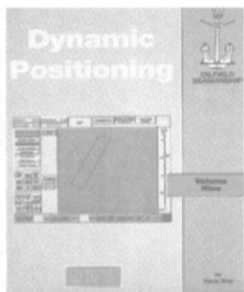
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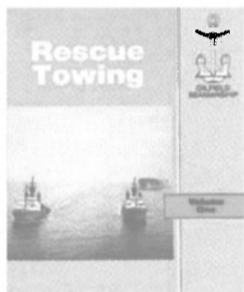
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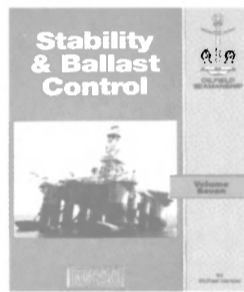
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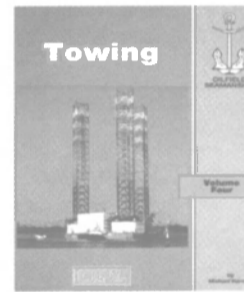
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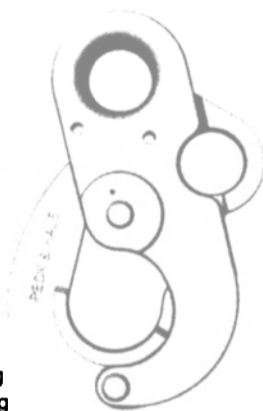
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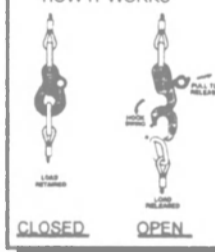
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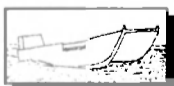
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